APPLICATION FOR SITE CERTIFICATION AGREEMENT
NO. 2013-01
VOLUME 1

TESORO SAVAGE
Vancouver Energy Distribution Terminal

Tesoro Savage
Vancouver Energy Distribution Terminal

Submitted to
State of Washington
Energy Facility Siting Evaluation Council
Olympia, Washington

29 August 2013

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Mr. Stephen Posner
Interim EFSEC Manager
Washington State Energy Facility Site Evaluation Council
1300 S. Evergreen Park Drive SW
Olympia WA 98504-3172

Dear Mr. Posner:

Tesoro Savage Petroleum Terminal LLC (the Applicant) seeks a Site Certificate Agreement (SCA) to construct and operate the Tesoro Savage Vancouver Energy Distribution Terminal (the Facility) at the Port of Vancouver USA (the Port). At full build-out, the Facility will be able to receive up to an average of 360,000 barrels of crude oil per day by rail, store the oil on site, and load the oil onto marine vessels primarily for delivery to refineries located on the United States' West Coast (the USWC). The Facility will be entirely located within the Port of Vancouver. Washington State Energy Facility Site Evaluation Council (EFSEC) jurisdiction will begin at the time of delivery from the class 1 railroads transfering control of the unit trains to the Applicant at the project site boundary within the Port, and will end upon the return of the trains back to the receiving class 1 railroads from the Applicant.

The Facility's principal purpose is to provide North American crude oil to U.S. refineries to offset or replace declining Alaska North Slope crude reserves, California crude production, and more expensive foreign crude-oil imports. The crude oil handled by and shipped through the Facility will largely offset other sources of crude oil used by U.S. refineries that choose to source a portion of their crude through the Facility. In accordance with current federal law, crude oil extracted in the United States generally cannot be exported to foreign countries.

The Facility will increase the stability of energy supply for the USWC and advance the nation's movement toward energy independence. In accordance with the Merchant Marine Act of 1920 (better known as the "Jones Act") the oil, transported by water between United States ports, will only be carried in United States-flag ships, constructed in the United States, and owned and crewed by United States citizens and permanent residents. The economic impact directly and indirectly spurred by the Facility, through investment in energy exploration and development, manufacturing, and construction and facility operation jobs, will be significant. This benefit will extend both into the State of Washington, and to other areas of the United States. The applicant's analysis of the economic benefit the Facility shows that once in operation, the Facility will bring to the State of Washington and the City of Vancouver significant revenue through taxation of the Facility's capital improvements and annual property taxes. In total, construction of the terminal is expected to generate $9.76 million in non-recurring taxes, of which Washington State can be expected to receive $7.67 million and local government $2.09 million. Based on the value of the project, the annual property tax generated is estimated to be $1,552,951 in current (2013) dollars.

Facility Location: Oil production in portions of the United States and Canada is growing, resulting in the increased availability of crude oil to serve the U.S. domestic market. Transportation of the crude oil from the well sites, primarily in North Dakota, Montana, Colorado, Wyoming, and Texas, is limited by the lack of pipelines to the USWC. At the same time, production in California and Alaska is declining. USWC refineries have typically relied upon the receipt of crude oil from domestic and foreign sources for supply of refinery operations by marine vessels. These new sources of supply from Midwest North America will primarily replace crude oil from the Alaska North Slope and foreign sources all currently transported to the USWC by marine vessel.

The Port is an economic engine for the entire southwest Washington region. The Port has been in continuous operation since 1912, and provides quality jobs, international trade connections, a strong industrial land base and economic stability by generating revenue for our state and local services. Through the Columbia River and efficient national rail and road systems, the Port connects Southwest Washington to the national and global marketplace, a key factor in bringing community prosperity to Clark County. The Port represents the closest deep water port to the primary sources of the increased domestic production of petroleum, and is already served by the Class 1 railroads providing service from the source regions, thereby already providing the necessary transportation infrastructure for transportation of crude oil to United States West Coast refineries.

Among the many advantages of the Facility's location, are the Port's position on the Columbia River, a water way that has a comprehensively-developed infrastructure to serve large vessels of the type that will berth at the Facility. In addition, the Port has an existing, mature spill contingency planning system that is already serving the transportation of crude oil, petroleum products, and other materials. The Port's spill contingency planning, and other workplace and environmental plans and protocols, have been developed collaboratively with existing tenants and operators, local, state and federal agencies, and the environmental community.

The Port has existing deep draft berths to accommodate current and future marine vessels. It has programmatically developed the necessary rail infrastructure to handle the proposed rail traffic resulting from this and other projects, fully planned and constructed for unit train configuration; and it has the associated requisite marine infrastructure. The project is proposed in a fully developed industrial location, and will not require the filling of wetlands or the removal of long established native vegetation. With the exception of project-specific rail loops, no additional rail lines need to be constructed to service the facility's operations. The project will be constructed in an area that consists of modern fill, and direct impacts to cultural resources will be minimal to non-existent.

The Site; Heavy Industrial Zoning and Compatible Use: Much of the project will be located in northern portion of the Port that is the former site of aluminum processing facilities. The site has an intensive history of industrial use, dating back to 1940, when Alcoa first developed the site for aluminum smelting operations, and continuing until the early 2000's. When aluminum processing activities on the property ended, the Port completed the purchase of the Evergreen and Alcoa properties, with the exception of the on-site water tower and the dock structure in the Columbia River. All structures of the defunct aluminum processing plants have since been removed. The City of Vancouver's zoning allows all operations of the Facility within this heavy industrial-zoned area.

Transportation of Domestic Crude Oil: The Applicant proposes to bring unit trains of up to 120 cars with crude oil from Midwest North America into the Port, transported via Class I railroad lines. The oil will be received at the Port's existing West Vancouver Freight Access ("WVFA") rail facility, a facility built to accommodate unit trains for transport of materials on the Columbia River. The WVFA facility is considered by the State of Washington to be an "essential public facility," which has been subject to extensive prior land use planning and prior environmental review. The WVFA facility needs little enhancement to accommodate the project, and is operated and controlled by a Washington governmental agency (the Port), subject to rigorous environmental and safety standards.

Up to four unit trains per day (on average) will be delivered onto the Port's rail network for staging on the rail loops serving the Facility. Trains will arrive at Terminal 5 from the east and travel to the rail unloading building located on the north side of the Terminal 5 rail loop. The design of the rail access will accommodate complete unit trains, eliminating the need to break trains into smaller segments during the unloading process. Transportation of products via unit trains is more efficient and economical, while also

avoiding the potential safety risks inherent in breaking down and dispatching train cars within the transportation chain.

To support the staging of unit trains, two new rail lines will be added to the Terminal 5 rail infrastructure. These additional lines will form two complete loops inside the existing rail loops and will begin and end near the Gateway Avenue grade separation. The rail car unloading facility is composed of a covered structure through which the trains will be pulled and safely secured where the unloading will occur. Once delivered by rail, the crude oil will be transferred by pipeline into storage tanks, and then delivered by pipelines to the dock facility, where it will be loaded onto vessels.

The Marine Terminal: Impacts to critical areas have been avoided, to a large degree, by locating the Facility at an existing marine terminal, thus avoiding many of the direct environmental effects that could be expected from a new in-water facility. To obtain an optimal mooring configuration and to meet current, rigorous structural and seismic standards, a number of modifications will be required at the existing dock. These modifications include the removal of existing mooring dolphins and existing over-water solid and grated walkways, and the installation of new mooring dolphins and piles, along with new grated walkways. To mitigate the impacts of this in-water work the Applicant proposes to remove a substantial number of existing shallow water pilings, with a net benefit for the surrounding river habitat.

Air Quality and Greenhouse Gas: The applicant has designed the project to meet all applicable air emission standards, and is proposing measures to reduce emissions including handling crude oil in a fully closed system throughout the Facility to reduce VOC emissions, firing Facility boilers with pipeline quality natural gas, and installing a floating roof in each of the storage tanks. The applicant has conducted a comprehensive Best Available Control Technology (BACT) analysis, and has selected the most feasible, effective and economically viable emission controls.

Safety: The safe construction and operation of the Facility is the Applicant's top priority. Due to its location within the Port of Vancouver, the Facility is proposed to be within an area of the Port of Vancouver that has managed the transportation of many materials, including petroleum products, for many years. The Port and its tenants have long-established protocols, plans and operational strategies to respond to safety concerns, including a collaborative system to avoid and respond in the unlikely event of unintentional releases.

The Facility will receive crude oil in FRA and DOT approved rail tank cars. Beginning October 2011, all new DOT rail tank cars in crude oil service have included additional protective safety measures as compared to previous versions of these cars, including increased head and shell thickness, the use of normalized steel, incorporation of a ½-inch thick head shield, and a more robust housing or rollover skid for protection of top fittings. The Facility will incorporate industry standard secondary containment systems and will implement operating procedures, monitoring and inspection systems to ensure all unloading, storage, conveyance and vessel loading activities are conducted with the highest standard of care. These systems will include the capability to collect unintentional releases from the unloading operation with a capacity to secure the contents of an entire railcar; a fully lined storage area containment berm designed to capture 110% of the contents of the largest tank, in addition to storm water resulting from a 24-hour 100-year storm event, fully welded transfer pipelines, and a vessel loading facility designed to meet USCG spill prevention and safety regulations. The Facility will not handle Group 5 persistent oils which sink in water in the event of unintentional releases. The Facility will have at hand state-of-the-art booming and skimming equipment to recover materials should there be any releases to water; the Facility will also participate in the comprehensive spill contingency plan cooperatively implemented by local, state and federal regulators and marine shipping related industries. The Facility will incorporate a comprehensive fire protection system, and will work cooperative with local emergency responders to ensure they are equipped and trained to respond if needed.

Public and Agency Outreach: The Applicant has conferred with local, state and federal agencies, and will continue to do so in order to achieve compliance with all applicable regulatory standards. We have engaged in formal pre-application consultation with the City of Vancouver, and we anticipate fully meeting all applicable local land use, environmental and safety standards. We have conferred extensively with EFSEC staff, and anticipate achieving compliance with all regulatory standards, including assurance of safe, environmentally sound operation of the Facility. Consultation with local Native American Tribes is proceeding, and will continue throughout the EFSEC process. We have participated in public forums conducted by the Port, and have met individually with members of the local neighborhood association, along with local business and civic organizations. We will continue this outreach and consultation, including an upcoming public meeting to be held in Vancouver.

The Applicant requests that EFSEC make a determination under WAC 463-47- 060(1) that an Environmental Impact Statement is required.

We are looking forward to working with EFSEC on this site certification permit. We feel that our core values of safety and environmental stewardship will be a positive contribution to the area. Further, we feel the project fits within historical use for this site and the Facility will bring many jobs to the area. We are committed to educating the community and interested parties about our proposed project through the EFSEC process. Please feel free to contact me at 801-944-6600 should you have any questions.

Sincerely,

Kelly J. Flint

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List of Acronyms, Initialisms, and Abbreviations

A

ACP	Area contingency plans
af/year	Acre feet per year
ANT	Advance notice of oil transfer
AQRV	Air quality related values
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
ASC	Application for Site Certification
ASIL	Acceptable source impact level
AST	Aboveground storage tank
ASTM	American Standards Testing and Materials

B

BACT	Best available control technology
BAPE	Biological area of potential effect
bbl	Barrel
BE	Biological evaluation
BGS	Below ground surface
BMP	Best management practice
BNSF	Burlington Northern/Santa Fe
BO	Biological opinion
BOD	Biological oxygen demand
BPA	Bonneville Power Administration
BTU	British thermal unit

C

CAA	Clean Air Act
CAO	Critical areas ordinance
CARA	Critical aquifer recharge area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFHMP	Comprehensive flood hazard management plan
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CH4	Methane
City	City of Vancouver
CO	Carbon monoxide
CO_2	Carbon dioxide
COD	Chemical oxygen demand
COS	Carbonyl sulfide
County	Clark County
CPU	Clark Public Utilities
CRBG	Columbia River Basalt Group
CRWMB	Columbia River Wetland Mitigation Bank
CSGP	Construction stormwater general permit

CSZ	Cascadia subduction zone
CWA	Clean Water Act

D

DAHP	Department of Archaeology and Historic Preservation
dB	Decibel
dBA	A-weighted decibel
dB_{RMS}	Decibel mean root square
DI	Ductile iron
DLN	Dry lox-NOx
DNR	Washington State Department of Natural Resources
DO	Dissolved oxygen
DPS	Distinct population segment

E

EA	Environmental assessment
Ecology	Washington State Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental impact statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionarily significant unit

F

FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood insurance rate maps
FONSI	Finding of no significant impact
FOSC	Federal On-Scene Coordinator
FRA	Federal Railroad Administration
FRP	Facility response plan
FTA	Federal Transit Administration
FT-MSL	Feet above mean sea level
FWPCA	Federal Water Pollution Control Act

G

GCP	Good combustion practice
GEP	Good engineering practice
GHG	Greenhouse gas
GMA	Growth Management Act
gpd	Gallons per day
gpm	Gallons per minute

GRP	Geographic response plans
GWI	Groundwater under the influence of surface water

H

H	Hydrogen
HAP	Hazardous air pollutant
H_2S	Hydrogen sulfide
HGM	Hydrogeomorphic
HMR	Hazardous materials regulations
HPA	Hydraulic Project Approval
Hz	Hertz; unit of frequency

I

I-5	Interstate 5
IBC	International Building Code
IFC	International Fire Code
IH	Heavy industrial
IHA	Incidental Harassment Authorization
IMC	International Mechanical Code

J

JARPA	Joint Aquatic Resources Permit Application

K

kW	Kilowatt
kWh	Kilowatt hour

L

LEPC	Local Emergency Planning Committee
LEPGP	Large electric power generating plant
LGIA	Large generator interconnect agreement
LGIP	Large generator interconnection procedure
LOA	Letter of authorization

M

MACT	Maximum achievable control technology
MGD	Million gallons per day
MMBTU	Million British thermal units
MMPA	Marine Mammal Protection Act
MOTEMS	Marine Oil Terminals Engineering and Maintenance Standards
MOU	Memorandum of understanding
MSDS	Material safety data sheets
MSL	Mean sea level
MTCA	Model Toxics Control Act
MTR	Marine transportation-related
MTSA	Maritime Transportation Security Act

MVCU	marine vapor combustion unit

N

NAAQS	National ambient air quality standards
NAVD	North American Vertical Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of construction
NOI	Notice of intent
NO_X	Oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRT	National Response Team
NSR	New source review
NSPS	New source performance standards
NWACP	Northwest Area Contingency Plan
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
NWS	National Weather Service

O

OC	Organic carbon
OHWM	Ordinary high water mark
OPA 90	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety and Health Act
OSRA	Oil Spill Recovery Act

P

PAH	Polynuclear aromatic hydrocarbon
PATON	Private Aids to Navigation
PCB	Polychlorinated biphenyls
PFC	Perfluorocarbons
PGA	Peak ground acceleration
PHS	Priority Habitat and Species
PIC	Person in charge
PM	Particulate matter
PM_{10}	Particulate matter of 10 microns in diameter or less
$PM_{2.5}$	Particulate matter of 2.5 microns in diameter or less
Port	Port of Vancouver
POTW	Publicly owned treatment works
PPB	Parts per billion

PPM	Parts per million
PPE	Personal protective equipment
PPMVD	Parts per million (dry basis)
PPMW	Parts per million by weight
PSD	Prevention of significant deterioration
PSIA	Pounds per square inch absolute
PUD	Public utility district

Q

QA	Quality assurance
QC	Quality control

R

RACT	Reasonably achievable control technology
RCP	Regional contingency plan
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RDA	Resource damage assessment
RM	River mile
ROW	Right of way
RRT	Regional Response Team

S

SARA	Superfund Amendments and Reauthorization Act
SDP	Shoreline Development Permit
SEPA	State Environmental Policy Act
SF6	Sulfur hexafluoride
SGCN	Species of greatest conservation need
SLM	Sound level measurements
SMA	Shoreline Management Act
SMP	Shoreline Management Program
SO_2	Sulfur dioxide
SOPEP	Shipboard oil pollution emergency plans
SOSC	State On-Scene Coordinator
SPCC	Spill prevention control and countermeasures
SQER	Small quantity emission rate
SR	State Route
Superfund	Common name for CERCLA
SWCAA	Southwest Clean Air Agency
SWDA	Solid Waste Disposal Act
SWPPP	Stormwater pollution prevention plan

T

TAP	Toxic air pollutant
TDS	Total dissolved solids
TPD	Tons per day

TSS	Total suspended solids
TSVEDT	Tesoro Savage Vancouver Energy Distribution Terminal

U

UP	Union Pacific Railroad
UPC	Uniform Plumbing Code
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator

V

VFD	Vancouver Fire Department
VMC	Vancouver Municipal Code
VOC	Volatile organic compounds

W

WAAQS	Washington ambient air quality standards
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WISHA	Washington Industrial Safety and Health Act
WNHP	Washington Natural Heritage Program
WOFM	Washington Office of Financial Management
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol
WUTC	Washington Utilities and Transportation Commission
WVFA	West Vancouver Freight Access
WWTP	Westside Wastewater Treatment Plant

Tesoro Savage
Vancouver Energy Distribution Terminal

PART 1 GENERAL

Section 1.1 – Description of Applicant

Washington Administrative Code (WAC) 463-60-015
General – Description of applicant.

The applicant shall provide an appropriate description of the applicant's organization and affiliations for this proposal.

(Statutory Authority: Revised Code of Washington [RCW] 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-015, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-015, filed 10/8/81. Formerly WAC 463-42-170.)

Section 1.1 Description of Applicant

1.1.1 Applicant

This Application for a Site Certification Agreement (Application) is made for the construction and operation of the Tesoro Savage Vancouver Energy Distribution Terminal (Facility). The Applicant is Tesoro Savage Petroleum Terminal LLC (Applicant).

This Application was professionally prepared by BergerABAM and subconsultants under the direction of Tesoro Savage Petroleum Terminal LLC. These parties believe that the Application is substantially complete and meets the requirements established in Chapter 80.50 of the Revised Code of Washington (RCW) and Washington Administrative Code (WAC) Title 463.

1.1.2 Tesoro Savage Petroleum Terminal LLC

Tesoro Savage Petroleum Terminal LLC is a Delaware limited liability company that is qualified to do business in the state of Washington. Its members are Savage Companies and Tesoro Refining & Marketing Company LLC.

1.1.3 Tesoro Corporation

Tesoro Corporation, a Fortune 150 company, is an independent refiner and marketer of petroleum products. Tesoro, through its subsidiaries, operates seven refineries in the western United States with a combined capacity of approximately 675,000 barrels per day. Tesoro's retail marketing system includes over 1,400 branded retail stations, of which 595 are company-operated under the Tesoro, Shell, and USA Gasoline brands.

Tesoro's seven refineries are located in Anacortes, Washington; Martinez, California; Wilmington, California; Mandan, North Dakota; Kenai, Alaska; Kapolei, Hawaii; and Salt Lake City, Utah.

Tesoro Refining and Marketing Company LLC is a subsidiary of Tesoro Corporation.

1.1.4 Savage Companies

Savage Companies is a privately held operator that provides supply chain management solutions tailored to meet the needs of customers across a variety of industries including electric power generation, coal production, oil refining, and the railroad, chemical, and other industries. The operations of Savage Companies include over 170 locations and more than 2,600 employees in North America and internationally, handling more than 100 million tons of materials annually.

Section 1.2 – Designation of Agent

WAC 463-60-025
General – Designation of agent.

The applicant shall designate an agent to receive communications on behalf of the applicant.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-025, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-025, filed 10/8/81. Formerly WAC 463-42-090.)

Section 1.2 Designation of Agent

All official communication concerning this Application during the application review process should be directed to Kelly Flint, Sr., Vice President and Corporate Counsel for Savage Companies. This person is the designated agent for the project. Mr. Flint's contact information is as follows.

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David Corpron and Tim McMahan will serve as secondary contacts. Their contact information is as follows.

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Section 1.3 – Assurances

WAC 463-60-075
General – Assurances.

The application shall set forth insurance, bonding or other arrangements proposed in order to mitigate for damage or loss to the physical or human environment caused by project construction, operation, abandonment, termination, or when operations cease at the completion of a project's life. The application shall describe the applicant's commitment to the requirements of chapter 463-72 WAC, Site restoration and preservation.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-075, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 87-05-017 (Order 87-1), § 463-42-075, filed 2/11/87. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. WSR 81-21-006 (Order 81-5), § 463-42-075, filed 10/8/81.)

Section 1.3 Assurances

Tesoro Savage Petroleum Terminal LLC will establish and maintain, or cause to be established and maintained, several forms of insurance during the construction and operation of the Tesoro Savage Vancouver Energy Distribution Terminal. Insurance will be maintained as required by law and customary business practice and to satisfy third-party participants and lenders.

1.3.1 Commercial General Liability Insurance

The construction contractor and subcontractors will be required to carry commercial general liability insurance, including products and completed operations in amounts sufficient to respond to liability and property damage risks arising during the construction and startup phases of the Tesoro Savage Vancouver Energy Distribution Terminal.

Tesoro Savage Petroleum Terminal LLC will obtain and maintain in full force and effect, commercial general liability insurance against claims for liability and property damage arising out of the use and occupancy of the premises.

Tesoro Savage Petroleum Terminal LLC will purchase insurance policies to cover liabilities arising from environmental, casualty, and other major incidents. The insurance industry views facilities such as the Tesoro Savage Vancouver Energy Distribution Terminal as low to moderate risk. Therefore, high coverage limits are available at reasonable cost.

1.3.2 Automobile Insurance

The construction contractor and subcontractors will be required to carry automobile liability insurance covering all owned, leased, and non-owned and hired automobiles used during the construction and startup phases of the Tesoro Savage Vancouver Energy Distribution Terminal.

Tesoro Savage Petroleum Terminal LLC will obtain and maintain in full force and effect automobile liability insurance covering owned, non-owned, and hired automobiles.

1.3.3 Property Insurance

Tesoro Savage Petroleum Terminal LLC will obtain and maintain at all times during the term of construction and operation of the Facility, physical damage insurance on the buildings and improvements that are to be erected on the premises on an “all risk” basis, including coverage against damage or loss caused by earth movement and flood in an amount sufficient to cover any expected losses or damages.

Upon completion of project design, insurance underwriters will evaluate the design and estimate maximum potential damage due to failure. In some cases, design changes may be implemented to reduce the damages. Insurance would then be purchased to cover the maximum expected damages.

1.3.4 Worker’s Compensation and Washington Stop Gap Liability

Tesoro Savage Petroleum Terminal LLC will fully comply with the statutory requirements for worker’s compensation as required with respect to any employees performing work in the subject property and premises. Tesoro Savage Petroleum Terminal LLC also will insure its exposure with employer’s liability insurance (Washington Stop Gap Liability).

Tesoro Savage Petroleum Terminal LLC will require that any construction contractor and all subcontractors working on the project comply similarly with the statutory requirements for worker's compensation with respect to their employees performing work on the subject property and premises. Tesoro Savage Petroleum Terminal LLC also will require employer's liability insurance for exposure under Washington Stop Gap Liability.

1.3.5 Environmental Impairment

1.3.5.1 Environmental Impairment Liability Insurance

Tesoro Savage Petroleum Terminal LLC and its operator(s) will be responsible, as required by law, for acts of environmental impairment related to the ownership and operation of the Tesoro Savage Vancouver Energy Distribution Terminal. Such losses may, in some circumstances, be covered by general liability insurance, which Tesoro Savage Petroleum Terminal LLC and the construction contractor will carry. In addition, Tesoro Savage Petroleum Terminal LLC and/or its contracted operator(s) will obtain environmental impairment liability insurance to the extent such coverage is available on a commercially viable basis. This insurance will cover the acts of Tesoro Savage Petroleum Terminal LLC and its operator(s) at the site, consistent with or in excess of then-prevailing industry standards for such insurance in the petroleum transportation industry. Commercial viability will be determined by reference to the norm of the industry.

1.3.5.2 Financial Responsibility under Revised Code of Washington (RCW 88.40.025)

RCW 88.40 defines and prescribes financial responsibility requirements for facilities that store, handle, or transfer oil (including crude oil) in bulk near the navigable waters of the state. The Facility will be subject to these requirements because the structures, equipment, and devices comprising the Facility will be located near the navigable waters of the state and will transfer oil in bulk to vessels having an oil-carrying capacity of over 250 barrels which will transport the oil in bulk. In accordance with RCW 88.40.025, the Applicant will demonstrate financial responsibility in an amount determined by the Washington State Energy Facility Site Evaluation Council (EFSEC) as necessary to compensate the state and affected local governments for damages that might occur during a reasonable worst-case spill of oil from the Facility into the navigable waters of the state. The amount of financial responsibility will consider such matters as the amount of oil that could be spilled into the navigable waters from the Facility, the cost of cleaning up the spilled oil, the frequency of operations at the Facility, the damages that could result from the spill, and the commercial availability and affordability of financial responsibility. In accordance with RCW 88.40 030, the financial responsibility required may be established by any one of, or a combination of, the following methods acceptable to EFSEC: (1) evidence of insurance; (2) surety bonds; (3) qualification as a self-insurer; or (4) other evidence of financial responsibility.

1.3.6 Site Closure Bond (Ch. 463-72 WAC)

No set-aside from operating funds is anticipated for site abandonment, but Tesoro Savage Petroleum Terminal LLC will obtain a site closure bond in an amount to be determined by EFSEC upon approval of an initial site restoration plan. To the extent site facilities are not otherwise removed, recycled, or salvaged, Tesoro Savage Petroleum Terminal LLC will pursue a modification of the Site Certification Agreement to reflect equipment that is removed or maintained on the site for future use.

Section 1.4 – Mitigation Measures

WAC 463-60-085
General – Mitigation measures.

(1) Mitigation measures summary. The application shall summarize the impacts to each element of the natural or built environment and the means to be utilized to minimize or mitigate possible adverse impacts during construction, operation, and decommissioning of the proposal, all associated facilities, and any alternatives being brought forward.

(2) Fair treatment. The application shall describe how the proposal's design and mitigation measures ensure that no group of people, including any racial, ethnic, or socioeconomic group, bear a disproportionate share of the environmental or socioeconomic impacts resulting from the construction and operation of the proposed facility.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-085, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-085, filed 10/8/81.)

Section 1.4 Mitigation Measures

1.4.1 Mitigation Measures

This section summarizes the mitigation measures identified in this application.

1.4.1.1 Section 2.6, Water Supply System

Mitigation measures for the water supply consist of the monetary contribution required by the City for water connections and new services. Service connection fees, system development charges, and industrial water use billing will be paid to the City. Connection fees and system development charges paid at the time of building permit application and application for water service is compensatory mitigation paid to the City for the long-term impacts to water rights, source development, system storage, and distribution piping.

The connection to the City water supply system will be made consistent with standard specifications adopted by the City. Backflow devices will be tested yearly per State requirements.

1.4.1.2 Section 2.18, Protection from Natural Hazards

Earthquake Hazards

All structures and pipelines constructed for the Facility will be designed and built in accordance with the applicable design provisions and seismic requirements of the 2012 International Building Code, the American Society of Civil Engineers 7-10 standard (Minimum Design Loads for Buildings and Other Structures), America Concrete Institute 318-11 standard (Building Code Requirements for Structural Concrete), American Institute of Steel Construction Manual section 360-10 (Specifications for Structural Steel Buildings) and Seismic Design Manual 2nd Ed., and the American Forest & Paper Association 2008 Special Design Provisions for Wind and Seismic. Tables 2.18-1 and 2.18-2 list the seismic design criteria for the Facility.

Table 2.18-1. 2012 IBC Seismic Design Criteria Storage (Area 300)

Parameter	Value	2012 IBC/ASCE 7-10 Reference
0.2 Second Spectral Acceleration, S_s	0.94	ASCE 7-10 Figure 22-1
1.0 Second Spectral Acceleration, S_1	0.41	ASCE 7-10 Figure 22-2
MCE_G Peak Ground Acceleration, PGA (Site Class B)	0.41	ASCE 7-10 Figure 22-7
Soil Profile Site Class	N/A*	ASCE 7-10 Section 20.3.1 and 21.3*
0.2 Second MCE_R Spectral Acceleration, S_{Ms}	1.04	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
1.0 Second MCE_R Spectral Acceleration, S_{M1}	0.8	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
MCE_G Peak Ground Acceleration, PGA	0.37	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
0.2 Second Design Spectral Acceleration, S_{Ds}	0.69	2012 IBC Equation 16-39

Parameter	Value	2012 IBC/ASCE 7-10 Reference
1.0 Second Design Spectral Acceleration, S_{D1}	0.53	2012 IBC Equation 16-40
Seismic Design Category	D	2012 IBC Table 11.6-1 (& -2)

*A liquefaction hazard was identified for the Storage area (Area 300). In accordance with ASCE 7-10 Section 11.4.7 and 20.3, a site-specific ground motion analysis was completed for seismic design at the Storage area to develop the criteria listed above.

Table 2.18-2. 2012 IBC Seismic Design Criteria Unloading and Office (Areas 200 and 600)

Parameter	Value	2012 IBC / ASCE 7-10 Reference
0.2-Second Spectral Acceleration, S_s	0.94	ASCE 7-10 Figure 22-1
1.0-Second Spectral Acceleration, S_1	0.41	ASCE 7-10 Figure 22-2
MCE_G Peak Ground Acceleration, PGA (Site Class B)	0.41	ASCE 7-10 Figure 22-7
Soil Profile Site Class	E*	ASCE 7-10 Section 20.3.1*
Site Coefficient, F_a	0.97	2012 IBC Table 1613.3.3(1)
Site Coefficient, F_v	2.40	2012 IBC Table 1613.3.3(2)
Site Coefficient, F_{PGA}	0.9	ASCE 7-10 Table 11.8-1
0.2 Second MCE_R Spectral Acceleration, S_{Ms}	0.91	2012 IBC Equation 11.4-1
1.0 Second MCE_R Spectral Acceleration, S_{M1}	0.98	2012 IBC Equation 11.4-2
MCE_G Peak Ground Acceleration, PGA	0.37	2012 IBC Equation 11.8-1
0.2 Second Design Spectral Acceleration, S_{Ds}	0.61	2012 IBC Equation 11.4-3
1.0 Second Design Spectral Acceleration, S_{D1}	0.66	2012 IBC Equation 11.4-4
Seismic Design Category	D	2012 IBC Table 11.6-1 (& -2)

*A liquefaction hazard was identified for the Unloading and Office area (Areas 200 and 600). Based on ASCE 7-10 Section 20.3.1, Site Class E was used to develop seismic design criteria for the structures in Areas 200 and 600 assuming the fundamental period of the structures in Areas 200 and 600 is less than 0.5 second.

Ground improvement methods and foundations designs will be selected to meet the criteria identified above. Liquefaction mitigation solutions for the risk of liquefaction may include improving the condition of soils beneath the site to reduce the risk of liquefaction during an earthquake or the use of deep foundations to provide foundation support below the liquefiable soils. Ground improvement methods, such as stone columns, jet grouting, or deep soils mixing, could be designed to reduce the seismic lateral load on the dock foundations and improve seismic slope stability. Ground improvement methods and/or the use of deep foundations, such as driven piles or drilled shafts, could be designed to reduce the risk of seismic settlement impacting the proposed structures. Specific mitigation measures will be identified based on the results of the project-specific geotechnical investigation.

Volcanic Eruptions

Should an eruption occur and pose a risk to the Facility the operations will be shut down until conditions allow for safe operation.

Flooding

The Facility will be designed to comply with the City's Frequently Flooded Areas provisions of the Shoreline Management Program. These provisions require that buildings and structures located in the floodplain be elevated to at least one foot above the flood elevation or be floodproofed, be anchored to prevent floatation, collapse or lateral movement and incorporate other design elements to insure safety during a flood event.

Dock operations will comply with the USCG- and Ecology-approved Terminal Operating Limits as published in the Terminal Operations Manual

Storms

The Facility will be designed to comply with the International Building Code requirements to reduce the risk of damage to structures from storm events. For the City of Vancouver the basic wind speed design is 105 miles per hour for a 3-second gust. All buildings are required to be designed by a structural engineer. Compliance with the code provisions will be determined during the building permits administered by EFSEC.

During severe weather events, the Facility operator will monitor the conditions at the site and if conditions result in risks to employees or facilities, will cease operations until safe to resume.

1.4.1.3 Section 3.1, Earth

Seismicity

Mitigation measures for seismicity are identified under section 2.18.

Soils

A qualified geotechnical engineer will monitor the fill placement during construction and conduct appropriate field tests to verify the proper compaction of the fill soils. Appropriate types of ground improvements will be selected during final design based on the specified performance criteria for the elements of the Facility.

Erosion/Enlargement of Land Area (Accretion)

The potential erosion impacts will be minimized through the use of erosion and sedimentation control measures outlined in the preliminary SWPPP (Appendix C). Construction activities will be sequenced and controlled to limit erosion. Clearing, excavation, and grading will be limited to the areas necessary to construct the Facility. Interim surface protection measures, including dust control, straw matting, and erosion control blankets, will be required to prevent erosion. Final surface restoration will be completed within 14 days of an area's final disturbance. All construction practices will emphasize erosion control over sediment control. Temporary cutoff swales and ditches will be installed to route stormwater to the appropriate sediment trap and discharge location.

1.4.1.4 Section 3.2, Air

The Applicant has designed the project to meet all applicable air emission standards, and is proposing measures to reduce emissions including handling crude oil in a fully closed system throughout the Facility to reduce VOC emissions, firing Facility boilers with pipeline quality natural gas, using ultra low sulfur diesel fuel for the emergency fire pumps, and installing a

floating roof in each of the storage tanks. The Applicant has conducted a comprehensive Best Available Control Technology (BACT) analysis, and has selected the most feasible, effective, and economically viable emission controls (see section 5.1, Attachment 1).

- To control dust during construction, water would be applied as necessary. Site access and travel roads would be graveled or paved.
- Emissions from vehicle use will be minimized by adherence to a set of best practices including limited idling time.

1.4.1.5 Section 3.3, Water

Surface Water

A permanent stormwater management system will be constructed to serve the Facility; this system will be constructed during site grading and construction of the Facility surface and subsurface elements. The system is designed in accordance with VMC 14.024, 14.025, and 14.026 and Ecology's administrative codes for stormwater and spill prevention, preparedness, and response and the Ecology stormwater manual.

Surface water quality will be protected through the use of the BMPs designed and constructed in accordance with Ecology's stormwater manual. BMPs, such as oil water separators, hydrodynamic separation, particulate filters, biofiltration swales, and permanent vegetation, will be used in the permanent Facility installation to protect surface water. Once all permanent stormwater BMPs are in place, operations-related impacts to surface water will be minimized through the use of operational BMPs and operational procedures.

Containment rail drip pans, pumps, and containment sump tanks will be provided for the rail unloading area; the capacity of the containment systems will be sufficient to contain and store the entire volume of a single rail car staged within the unloading building. The tank farm will be surrounded by a containment berm 6 feet high with a full impervious liner capable of containing 110 percent of the largest tank and a 100-year 24-hour rainfall event. Spill, containment will be designed to meet or exceed API, EPA, NFPA, City and other applicable requirements. Tank monitoring, inspection, and testing will be in accordance with API 653, the industry standard for the inspection of aboveground petroleum storage tanks.

The transmission pipeline will be constructed of welded steel pipe, designed specifically for oil conveyance. Safety measures built into the design include thickened pipe walls, pipeline expansion for thermal and/or seismic movement, pressure and temperature sensors, and emergency shutoff valves. The pipeline will largely be constructed aboveground, on concrete foundations, with the exception of a few portions that will be constructed underground to accommodate existing rail and road crossings. The above-grade portion of the pipeline will be subject to visual inspection for leaks and double-walled pipe will be used underground with monitoring to detect any leaks.

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. All facility piping systems and storage tanks will be hydrostatically tested prior to being placed into operation.

Runoff/Absorption

The designed BMPs are expected to minimize erosion and control sedimentation. Construction-phase erosion and sedimentation control BMPs, as described in sections 2.11 and 5.3 of this Application, will be implemented to mitigate the impacts of soil disturbance. Permanent operations-phase runoff control and water quality treatment will be implemented to mitigate any impacts from the project.

Floodplains

Structures located within the 100-year floodplain will be elevated so that the floor is at least 1 foot above the base flood elevation. They will also be anchored to resistant movement and designed with utilities and other connections that are designed to withstand flood events consistent with the requirements of VMC 20.740.120 Frequently Flooded Areas. Where the pipeline route lies in the floodplain, the pipeline will be elevated aboveground.

Groundwater Resources

Some foundations and utility and pipeline excavations for the project may require dewatering of the excavations during the construction process. Groundwater that is pumped out of the excavations will be stored on site in mobile water tanks and analyzed and managed in accordance with local, state and federal regulations prior to reuse, infiltration or disposal. Disposal will be conducted in accordance with the stormwater permit issued for the project. If dewatering wells are necessary, well points used for construction dewatering will be completed in accordance with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells. If groundwater extracted for construction dewatering is directed to the City's sanitary sewer it will be disposed in accordance with VMC 14.12 Discharge of Industrial Wastes to the Industrial Wastewater Pretreatment Facility.

Public Water Supplies

The Facility will purchase its water supply from the City. The development of new water sources or wells is not required for this Facility. Relative to the existing system demands and total City water rights, the project is not anticipated to have an effect upon the private water supplies in the vicinity of the project site. Mitigation for the use of and impact on the public water system includes payment of system development charges, connection fees, and utility rates. These fees and rates are to support capital and operating expenses of the water system.

1.4.1.6 Section 3.4, Habitat, Vegetation, Fish, and Wildlife

Habitat and Vegetation

The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to terrestrial habitats and vegetation.

Direct Habitat Modification

The proposed project has been designed to avoid and/or minimize impacts to biological resources to the greatest extent possible. The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a

developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided.

Ground disturbance and vegetation removal will be limited to the amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained. The project will install urban landscaping including trees and shrubs in Area 200 and 300. These landscaped areas will provide wildlife habitat typical in an urban environment.

Operational Water Quality Impacts
Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Fish

The dock configuration has been designed to require the minimum amount of new piling and overwater structure necessary, and has reduced the quantity of direct permanent habitat impacts to the amount practicable. The proposed removal of piles and existing overwater coverage has further minimized the extent of impacts.

Temporary Water Quality Impacts
The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

All pile installation and removal activities will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between October 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

Temporary Construction Noise
The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect fish and fish habitat quality. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish.

In addition, all pile installation will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established

to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between October 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to fish and fish habitat through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. The Facility will discharge to existing Columbia River outfalls through existing manmade conveyance pipelines, and is categorically exempt from the flow control provisions of the Ecology stormwater manual. According to Appendix I-E of the manual, the Columbia River is listed as a flow control-exempt water body.

As described in section 2.11 of this application, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. Stormwater from the storage area will be treated to enhanced water quality standards and discharged to the existing Terminal 4 stormwater system. Stormwater from areas 200, 500, and 600 and the rail improvements will be treated to basic levels and discharged to the existing Terminal 5 stormwater system. Stormwater from Area 400 will be treated to an enhanced treatment level and conveyed to existing infiltration swales located immediately north of the site. Stormwater treatment facilities will be sized to accommodate the 6-month, 24-hour event as estimated using Ecology's hydrology model. The proposed stormwater treatment will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and will ensure that fish and fish habitat are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed BMPs and safety and security measures will minimize the risk of impacts to biological resources.

Shipping

The proposed project will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full buildout. Increased marine traffic on the Columbia River has the potential to result in impacts to fish and fish habitat through increases in the potential for fish stranding, increased potential for shoreline erosion associated with propeller wash, and through the introduction of exotic species.

The risk of adverse effects to fish and fish habitat from increased bank erosion is low. Streambanks at the site are well armored, and not particularly sensitive to erosion, so these habitats likely will not be affected. Elsewhere in the project vicinity and shipping prism, there

are unarmored banks, which could potentially be susceptible to increased erosion from prop wash. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to fish and fish habitat.

Operators of commercial vessels have a significant economic interest in maintaining underwater body hull platings in a clean condition. Fouled bottom platings result in increased fuel costs and can reduce the vessel's maximum transit speed. To prevent fouling and higher costs, operators preserve and maintain the hulls of their ships aggressively (FERC 2008), greatly reducing the risk of the transport of exotic species. Additionally, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar guidelines. These practices include requirements for ballast water exchange, to rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin, to regularly remove fouling organisms from the hull, piping, and tanks, and to dispose of any removed substances in accordance with local, state, and federal regulations.

Wildlife

Direct Habitat Modification

The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided. Ground disturbance and vegetation removal will be limited to the minimum amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

High volume flow events can result in hydraulic forces that re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed project is not anticipated to measurably exceed levels caused by these normal periodic increases. Additionally, the volume of flow will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

In addition, all pile installation and removal will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River.

Temporary Construction Noise

Terrestrial noise levels will be elevated within the vicinity of the project site during impact pile driving, but these sound levels will be expected to decrease to ambient conditions within a

relatively short distance from the immediate project site. Most of the terrestrial habitat within approximately 3,200 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the immediate project site are of limited quality and quantity. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity.

The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect marine mammals and the quality of their habitat. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will result the intensity of underwater noise, and will limit the potential for adverse effects to marine mammals.

In addition, all pile installation and removal will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River. Marine mammals are not expected to occur within the action area during the in-water work period.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to wildlife through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. However, the terrestrial habitats at the site provide very little functional habitat, and the impact minimization measures and BMPs that will be implemented will effectively reduce the potential for any adverse effects to the quantity or quality of terrestrial habitats as a result of operation.

As described in section 2.11, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. The proposed stormwater treatment will provide treatment to a level that is consistent with existing treatment at the site, which will ensure that aquatic wildlife are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of crude oil should an accident occur. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic release of crude oil is very low, and the proposed BMPs and safety and security measures will manage the risk of impacts to biological resources effectively.

1.4.1.7 Section 3.5, Wetlands

Wetlands

Direct Habitat Effects
The upland facilities associated with the project have been located on developed portions of an existing industrial site, and no wetlands are present at the site. By siting the project in a developed location, the project has completely avoided the need to directly impact wetlands.

Temporary Water Quality Impacts
The project has the potential to result in temporary water quality impacts during construction which could affect off-site wetlands within the project vicinity or shipping prism. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Operational Water Quality Impacts
The proposed project has the potential to result in indirect effects to wetlands through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters.

As described in section 2.11, the project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity. The proposed stormwater treatment will provide treatment to a level that is consistent with existing treatment at the site, which will ensure that off-site wetlands are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed BMPs and safety and security measures will manage the risk of impacts to wetlands effectively.

Shipping
The proposed project will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits at full buildout. Marine traffic on the Columbia River has the potential to result in impacts to wetlands through the introduction of exotic species Wetlands are unlikely to be affected by an increase in shipping traffic. Wetland resources within the project vicinity or downstream in the shipping prism could be impacted through the

introduction of exotic species, but there is little risk of ships increasing the transport of exotic species.

1.4.1.8 Section 3.6, Energy and Natural Resources

Conservation and Renewable Resources

During construction, conservation measures will include construction waste recycling when possible and the coordination of carpooling between construction workers to reduce vehicle emissions.

Operations BMPs will be developed that include conservation measures for nonrenewable resources such as water, fuel, and electricity. These BMPs may include the following conservation measures when cost effective:

- Installation of high efficiency electrical fixtures, appliances, and light bulbs in the support/administrative building;
- Installation of LED light bulbs throughout the Facility;
- Using low-water flush toilets in the support/administrative building;
- Coordinating carpooling among operations workers;
- Recycling waste office paper and aluminum; and
- Sending used oils, lubricants, and greases to facilities where they can be recycled when possible.
- Using vehicles that comply with current fuel consumption and emission standards.

1.4.1.9 Section 4.1, Environmental Health

Noise

Construction would occur only during daytime hours to reduce the potential for noise impacts from this activity. Construction noise is exempt from the Washington noise limits during daytime hours. The Applicant will, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4), i.e., between 7 AM and 8 PM. If outdoor construction is required outside of these hours, the Applicant will consult with the City of Vancouver, will notify EFSEC in advance, and will not conduct the work until EFSEC has reviewed and approved the planned activities.

Modeled sound levels of the Facility would comply with the applicable Washington State noise limits. Therefore, no operational noise mitigation is proposed.

Risk of Fire or Explosion

Fire Prevention and Suppression

The Facility will be designed and operated according to federal, state, and local standards for the prevention of fire and explosion hazards, including provisions for distances between tanks in the Facility and between the crude oil-handling facilities and adjacent buildings. Examples of other risk-based management approaches to be implemented include:

- Implementing safety procedures for unloading of crude oil from rail cars and loading to vessels, including using fail-safe control valves and emergency shutdown equipment.

- Protecting against potential ignition sources and lightning by (1) proper grounding to avoid static electricity buildup and formal procedures for the use and maintenance of grounding connections; (2) using intrinsically safe electrical installations and non-sparking tools; and (3) implementing permit systems and formal procedures for conducting any hot work during maintenance activities, including proper tank cleaning and venting.
- Reducing emissions of VOCs and evaporative losses by:
- Conducting all unloading, conveyance, storage and loading operations using a closed system, where product is not exposed to the atmosphere;
- Using a double seal internal floating roof in each of the crude oil storage tanks to eliminate vapor space;
- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to a fire;
- Designing electrical equipment to WAC 296-24-95711 which addresses the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present.
- Installing a dock safety unit at the loading berth and a marine vapor combustion unit (MVCU) to minimize the risk of explosive conditions being created during the marine vessel loading operations;
- Requiring all personnel to wear Lower Explosive Limit (LEL) detectors to detect hydrocarbon concentrations that could lead to ignition conditions; requiring all personnel to wear H2S detectors to detect H2S concentrations that could be unsafe.
- Monitoring for fugitive emissions from pipes, valves, seals, tanks and other components with vapor detection equipment and maintaining and/or replacing components as needed.

Fire suppression equipment will be installed to allow control of fires should they occur. Fire suppression equipment and systems will be designed to NFPA and API requirements, the more stringent Factory Mutual Global insurance requirements, and state and local regulations, and will include automatic and engineered controls. Buildings will be fireproofed and emergency egress will be provided in accordance with applicable fire and building codes. All fire suppression systems will be designed to activate automatically and will be equipped with manual trip stations.

Explosion Prevention

Two sources of explosions could potentially occur at the Facility – mechanical explosions due to overpressure conditions, and explosions due to the release of H2S. In addition to the fire prevention and suppression elements listed above, Facility design and operating procedures will include, but not be limited to, the following explosion prevention elements:

- The storage tanks will be operated at atmospheric pressure, and will be equipped with internal pressure relief devices to vent gases should an overpressure situation arise;
- Internal pressure relieving systems will be incorporated throughout the Facility, including the transfer pipelines, marine terminal loading equipment, and rail cars;

- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to an explosion;
- Including expansion loops in the design of the transfer pipelines to ensure the pipelines can expand and contract to accommodate changes in ambient temperature;
- Equipping personnel with H_2S detectors which will trigger alarms at levels well below the explosive concentrations of H_2S gases emitted.

Releases or Potential Releases to the Environment Affecting Public Health

Releases to the environment affecting public health are not anticipated during construction due to the limited types and relatively small quantities of hazardous materials that will be used during construction. Measures to prevent and contain any inadvertent release of hazardous materials will be provided as described in section 2.10 Spill Prevention and Control.

Construction of the Facility is not expected to result in the generation of any hazardous wastes in quantities regulated by state or federal law. Hazardous waste and solid construction debris such as scrap metal, cable, wire, wood pallets, plastic packaging materials, and cardboard will be removed by licensed disposal operators and disposed in accordance with applicable federal, state, and local regulations.

As noted in section 4.1.3.1, areas of the site and/or adjacent to the site are restricted for use because of the presence of subsurface soil and/or groundwater contamination from previous historic uses. Disturbance of those areas will be avoided to the extent practical. However, construction is necessary in each of the restricted areas. Construction will comply with the site-specific restrictive covenants, consent decrees, and MTCA and Dangerous Waste Regulations.

Safety Standards Compliance

The implementation of a safety program for the facility will be based on compliance with state and federal regulations, as well as the implementation of industry standards. The following discussion identifies the primary safety regulations applicable to the activities conducted at the facility, and provides an overview of the numerous industry standards that the Applicant will implement in the design, construction and operation of the facility.

Facility Design

The Facility will be designed in compliance with all applicable safety regulations and requirements, including applicable industry standards. Prior to beginning construction of the Facility, the Applicant will submit a complete set of construction plans to EFSEC for approval. These construction plans will identify the safety regulations and industry standards that apply to the Facility, and as appropriate will specify which standards apply to specific element designs.

Facility Construction

Through the construction management program described in section 2.16, the Applicant will ensure that the Facility has been constructed to the specifications of the construction drawings approved above. The Applicant will conduct pre-operational commissioning tests in accordance with industry standards and applicable regulations, including but not limited to the following:

- Hydrostatic testing of piping systems, transfer pipelines and storage tanks
- Testing and certification of the dock safety unit and MVCU in accordance with the provisions of 33 CFR 154 Subpart E

- Testing of fire and alarm systems in accordance with applicable fire and building safety codes

Facility Operation
The Applicant will ensure that all safety systems inherent in the project design will be operated according to applicable industry standards and state and local regulations and codes. The Applicant will develop operations manuals to address appropriate measures for operation of facility safety systems and their ongoing maintenance. Facility systems will be tested according to industry standards and applicable state and federal regulations.

The Applicant will implement the usage of personal and facility sub area-wide Lower Explosive Limit (LEL) hydrocarbon detection systems and H_2S detection systems. Personal detection systems will notify individual employees when concentrations of hydrocarbons or H_2S exceed safe thresholds and they must evacuate their immediate work area. Similarly, sub-area-wide detectors will trigger evacuation alarms.

The Applicant commits to having every train attended upon taking control of the unit train from BNSF, and until the time control is released back to BNSF when the train leaves the Facility.

Safety Program
The Applicant will develop, implement and document a facility safety program to ensure compliance with state and federal requirements. The program will incorporate applicable industry design standards. Appendix D includes the Applicant's preliminary Health Safety Security and Environmental (HSSE) Execution Plan. This plan lays out a process through which the Applicant will develop and implement its facility safety program, and identifies the various safety processes and organizational and staff responsibilities, and the training that will occur as a result of the implementation of the program.

The program will include the preparation of construction and operations safety plans, which will be submitted to EFSEC prior to the beginning of facility construction and operations respectively. The plans will address the requirements of WAC 296, as described above, and the requirements of 33 CFR 154 Part E, as well as any additional related requirements required under other applicable state and federal regulations and spill contingency planning processes described elsewhere in this Application.

Emergency Plans

The emergency response plan will be developed based on industry standards and regulatory requirements, including but not limited to, WAC 296-24 (Employee Emergency Plans and Fire Prevention Plans), WAC 296-56 (Safety Standards --Longshore, Stevedore and Waterfront Related Operations), WAC 296-824 (Emergency Response), and 29 CFR 1910.38 (Emergency Action Plan). The emergency action plan will be in writing, and will cover the designated actions employers and employees must take to ensure employee safety from fire and other emergencies. The emergency plan will address the following elements:

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed;
- Rescue and medical duties for those employees who are to perform them.

- The preferred means of reporting fires and other emergencies; and
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.
- Alarm systems established in compliance with WAC 296-800-310.
- Types of evacuation to be used in emergency circumstances.
- Training and review:
  - Of a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees prior to implementation of the plan.
  - Review with each employee when the plan is initially developed, whenever the employee's responsibilities or designated actions under the plan change; and whenever the plan is changed, and
  - Review with each employee upon initial assignment those parts of the plan which the employee must know to protect himself/herself in the event of an emergency.

The Applicant will keep the plan at the workplace and make it available for employee review.

1.4.1.10 Section 4.2, Land and Shoreline Use

Land Use

No impacts to existing land uses are anticipated. Therefore, no mitigation measures are specifically identified.

Light and Glare

Most construction will occur during the day. At night, lights will be directed towards the site and will be the minimum wattage required for safety and operations. Development elements, except for storage tanks, will be painted with earth tones. The storage tanks will be painted with nonreflective paint to reduce surface glare from direct sunlight during the day and headlights at night. Lighting associated with the project could lead to direct and/or indirect impacts to wildlife species because it may affect the nocturnal behavior of animals within the project vicinity, including bird and bat species. Lighting will be directed towards the site and away from adjacent areas.

Aesthetics

While visual impacts are not considered to be significant, to minimize impacts to all viewpoints, the project will implement the following mitigation measures. These are already required by the City and are standard development requirements. They include:

- Existing trees will be used as landscape buffers and will remain along SR 501 to reduce visual impacts.
- A landscape buffer with street trees, shrubs, groundcovers will be established along SR 501, entrance roads, and facilities along Old Lower River Road.
- Landscaping will be provided in parking lots per City requirements.
- Non-reflecting light colors will be used on structures.

Historic and Cultural Preservation

While findings from previous studies indicate a low likelihood for encountering cultural material during construction, an inadvertent discovery plan will be prepared and implemented. The inadvertent discovery plan will include, but not be limited to, these elements:

- Because of the possibility of encountering intact soils beneath the fill in some areas of the study area, and because the study area has been included in previous surveys, if project construction reaches the depth of intact native soils, archaeological monitoring will be conducted if soils are excavated to the surface.
- Should any archaeological resources be found, ground-disturbing activities will be halted in the area of the find in accordance with RCW 27.53.060 (Archaeological Sites and Resources) and RCW 27.44.020 (Indian Graves and Records). Following the stop work, a professional archaeologist will be called to assess the significance of the find and DAHP will be notified to define a course of action.

1.4.1.11 Section 4.3, Transportation

Based on the results of the transportation impact analysis, the proposed Facility can be developed while maintaining acceptable levels of service and safety on the surrounding transportation system. The study concluded that specific mitigation was not necessary to address project impacts. However, the study developed the following recommendations to address existing safety or operational issues within the project vicinity:

- The Applicant will work with the Port and City to post a 25 MPH speed limit on Old Lower River Road south of SR 501, where no posted speed sign exists.
- The Applicant will work with the Port and WSDOT to post a YIELD sign to control the channelized northbound right-turn maneuver from Old Lower River Road onto SR 501.
- The Applicant should work with the Port and City to reconfigure traffic control devices at the Old Lower River Road/Old Alcoa Facility Access Road intersection.
- The Applicant will work with the Port to add texturing/coloring treatments to the striped crosswalk on the private access approach to Lower River Road (SR 501), between the Far West Steel property and the proposed Storage area. This treatment is intended to enhance the safety of bicyclists and pedestrians using this crosswalk as part of the adjacent multi-use path.

1.4.1.12 Section 4.4, Socioeconomic Impact

Socioeconomic Impact

No mitigation measures are proposed for socioeconomic impacts.

1.4.2 Fair Treatment

No social or environmental justice impacts are anticipated to result from the construction and operation of the Facility. The Facility will not result in the displacement of minority or low-income populations. The developed area will occur on land owned by the Port and therefore no land use displacements or relocations will occur. The construction and operation of the proposed

project are not anticipated to result in disproportionately high or adverse effects to minority or low-income populations.

The demographics of the project study area (for this purpose defined as the area within an hour's commute of the proposed project) and Clark County (County) have been identified and a public involvement effort undertaken to reach all of the surrounding residents, including minority and low-income populations. Ongoing public outreach is planned after the submittal of the application as described in section 1.6 below.

Data about the total population and the proportions of minority populations in the County and the study area are shown in Table 1.4-1, which is followed by Table 1.4-2 showing the total population in the County and the study area who live below the poverty level.

Table 1.4-1. Race Composition in Clark County and Study Area, 2012

Location	Total Population (2012)	Race (%)						
		White	Black	Native American	Asian	Native Hawaiian/ Pacific Islander	Two or More Races	Hispanic
Clark County	438,290	87.9	2.1	1.0	4.4	0.7	3.8	8.1
Study Area	2,810,720	86.3	2.7	1.5	5.3	0.5	3.7	12.9

Source: U.S. Census Bureau, 2012

Table 1.4-2. Population Living Below Poverty Level, 2011

Location	Total Population Living Below Poverty Level	Percentage of Persons Living Below Poverty Level
Clark County	58,700	13.7%
Study Area	427,700	15.6%

Source: U.S. Census Bureau, 2011

The demographics of communities in the study area and in individual counties were identified and analyzed to determine potential project impacts on minority or low-income populations; the results are discussed in section 4.4. As discussed in section 4.4.1.1 and shown in Table 4.4-4, although minority residents do exist within the County near the project site, the County does not have a substantially higher minority population than larger reference populations.

Table 4.4-5 includes the 2011 poverty statistics for the County and the overall study area, which show that, compared to the larger study area, a lower proportion of the population in the County lives below the poverty level.

The potential impacts from construction and/or operation of the proposed project will be from additional traffic (including rail traffic), noise, air quality, visual quality and aesthetics, and safety or security. As described in parts 2.0, 3.0, and 4.0 of this application, these potential impacts will be mitigated through design features and construction techniques to ensure that they are reduced to less than significant levels.

It is anticipated that operation of the proposed project will result in a positive economic impact to the County and the state due to increased tax revenues, employment, and local expenditures. Operation of the project will require approximately 110 full-time employees, with most workers hired locally. Additional indirect jobs will also be created. These new jobs will increase the opportunities for all County residents, including minority and low-income populations.

Section 1.5 – Sources of Information

WAC 463-60-095
General – Sources of information.

The applicant shall disclose sources of all information and data and shall identify all preapplication studies bearing on the site and other sources of information.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-095, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-095, filed 10/8/81. Formerly WAC 463-42-120.)

Section 1.5 Sources of Information

A number of information sources are cited repeatedly in this Application. These sources include the regulations and codes that govern various aspects of the planning, construction, and operation of the Facility. The RCW, WAC, VMC, and the American Petroleum Institute (API) are examples. Although these sources are not cited in each section of this list, they govern the entirety of this application and are cited in the relevant sections of the text.

1.5.1 General

1.5.1.1 Description of Applicant

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1.5.2.2 Construction on Site

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1.5.2.3 Energy Transmission Systems

None.

1.5.2.4 Electrical Transmission Facilities

None.

1.5.2.5 Water Supply System

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1.5.2.6 System of Heat Dissipation

None.

1.5.2.7 Characteristics of Aquatic Discharge Systems

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1.5.2.9 Spill Prevention and Control

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1.5.2.12 Carbon Dioxide Mitigation

None.

1.5.2.13 Greenhouse Gases Emissions Performance Standards

None.

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Section 1.6 – Consultation

WAC 463-60-101
General – Consultation.

(1) Preapplication consultation. The application shall summarize all consultation that the applicant has conducted with local, state and federal agencies and governments, Indian tribes, nonprofit organizations and community citizen and interest groups prior to submittal of the application to the council.

(2) Meaningful involvement. The application shall describe all efforts made by the applicant to involve the public, regardless of race, ethnicity, or socioeconomic status, prior to submittal of the application to the council. The application shall also set forth information for contacting local interest and community groups to allow for meaningful involvement of all people, regardless of race, ethnicity or socioeconomic status. For example, such information may include contacts with local minority radio stations and news publications.

(04-23-003, recodified as § 463-60-101, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-101, filed 10/11/04, effective 11/11/04.)

Section 1.6 Consultation

The Applicant has conducted consultation with numerous local, state, and federal agencies, Indian Tribes, nonprofit organizations, and community citizens and interest groups before the submittal of this Application to EFSEC. Table 1.6-1 is a summary of the consultation activities that have been conducted, and identifies the efforts of the Applicant to involve the public, regardless of race, ethnicity, or socioeconomic status.

Table 1.6-1. Project Consultation Summary

Organization	Meeting Date	Meeting Description
Port of Vancouver	April 23, 2013	Applicant met with Todd Coleman, Chief Operating Officer (COO), to provide a project introduction.
	May 9, 2013	Applicant met with Theresa Wagner, Communications Manager, to discuss project communications.
	May 17, 2013	Dan Cameron and Bryan Meyer, Tesoro staff, provided a tour of the Anacortes rail unloading facility to Commissioner Brian Wolfe
	June 26, 2013	Matt Gill, Dan Cameron and Bryan Meyer, Tesoro staff, provided a tour of the Anacortes rail unloading facility to Commissioner Jerry Oliver
	June 26, 2013	Matt Gill, Dan Cameron and Bryan Meyer, Tesoro staff, provided a tour of the Anacortes rail unloading facility to Commissioner Nancy Baker, Commissioner Jerry Oliver and Todd Coleman, COO.
	June 27, 2013	Savage and Tesoro representatives provided a presentation regarding the project to Port Commissioner's at a public workshop
City of Vancouver (City)	April 22, 2013	Applicant met with Mayor Tim Leavitt to provide an introduction to the project.
	April 22, 2013	Applicant met with Jeanne Harris, City Councilmember, to provide an introduction to the project.
	April 22, 2013	Applicant met with Larry Smith, City Councilmember, to provide an introduction to the project.
	May 9, 2013	Applicant met with Eric Holmes, City Manager, to provide an introduction to the project.
	June 27, 2013	On June 6, the Applicant filed a pre-application package with the City's Planning Department. The City conducted review of the package and a public pre-application meeting, where members of the public were invited (see Note 1).
	July 12, 2013	The Applicant met with Debi Davis, Water/Sewer Divisions to discuss water and sewer service related issues.
	July 29, 2013	The Applicant met with Leo Kuzmen, Engineering Permit Representative to discuss water availability.
	August 12, 2013	The Applicant met with Tyler Clary, City Water Division, to discuss water use authorization.
US Army Corps of Engineers (USACE)	June 17, 2013	Applicant met with Steve Manlow, USACE Regulatory Project Manager to review the project and discuss federal permit requirements.
	August 15, 2013	Applicant meet with Muffy Walker, USACE Seattle

Organization	Meeting Date	Meeting Description
		District, Regulatory Branch Manager and other USACE staff to discuss project details and federal permit requirements. Also present were Jeff Fisher and Steve Landino from NMFS.
National Marine Fisheries Service (NMFS)	July 19, 2013	Applicant met with Jeff Fisher, SW Washington Branch Chief to introduce the project.
Governor Inslee's Office	April 22, 2013	Applicant met with Aisling Kerins, Executive Director of External Relations to provide a project introduction.
	April 22, 2013	Applicant met with Schuyler Hoss, Director of International Relations and Protocol Office of the Governor to provide an introduction to the project.
The Columbian	April 22, 2013	Applicant met with Aaron Corvin, reporter, to provide an introduction to the project.
Ecology	April 22, 2013	Applicant met with Maia Bellon, Director, to provide an introduction to the project.
	April 22, 2013	Applicant met with Sally Toteff, Southwest Regional Office Director, to provide an introduction to the project.
	April 24, 2013	Applicant met with Dale Jensen, Spill Prevention and Response, to provide an introduction to the project, and discuss spill concerns.
	August 7, 2013	Applicant and BergerABAM staff met with Stephen Posner and Hedia Adelsman to present the project.
Department of Archaeology and Historic	July 30, 2013	Applicant met with Rob Whitlam, State Archaeologist to introduce the project and discuss cultural and historic resources.
Department of Commerce	April 22, 2013	Applicant met with Brian Bolender, to provide an introduction to the project.
EFSEC	April 22, 2013	Applicant met with Stephen Posner, Acting EFSEC Manager, and James Luce, Chair, to discuss the EFSEC review process.
	June 14, 2013	BergerABAM staff met with Stephen Posner to discuss application submittal coordination.
	July 18, 2013	Applicant, Counsel Thomas Wood (Stoel Rives) and BergerABAM staff attended a special EFSEC Council meeting.
	August 7, 2013	Staff From Stoel Rives and BergerABAM met with EFSEC staff and their independent consultant, Cardno Entrix, to discuss application submittal coordination.
Clark County	April 22, 2013	Applicant met with Steve Stuart, Commissioner, to provide an introduction to the project.
	April 23, 2013	Applicant met with David Madore, Commissioner, to provide an introduction to the project.
Vancouver's Downtown Association	July 17, 2013	Applicant met with Lee Rafferty, Executive Director to provide an introduction to the project.
Vancouver Chamber of Commerce	April 23, 2013	Applicant met with Kelly Parker, President & CEO to provide an introduction to the project.
	July 17, 2013	Applicant met with Kelly Parker to provide further project information.
Hazel Dell/Salmon	July 17, 2013	Applicant met with Ginger Schmidt, President to

Organization	Meeting Date	Meeting Description
Creek Business Assoc.		provide an introduction to the project.
East Vancouver Business Assoc.	July 18, 2013	Applicant met with Kris Greene, Director of Governmental Affairs to provide an introduction to the project.
Identity Clark County	April 23, 2013	Applicant met with Paul Montague to provide an introduction to the project.
Columbia River Economic Development Council	April 23, 2013	Applicant met with Lisa Nisenfeld to provide an introduction to the project.
	July 18, 2013	Applicant presented to the project to the Council
49th Legislative District	April 24, 2013	Applicant met with Representative Sharon Wylie to provide an introduction to the project.
	April 24, 2013	Applicant met with Senator Annette Cleveland to provide an introduction to the project.
17th Legislative District	April 24, 2013	Applicant met with Representative Paul Harris to provide an introduction to the project.
	April 24, 2013	Applicant met with Senator Don Benton to provide an introduction to the project.
	April 24, 2013	Applicant met with Representative Monica Stonier to provide an introduction to the project.
18th Legislative District	April 24, 2013	Applicant met with Representative Brandon Vick to provide an introduction to the project.
	April 24, 2013	Applicant met with Representative Liz Pike to provide an introduction to the project.
	April 24, 2013	Applicant met with Senator Ann Rivers to provide an introduction to the project.
42nd Legislative District	April 24, 2013	Applicant met with Senator Doug Ericksen to provide an introduction to the project.
Washington State University, Vancouver	April 25, 2013	Applicant met with Rona Sen Hoss to provide an introduction to the project.
Washington Council on International Trade	April 25, 2013	Applicant met with Eric Schinfeld to provide an introduction to the project.
Office of Congresswoman Jaime Herrera Beutler	April 25, 2013	Applicant met with Ryan Hart, District Director, to provide an introduction to the project.
Sierra Club – Cascade Chapter	April 25, 2013	Applicant met with Linda Wolfe Executive Committee Vice Chair Loowit Chapter to provide an introduction to the project.
Fruit Valley Neighborhood Community Council	May 9, 2013	Applicant met with Eric Labrant to provide an introduction to the project, and discuss community concerns

Note 1: the following persons attended the City preapplication meeting on June 27, 2013:

- City: Jon Wagner, Mike Swanson, Richard Holland, John Gentry, Aaron A. Odegard, Greg Turner, Ryan Lopossa, Chris Drone, Tracy Tuntland, Chad Lawry
- Applicant: Kelly J. Flint (Savage), David Corpron (Savage), Mike Marchant (Savage), Matt Gill (Tesoro), Doug Price (Tesoro), Brian Carrico (BergerABAM), Helen Devery (BergerABAM), Irina Makarow (BergerABAM), Dan Shafar (BergerABAM), Sam Adams (BergerABAM), Ryan Bennett (Poole Fire Protection), Nic Nash (ICPE), Tim McMahan (Stoel Rives LLP), Rebecca Guiao (Stoel Rives LLP), Brian Dunn (Kittelson and Associates), Jeff Hale (R&M Engineering),
- Port of Vancouver: Patty Boyden, Lisa Willis, Mary Mattix, Greg Westrand
- EFSEC: Stephen Posner

- WDFW: Anne Friesz (Applicant is continuing to coordinate with WDFW to meet with additional resource specialists after Application for Site Certification is submitted.)
- Fruit Valley Neighborhood: Eric Labrant
- Columbia Riverkeepers: Lauren Goldberg, Candice McLaughlin

In addition to the June 27, 2013 presentation by the Applicant noted above, the Port commissioners conducted public workshops considering the project in tandem with their regular meetings; all of these workshops were taped by Clark Vancouver Television and were available for rebroadcast to the general public.

- May 14, 2013, overview of marine safety and oil spill response capabilities by Liz Wainwright, executive director of the Maritime Fire and Safety Association (MFSA); Holly Robinson, MFSA preparedness, response and compliance coordinator; and Ernie Quesada, general manager of Clean Rivers Cooperative, Inc.;
- June 11, 2013, overview of how hazardous materials, specifically crude oil, are transported along regional rail lines, presented by Colleen Weatherford, Director of Public and Private Partnerships for BNSF Railway; Patrick Brady, Assistant Director of Hazardous Materials for BNSF Railway; and William Ellings, Safety and Hazmat Specialist for the U.S. Department of Transportation, Federal Rail Administration (FRA);
- June 27, 2013, overview of the EFSEC review process, presented by EFSEC Chair James Luce.
- July 22, 2013, workshop focusing on presentation by Port staff regarding the project.
- The Port also conducted meetings with Linda Wolfe and Lehman Holder, Sierra Club on April 24, 2013, Gretchen Starke, Audubon Club on April 29, 2013 and Sydney Reisbick, Friends of Clark County on May 2, 2013 to discuss the project with the Applicant in attendance.

Finally, the Applicant is planning to conduct an open house in the Vancouver, Washington, area in mid-September 2013.

Tesoro Savage
Vancouver Energy Distribution Terminal

PART 2 PROPOSAL

Section 2.1 – Site Description

WAC 463-60-135
Proposal – Site description.

The application shall contain a description of the proposed site indicating its location, prominent geographic features, typical geological and climatological characteristics, and other information necessary to provide a general understanding of all sites involved, including county or regional land use plans and zoning ordinances.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-125, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-125, filed 10/8/81. Formerly WAC 463-42-180.)

Section 2.1 Site Description

2.1.1 Location of Tesoro Savage Vancouver Energy Distribution Terminal

The proposed Tesoro Savage Vancouver Energy Distribution Terminal (Facility) will be constructed at the Port of Vancouver (Port) within the City of Vancouver (City) in Clark County, Washington. The Facility includes construction and operations in different "Areas" on the overall facility, each area serving different functions. The site is located on the north (Washington) shore of the Columbia River. State Route (SR) 501 (Lower River Road) is located immediately to the north of the site. Interstate 5 (I-5) is located approximately 2.5 miles east. Rail access to the site is available from the east. Figure 2.1-1 presents a general vicinity map of the location; Figure 2.1-2 provides an aerial view and identifies existing adjacent uses. Each Facility area is described in further detail below. The entire Facility will be constructed on approximately 41.5 acres.

The Port is located from approximately 103 to 106 river miles (RM) from the Pacific Ocean on the Columbia River at the head of the deep-water navigation channel. The total land area of the Port is approximately 2,127 acres, including approximately 800 developed acres and 500 acres planned for future development. Marine operations include five terminals and 13 berths. The Port handles 400 to 500 vessel calls per year and approximately 5 million metric tons of cargo yearly, including grain, scrap steel, bulk minerals, pulp, automobiles, refined petroleum products, and other bulk liquids. More than 2,300 people are directly employed by businesses at the Port (Port of Vancouver 2013).

Most of the site will be leased from the Port and will be used exclusively by the Applicant for the construction and operation of the Facility. The Transfer Pipelines will be located on non-exclusive easements within the Port.

The site is located in the SE ¼ of Section 18, NW ¼ of Section 19, and the NW and NE ¼ of Section 20, Township 2 North, Range 1 East WM. Berths 13 and 14 are located at approximately Columbia RM 103.5. Table 2.1-1 summarizes the project site areas discussed in detail below.

Table 2.1-1. Project Development Summary

Project Element	Site Location	Area (acres)
Area 200 – Unloading and Office	5501 NW Lower River Road NE ¼ Section 19, & S ½ Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000	7.59
Area 300 – Storage	No site address N ½ Section 20, T2N, R1E WM Parcel: 152173-000	20.84
Area 400 – Marine Terminal	No site address NW ¼ Section 20, T2N, R1E WM Parcels: 152166-000, 503030-000, 503030-003	4.97
Area 500 – Transfer Pipelines	No address NE ¼ Section 19 & NW ¼ Section 20, T2N, R1E WM Parcels: 152184-000, 152177-000, 152179-000, 986027-146, 986027-027, 50303-001, 152166-000,	2.20

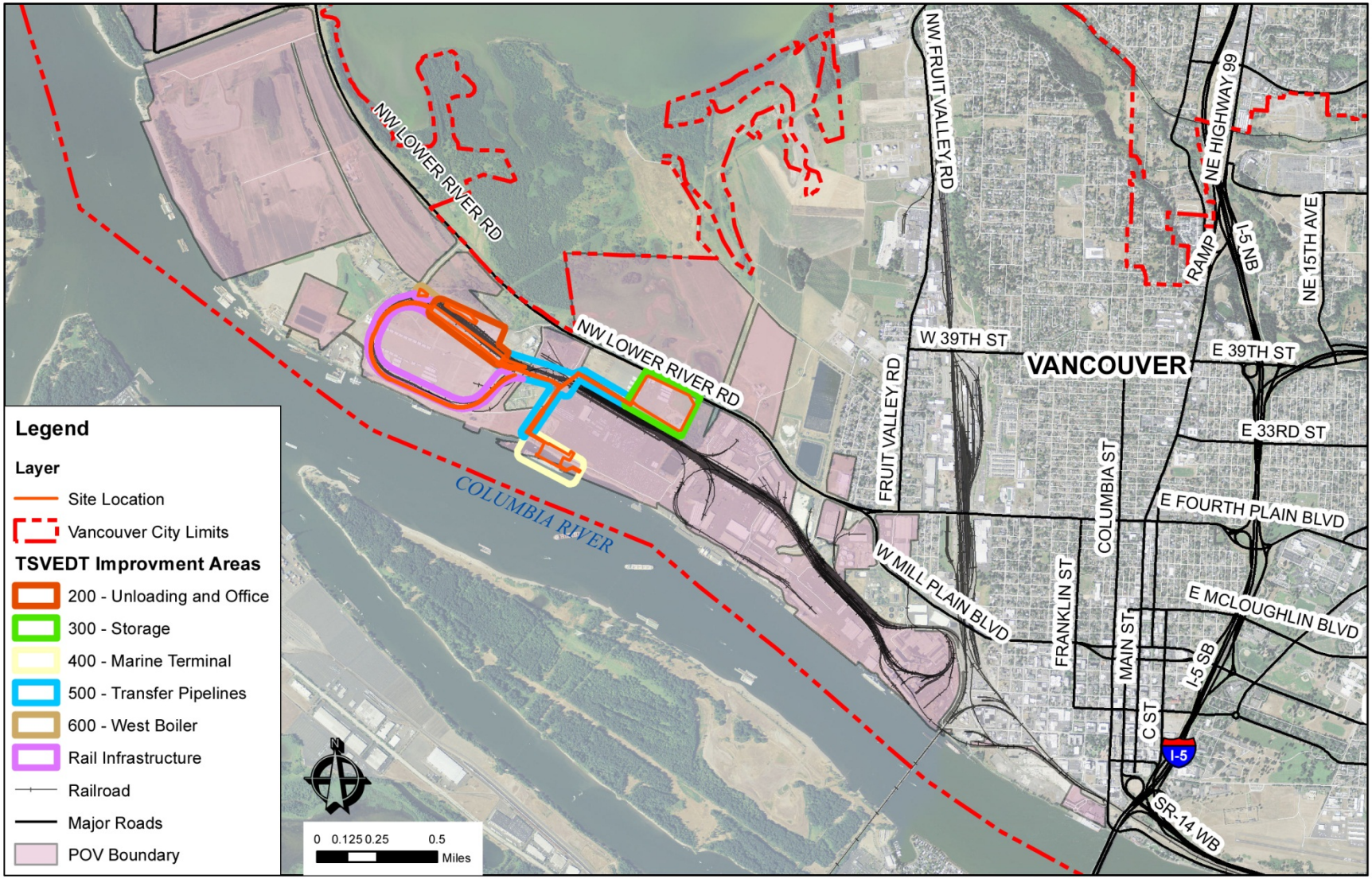
Project Element	Site Location	Area (acres)
Area 600 – West Boiler	No site address SW ¼ Section 19, T2N R1E WM Parcel:152799-000	0.45
Rail Infrastructure	5501 NW Lower River Road N ½ Section 19, & S ½ Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000, 152905-000, 152798-000	5.45

2.1.1.1 Area 200 – Administrative/Support and Rail Unloading

Area 200 is located at 5501 NW Lower River Road in Vancouver. The following Facility elements will be located in Area 200: administrative and support buildings, parking, rail access to the rail unloading facility, and the rail unloading facility. Area 200 will be accessible from an unnamed private road owned and maintained by the Port. Area 200 facilities will be constructed on approximately 7.59 acres.

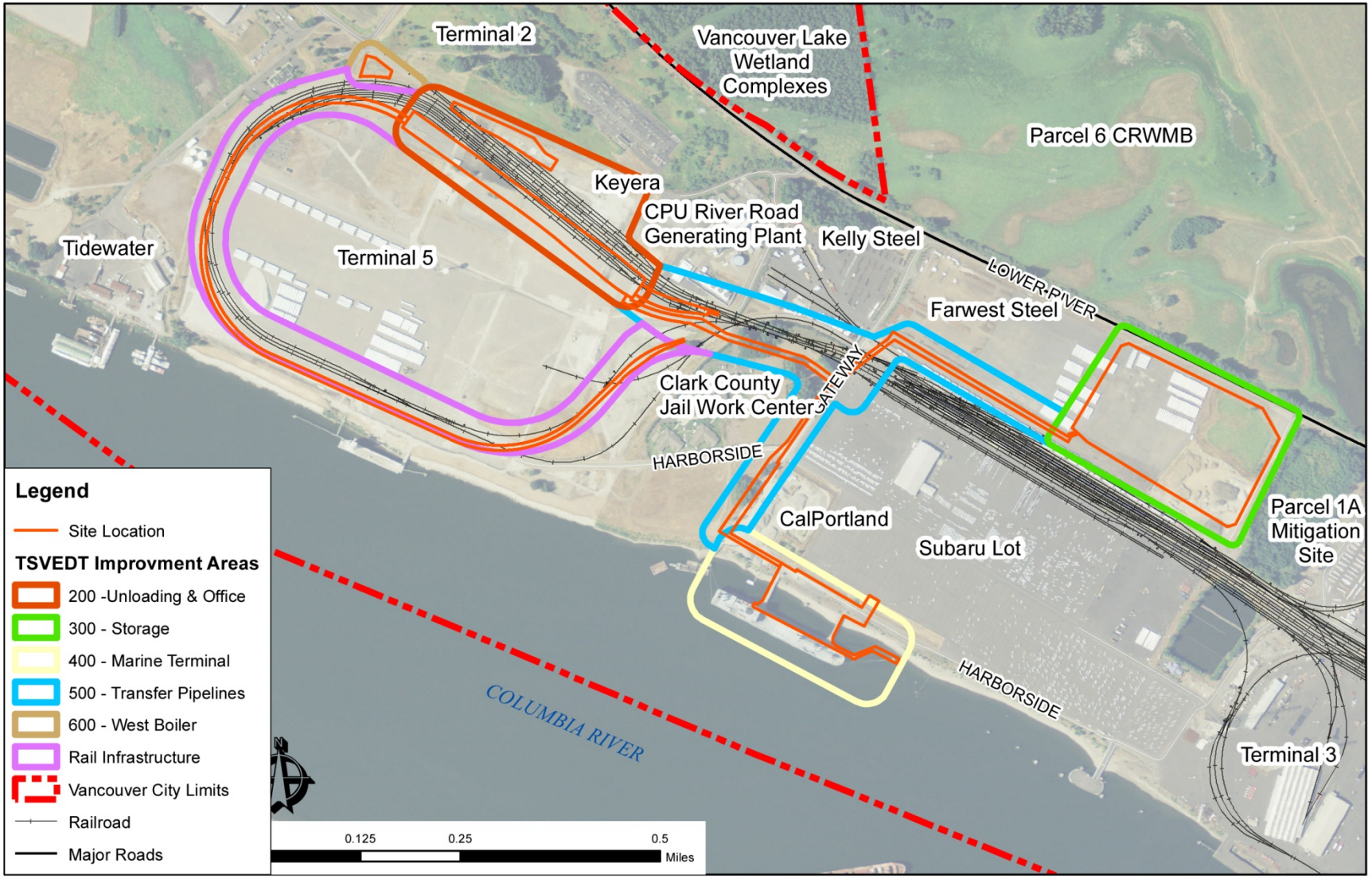
Area 200 is in the northern portion of the area of the Port that is generally defined as Terminal 5. Terminal 5 is the former location of aluminum processing facilities owned and operated by Evergreen Aluminum LLC (Evergreen) and the Aluminum Company of America (Alcoa). The site has been the location of intensive historic industrial use, dating back to the 1940s when Alcoa first developed the site for aluminum smelting operations, through the early 2000s, when aluminum processing activities on the property ended. The Port completed the purchase of the Evergreen and Alcoa properties in 2009 and, with the exception of the onsite water tower and the dock structure in the Columbia River, all structures of the former aluminum processing plants have been removed and remediation has been conducted at the site in accordance with Washington State Department of Ecology (Ecology) approvals.

The Terminal 5 site is currently developed and used for the outdoor storage of wind turbine components and other cargoes and contains multiple rail lines for Port operations. The rail on the site represents the westernmost segment of the West Vancouver Freight Access (WVFA) project, a rail improvement project that is under construction at the Port. See Figure 2.1-2 for existing conditions at Terminal 5.



BergerABAM

Figure 2.1-1. General Vicinity Map



BergerABAM

Figure 2.1-2. Aerial View

2.1.1.2 Area 300 – Storage

Area 300 is located at the Port's Parcel 1A on the south side of NW Lower River Road just east of the existing Farwest Steel facility. The following Facility elements will be located in Area 300: product storage tanks and associated secondary containment, the Area 300 Boiler Building, and associated control and ancillary systems. Area 300 will be accessible from NW Gateway Avenue and NW Lower River Road via a shared private drive. Area 300 elements will be constructed on approximately 20.84 acres.

This site was developed by the Port for laydown and industrial development and is currently partially occupied by a temporary steel scrap storage yard. See Figure 2.1-2 for existing conditions at Parcel 1A.

2.1.1.3 Area 400 – Marine Terminal

Area 400 is located at existing Port berths 13 and 14 on the Columbia River south of the current Subaru facility. The following Facility elements will be located in Area 400: product conveyance and loading facilities located on the dock, the MVCUs, emergency containment and response equipment, and control and ancillary facilities associated with vessel loading. This area will be accessed from Gateway Avenue and Harborside Drive by a driveway to be constructed with the project. Area 400 will be constructed on approximately 4.97 acres.

Berths 13 and 14 were developed by the port in the early 1990s and most recently have been used as vessel layberths. The dock consists of two access trestles and T docks with associated mooring elements. The access trestles and T docks consist of steel pile-supported concrete decks with a steel pile fenders system. Four steel pile-supported concrete breasting dolphins are connected to the T docks by steel-grated walkways. Three steel pile-supported concrete mooring dolphins are located between the shoreline and the T docks. The navigation channel of the Columbia River in this area is maintained artificially at a depth of -43 feet and the Port maintains the berths to the same depth. The nearshore habitat drops off rapidly and, as a result, there is little shallow water habitat or transition zone. Columbia River water volumes are managed by upstream dams, and there is no functioning floodplain within the project site. Sediments in the area of the project are predominantly silts, sands, and clays, with very little gravel or cobble present. There is no in-stream large woody debris or any backwater or side channel habitat at the project site. See Figure 2.1-2 for existing conditions at berths 13 and 14.

2.1.1.4 Area 500 – Transfer Pipelines

Area 500 consists of a non-exclusive easement located within Terminal 5, Parcel 1A, Terminal 4, and corridors adjacent to existing private port roads. Area 500 includes the corridors for the approximately 38,500 lineal feet of transfer pipelines that will connect the Unloading (Area 200), Storage (Area 300), and Marine Terminal (Area 400) portions of the project. See Figure 2.1-2 for existing conditions along the transfer pipeline corridor. Area 500 will be constructed on approximately 2.20 acres.

2.1.1.5 Area 600 – West Boiler

Area 600 is located at the northwest corner of Terminal 5. The Area 600 Boiler Building and its associated parking will be constructed at this location. Area 600 will be accessed from Old Lower River Road and a private road owned and maintained by the Port. See Figure 2.1-2 for

existing conditions at Area 600. Area 600 facilities will be constructed on approximately 0.45 acre.

2.1.1.6 Rail Infrastructure

The project will require the construction of two additional rail loops (tracks 4106 and 4107) consisting of approximately 18,000 lineal feet of new rail located on approximately 5.45 acres at Terminal 5. Existing Terminal 5 rail associated with the WVFA will be shifted; the shifting of existing facilities will be performed by others, has been previously permitted, and is not included within this request for Site Certification. A third rail loop (track 4105) is permitted for general Port use. This track may be transferred to exclusive use by the Facility once a sustained volume of 120,000 barrels per day is received by the Facility.

2.1.2 Prominent Geographic Features

2.1.2.1 Terminal 5

Terminal 5 is the location of the Unloading and Office elements (Area 200) and the rail infrastructure. This area is bounded on the south by the Columbia River. With the exception of the riprapped shoreline, the site is flat and is composed of developed rail facilities, gravel surfacing, and paving.

2.1.2.2 Parcel 1A

Parcel 1A is the location of Storage (Area 300). There are no prominent geographic features on Parcel 1A. The site is flat and consists of gravel or dirt with scattered grasses and weeds and a temporary scrap steel yard.

2.1.2.3 Terminal 4 Berths 13 and 14

Berths 13 and 14 are the location of the Marine Terminal (Area 400) and include the Columbia River and shoreline. At this location, the river has a bank to bank width of approximately 5,600 feet, with a maintained channel width of 600 to 800 feet and a maintained depth of -43 feet Columbia River Datum (CRD). The bank consists of steeply sloping riprap with parking and storage at the top of the bank. The existing pile-supported dock consists of two access trestles, four breasting dolphins connected to the trestles by catwalks, and three mooring dolphins.

2.1.2.4 General Area

Within the general vicinity of the Facility location, there are several other geographic features. Vancouver Lake is an approximately 2,287 acre shallow lake located in the Columbia River floodplain is located northeast of the project site (Clark County 2010). There is an associated wetland complex located south of Vancouver Lake. The Columbia River Wetland Mitigation Bank (CRWMB), an approximately 154-acre wetland mitigation bank established in 2010, is located at the southern extent of this wetland complex.

There are also two wetland mitigation sites in the vicinity of the project site. The Parcel 1A wetland mitigation site, located immediately east of Parcel 1A, was created in 1994. The Parcel 2 wetland mitigation site is an approximately 16.4-acre mitigation site, situated on an approximately 31.3-acre parcel north of the existing Terminal 5 site.

2.1.3 Typical Geological and Climatological Characteristics

The information below summarizes the more detailed information regarding geology and climate that is included as sections 3.1 Earth and 3.2 Air.

2.1.3.1 Geology

The Facility is located in the Vancouver Lake Lowlands. The natural geological features of the site have been modified over time through the development of Port facilities to today's existing conditions. Artificial fill material was used to modify historical topographic relief and typically consists of sand and silt. Much of this material was derived from suction dredging techniques where Columbia River channel sand was piped on shore for dewatering and grading. This fill material mantles the project site and is common in the historically industrial developed areas in the vicinity.

The Facility is situated in the Portland Basin, a northwest-elongated structural basin bordered to the east by the Cascade Mountain foothills, to the west by the Portland West Hills, to the south by the Clackamas River, and to the north by the Lewis River (Evarts et al., 2009). The Portland Basin began to form about 20 million years ago with folding and uplift of Tertiary basement marine and volcanic rocks, and was subsequently filled with volcanic and sedimentary rocks. Approximately 15 to 16 million years ago, flood-basalt flows of the entered the basin through a broad Columbia River valley transecting the Cascade Range and emptying into the Pacific Ocean (Beeson et al. 1989). By 14 million years ago, the uplift of the Portland Hills diverted the Columbia River northward (Evarts et al. 2009).

The Columbia River deposited up to 600 feet of fine-grained river and lake sediments into the subsiding Portland Basin (Trimble 1963). The deposits are poorly cemented siltstone, sandstone, and claystone. Overlaying this deposit is 600 feet of consolidated and cemented sandstone and conglomerate of the Troutdale Formation (Tolan and Beeson 1984). The Troutdale Formation resulted from a high-energy braided river system (Evarts et al. 2009) that was eroded during the last ice age by the ancestral Columbia and Willamette rivers and by catastrophic glacial outburst floods (Allen et al. 2009). Glacial outburst floodwaters from Montana washed across eastern Washington and through the Columbia River Gorge to spread out in the Portland Basin and pool to elevations of about 400 feet, depositing boulders, cobbles, and gravel sediment grading to thick blankets of micaceous sand. The sea level rose by about 300 feet after the last of the glacial outburst floods about 15,000 years ago, forming an estuarine environment that extends far upstream in the Columbia River. This low energy environment rapidly filled with more recent sandy alluvium and broad floodplains developed along the primary Columbia River channel, including the Vancouver Lake Lowlands (Peterson et al. 2011).

2.1.3.2 Climate

The climate of the City is predominately temperate, characterized by wet, mild winters and dry, warm summers. The climate is influenced by the relative proximity of the Pacific Ocean and the Cascade and Coast ranges of Oregon and Washington. Temperature and precipitation measurement records from the "Vancouver 4 NNE" agricultural meteorological station were accessed to analyze the climate at the project site. This station is located about 4 miles northeast of the project site and has been collecting measurements since 1856. The monthly climate summary is included in Table 3.2-5. The maximum temperature ever recorded at the site was 106° F on July 30, 2009 and minimum temperature recorded was -8.0° F in 1909. The site averages about 40 inches of rainfall and 6.5 inches of snow a year, with most of the precipitation

occurring during the winter months. Prevailing winds are from the west-northwest. See Section 3.2 for additional climate information.

2.1.4 Land Use Plans and Zoning Ordinances

A full description of the applicable comprehensive plans, zoning and development ordinances, and other land use programs applicable to the Facility is included in Section 4.2 Land and Shoreline Use.

The project is located completely within the corporate limits of the City. The land is designated as Industrial (IND) in the City of Vancouver Comprehensive Plan and is zoned as Heavy Industrial (IH). The IH zoning of the site allows a variety of industrial uses, including the proposed Facility, which is classified as a "warehouse/freight movement" as defined in Section 20.160.020 of the VMC. The VMC also permits "railroad yards" within the IH zone.

The ship loading elements located in Area 400 and Rail Infrastructure on Terminal 5 include features located within 200 feet of the Columbia River, a shoreline of statewide significance. Lands within 200 feet of the ordinary high water mark (OHWM) of the Columbia River are subject to regulation under the City of Vancouver Shoreline Master Program (SMP). The SMP designates the shoreline environment of the upland areas on the site as High Intensity and the areas of the site below the OHWM of the river as Aquatic. Within the High Intensity and Aquatic designations, water-dependent industrial uses are permitted activities. The SMP defines a water-dependent use as follows: "a use or a portion of a use which requires direct contact with the water and cannot exist at a non-water location due to the intrinsic nature of its operations." The purpose of the proposed project is to transfer crude oil from rail cars to ships, consistent with the definition of water dependent use. Furthermore, within the High Intensity designation Railroads are a permitted activity. A shoreline substantial development permit would be required for the proposed activities within the shoreline jurisdiction.

Section 2.2 – Legal Descriptions and Ownership Interests

WAC 463-60-135
Proposal – Legal descriptions and ownership interests.

(1) Principal facility. The application shall contain a legal description of the site to be certified and shall identify the applicants and all nonprivate ownership interests in such land.

(2) Associated and transmission facilities. For those facilities described in RCW 80.50.020 (6) and (7) the application shall contain the legal metes and bounds description of the preferred centerline of the corridor necessary to construct and operate the facility contained therein, the width of the corridor, or variations in width between survey stations if appropriate, and shall identify the applicant's and others' ownership interests in lands over which the preferred centerline is described and of those lands lying equidistant for 1/4 mile either side of such center line.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-135, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 83-01-128 (Order 82-6), § 463-42-135, filed 12/22/82. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-135, filed 10/8/81. Formerly WAC 463-42-190.)

Section 2.2 Legal Descriptions and Ownership Interests

The Facility will be constructed on an approximately 41.5-acre site within portions of the SE ¼ of Section 18, NW ¼ of Section 19, and the NW and NE ¼ of Section 20, Township 2 North, Range 1 East WM. Berths 13 and 14 are located at approximately RM 103.5.

2.2.1 Legal Description of Property

The legal description is presented in the following pages.

This legal description is a preliminary description of the lease areas and non-exclusive easements. The lease agreement between the Applicant and the Port contemplates refinements to the precise boundaries of the lease areas based on final facility design. A final legal description will be provided to EFSEC prior to the beginning of Facility construction.

2.2.1 Legal Description of Property

MacKay Sposito

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

15622LD1
8/12/13
GAH

LEGAL DESCRIPTION
AREA 600 LEASE PARCEL (West Boiler Building)
PORT OF VANCOUVER

Real property situated in the City of Vancouver, Clark County, Washington, being portions of the John Mathews and William Hendrickson Donation Land Claims and lying in the South half of Section 18, Township 2 North, Range 1 East of the Willamette Meridian described as follows:

(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the Southeast corner of Lot 1 of that Port of Vancouver Binding Site Plan recorded in Book 53 of Surveys at page 141, said corner also being the Northeast corner of Lot 2 of said Binding Site Plan; thence along the North line of said Lot 2 and the South line of said Lot 1 North 59° 11' 50" West 823.17 feet to the Southwest corner of said Lot 1 and Northwest corner of said Lot 2; thence North 65° 35' 27" West 2,772.75 feet to the **Point of Beginning**; thence South 17° 01' 46" West 50.99 feet a point on an arc of an 839.99 foot radius curve; thence from a tangent bearing of North 82° 09' 45" West, along said curve to the left, through a central angle of 01° 18' 28", an arc distance of 19.17 feet to a point of compound curvature with a 1,236.07 foot radius curve; thence along said curve to the left, through a central angle of 08° 07' 47", an arc distance of 175.39 feet; thence leaving said curve North 17° 01' 46" East 145.16 feet; thence South 72° 58' 14" East 62.12 feet; thence South 52° 38' 39" East 134.77 feet to the **Point of Beginning**.

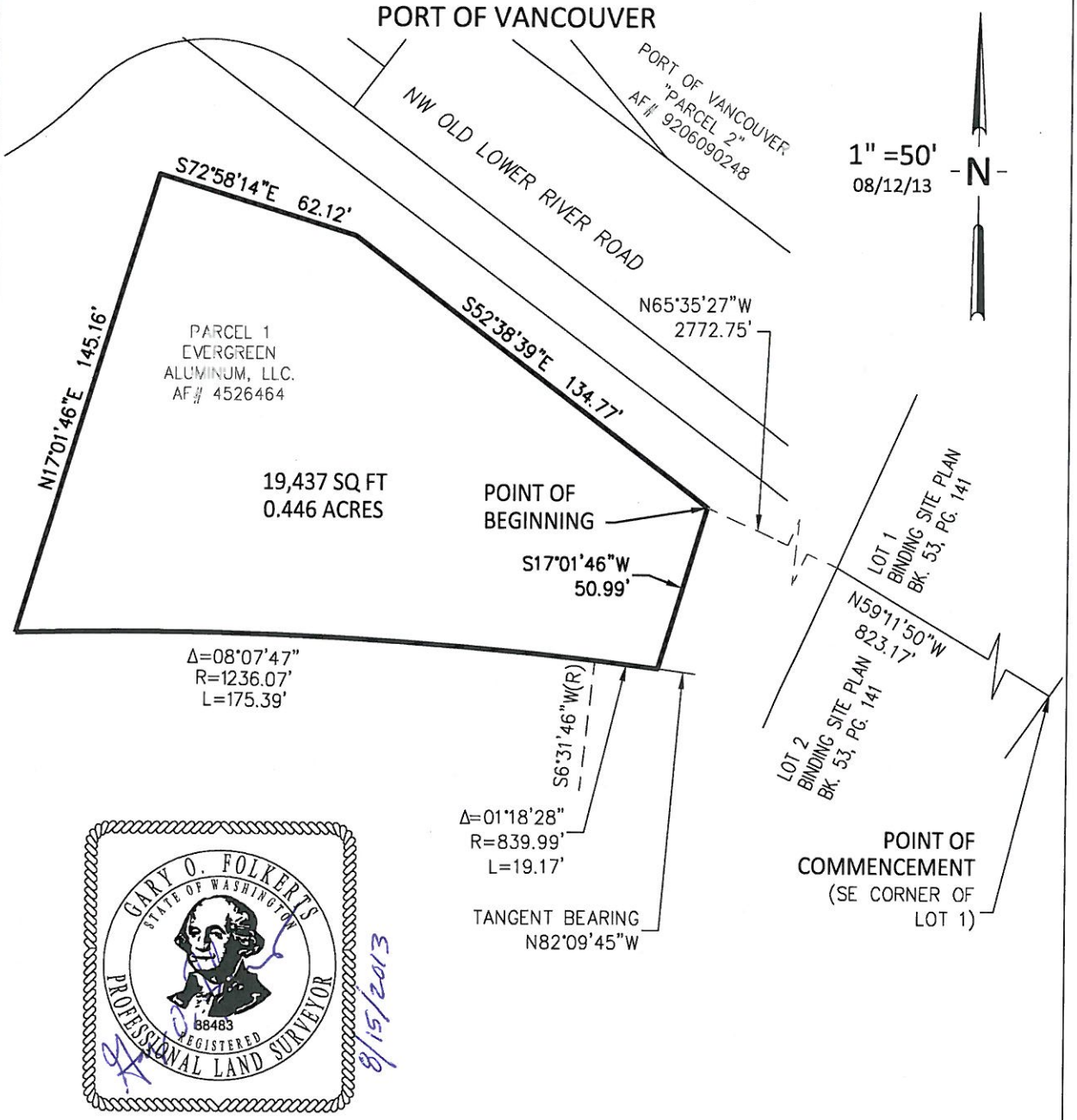
Containing 19,437 square feet or approximately 0.446 acres.

Subject to easements and restrictions of record.

8/15/2013

GARY O. FOLKERTS
STATE OF WASHINGTON
38483
REGISTERED
PROFESSIONAL LAND SURVEYOR

SKETCH TO ACCOMPANY LEGAL DESCRIPTION
AREA 600 LEASE PARCEL
(WEST BOILER BUILDING AREA)
PORT OF VANCOUVER



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PAGE 2 OF 2 15622SS1

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15622LD2
8/20/13
GAH

LEGAL DESCRIPTION
AREA 200 LEASE PARCELS
(UNLOADING AND OFFICE AREA)
PORT OF VANCOUVER

(UNLOADING AREA)
Real property situated in the City of Vancouver, Clark County, Washington, being portions of the Patrick Markey and John Mathews Donation Land Claims and lying in the Southeast quarter of Section 18 and the Northeast quarter of Section 19, Township 2 North, Range 1 East of the Willamette Meridian described as follows:

A portion of "Parcel 1" as conveyed to Port of Vancouver by Evergreen Aluminum, LLC by deed recorded under Auditor's File No. 4526464 and a portion of "Parcel 1" as conveyed to the Port of Vancouver by Alcoa by deed recorded under Auditor's file No. 4547240, records of said county, described as follows:

(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the Southeast corner of Lot 1 of that Port of Vancouver Binding Site Plan recorded in Book 53 of Surveys at page 141, said corner also being the Northeast corner of Lot 2 of said Binding Site Plan; thence along the North line of said Lot 2 and the South line of said Lot 1 North 59° 11' 50" West 823.17 feet to the Southwest corner of said Lot 1 and Northwest corner of said Lot 2; thence South 74° 49' 47" West 877.26 feet to the **Point of Beginning**; thence South 35° 01' 15" West 153.52 feet to a point on an arc of an 945.37 foot radius curve; thence from a tangent bearing of North 61° 46' 41" West, along said curve to the right, through a central angle of 11° 03' 47", an arc distance of 182.54 feet to a point of tangency; thence North 50° 42' 54" West 421.43 feet to a point of curvature with a 5743.00 foot radius curve; thence along said curve to the left, through a central angle of 03° 48' 43", an arc distance of 382.10 feet to a point of tangency; thence North 54° 31' 45" West 906.24 feet; thence North 35° 28' 15" East 134.00 feet to a point hereinafter referred to as

"**Point A**"; thence South 54° 31' 45" East 1651.32 feet; thence South 50° 40' 40" East 226.20 feet; thence South 51° 51' 45" East 12.52 feet to the **Point of Beginning**.

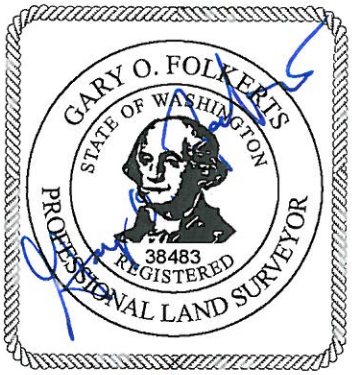
Containing 271,636 square feet or approximately 6.236 acres.

Subject to easements and restrictions of record.

(OFFICE AREA)
Also:
Beginning at said "**Point A**"; thence North 85° 31' 18" East 243.75 feet to the **Point of Beginning**; thence North 24° 07' 06" East 44.62 feet; thence South 65° 55' 02" East 585.81 feet; thence South 24° 00' 02" West 6.37 feet; thence South 37° 55' 26" East 104.74 feet; thence South 48° 25' 32" East 19.93 feet; thence South 58° 52' 37" East 83.29 feet; thence South 31° 52' 06" West 77.32 feet; thence North 59° 12' 26" West 188.75 feet; thence North 58° 12' 15" West 20.68 feet; thence North 57° 12' 51" West 193.11 feet; thence North 62° 29' 14" West 70.04 feet; thence North 63° 20' 37" West 70.51 feet; thence North 60° 16' 21" West 64.16 feet; thence North 57° 12' 05" West 77.20 feet; thence North 50° 50' 30" West 93.40 feet to the **Point of Beginning.**

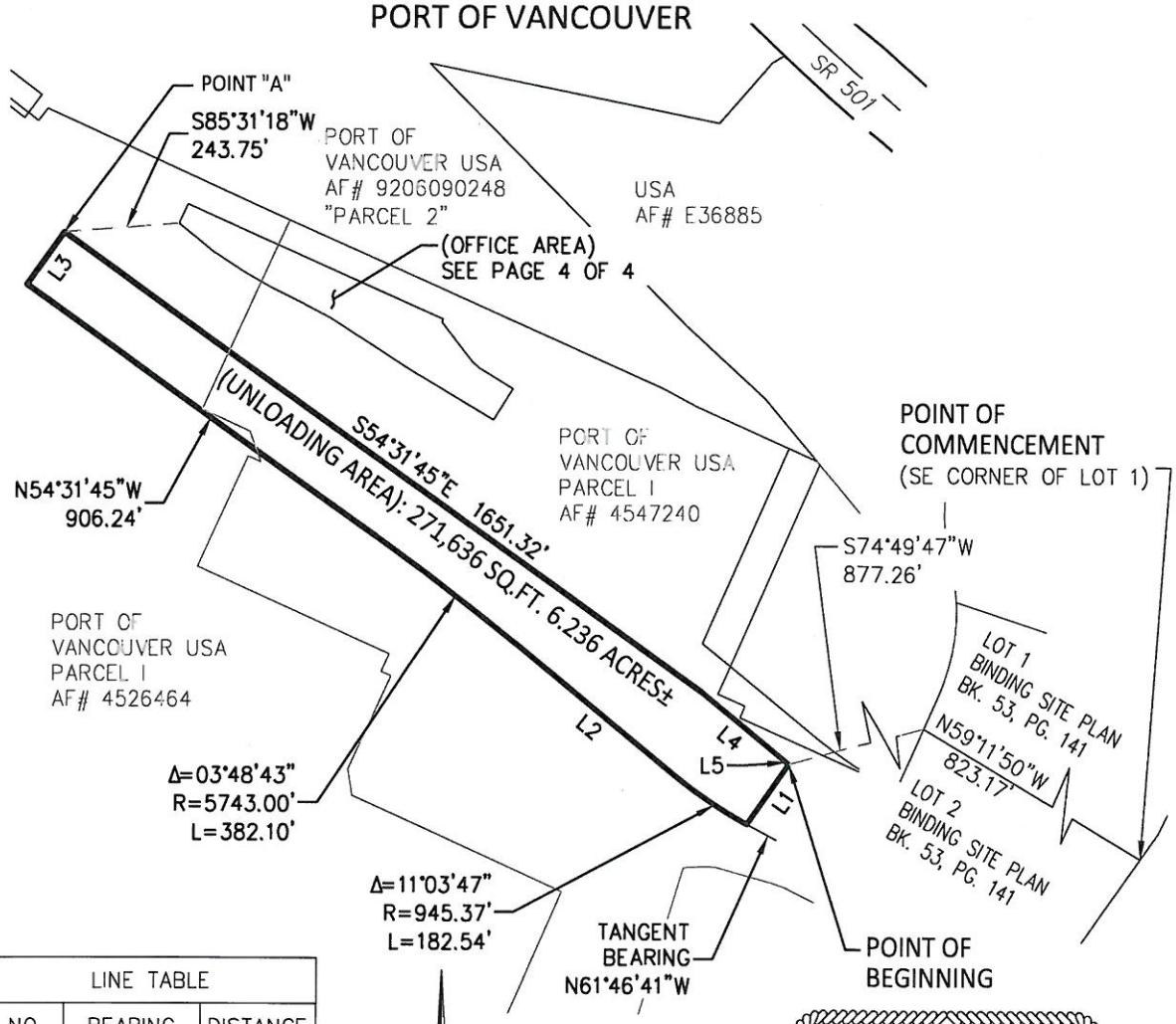
Containing 69,603 square feet or approximately 1.598 acres.

Subject to easements and restrictions of record.



8/21/2013

SKETCH TO ACCOMPANY LEGAL DESCRIPTION
AREA 200 LEASE PARCELS
(UNLOADING AREA)
PORT OF VANCOUVER



LINE TABLE		
NO.	BEARING	DISTANCE
L1	S35°01'15"W	153.52'
L2	N50°42'54"W	421.43'
L3	N35°28'15"E	134.00'
L4	S50°40'40"E	226.20'
L5	S51°51'45"E	12.52'

-N- 1" =400'
08/20/2013

GARY O. FOLKERTS
STATE OF WASHINGTON
38483
REGISTERED
PROFESSIONAL LAND SURVEYOR
8/21/2013

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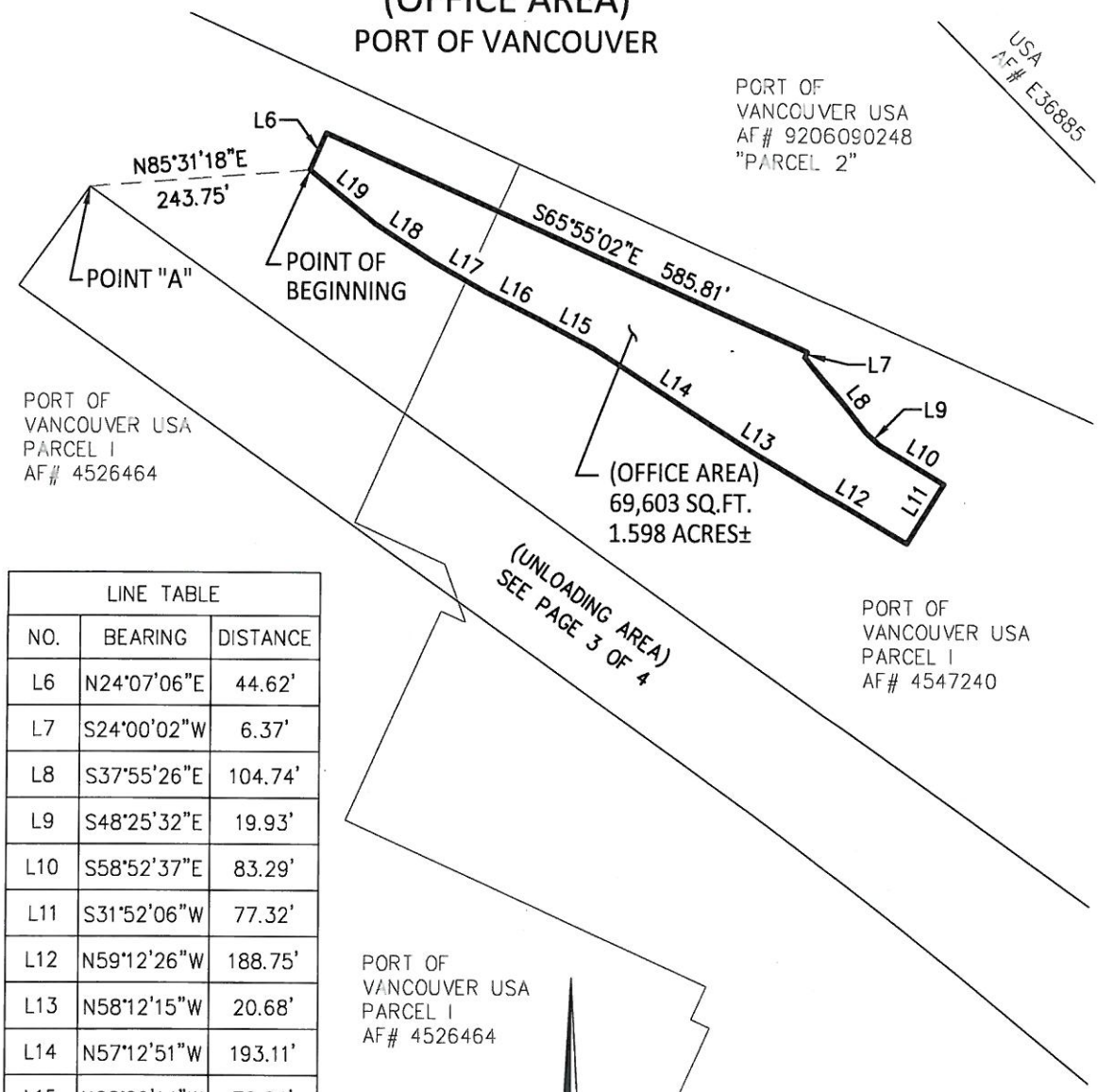
SKETCH TO ACCOMPANY LEGAL DESCRIPTION
AREA 200 LEASE PARCELS
(OFFICE AREA)
PORT OF VANCOUVER



LINE TABLE		
NO.	BEARING	DISTANCE
L6	N24°07'06"E	44.62'
L7	S24°00'02"W	6.37'
L8	S37°55'26"E	104.74'
L9	S48°25'32"E	19.93'
L10	S58°52'37"E	83.29'
L11	S31°52'06"W	77.32'
L12	N59°12'26"W	188.75'
L13	N58°12'15"W	20.68'
L14	N57°12'51"W	193.11'
L15	N62°29'14"W	70.04'
L16	N63°20'37"W	70.51'
L17	N60°16'21"W	64.16'
L18	N57°12'05"W	77.20'
L19	N50°50'30"W	93.40'

-N- 1" =200'
08/20/2013

GARY O. FOLKERTS
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8/21/2013

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PAGE 4 OF 4 15622SS2

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15622LD3
8/13/13
GAH

LEGAL DESCRIPTION
AREA 300 LEASE PARCEL (TANK FARM)
PORT OF VANCOUVER

Real property situated in the City of Vancouver, Clark County, Washington, being a portion of the Henry Van Alman Donation Land Claim, lying in the North half of Section 20, Township 2 North, Range 1 East of the Willamette Meridian, described as follows:

Portions of Lot 3 and Lot 4 of the Port of Vancouver Binding Site Plan recorded in Book 53 of surveys, at Page 141, records of said county, described as follows:

(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the Northwest corner of said Lot 4, said corner being on the South right of way line of Lower River Road (SR 501) as shown on said Binding Site Plan; Thence along the North line of said Lot 4 and said South right of way line South 64° 04' 04" East 572.59 feet to the Northeast corner of said Lot 4, said corner being an angle point on the North line of Tract B of said Binding Site Plan; thence along the East line of said Lot 4 and the North line of said Tract B South 27° 04' 10" West 136.35 feet to the **Point of Beginning**; thence continuing along said East and North line South 27° 04' 10" West 635.67 feet; thence leaving said East and North line South 70° 47' 50" West 57.47 feet; thence North 58° 53' 18" West 1082.42 feet; thence North 46° 35' 26" West 138.06 feet; thence North 30° 59' 21" East 631.05 feet; thence North 73° 27' 39" East 51.57 feet; thence South 64° 04' 04" East 984.81 feet; thence South 29° 39' 03" East 223.50 feet to the **Point of Beginning**.

Containing 908,136 square feet or approximately 20.848 acres.

Subject to easements and restrictions of record.

8/15/2013

GARY O. FOLKERTS
STATE OF WASHINGTON
38483
REGISTERED
PROFESSIONAL LAND SURVEYOR

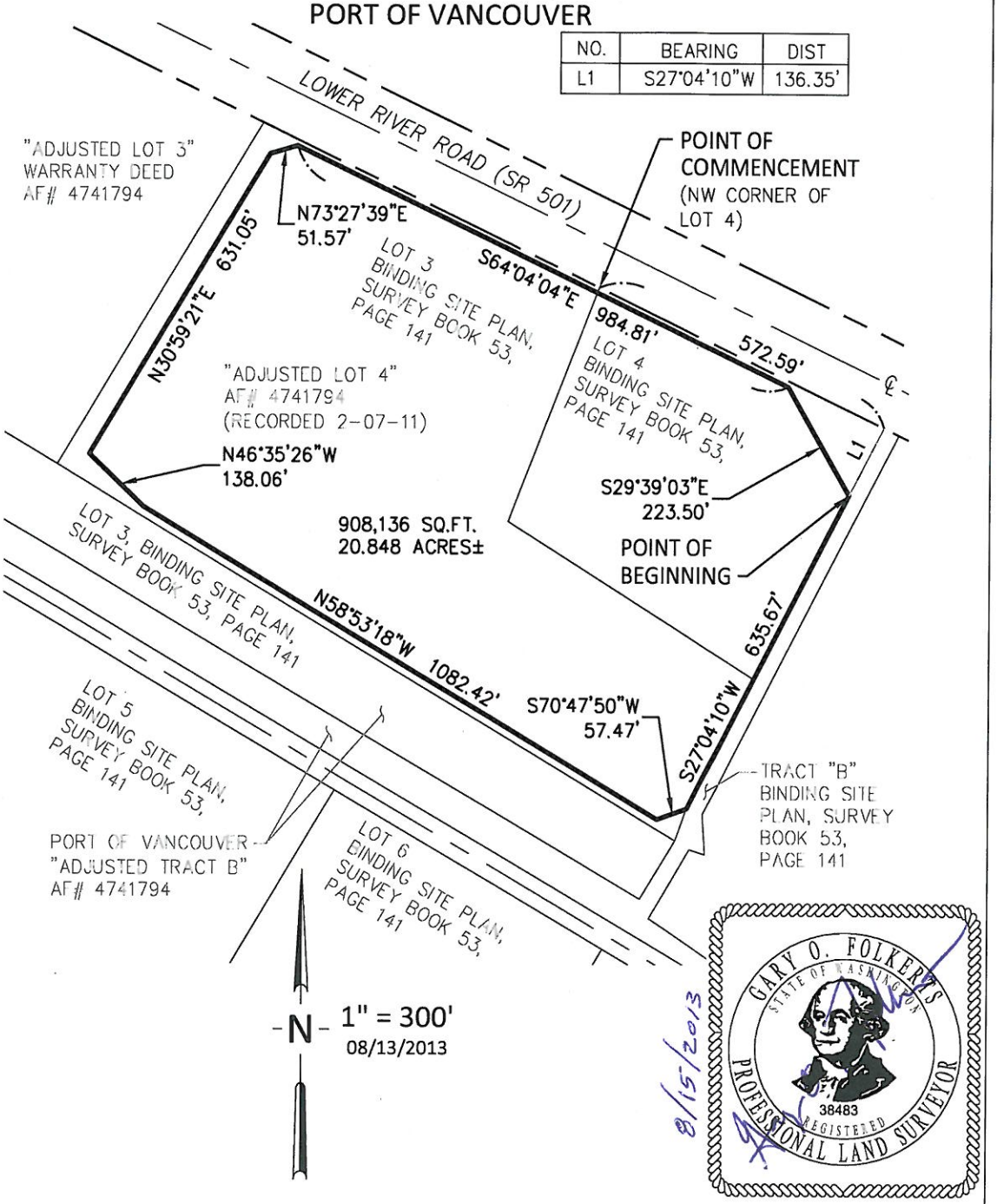
SKETCH TO ACCOMPANY LEGAL DESCRIPTION

AREA 300 LEASE PARCEL

(TANK FARM)

PORT OF VANCOUVER

NO.	BEARING	DIST
L1	S27°04'10"W	136.35'



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PAGE 2 OF 2 15622SS3

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15622LD4
8/20/13
GAH

LEGAL DESCRIPTION
AREA 400 LEASE PARCEL
(DOCK AREA)
PORT OF VANCOUVER

Real property situated in the City of Vancouver, Clark County, Washington, being a portion of the Henry Van Alman Donation Land Claim, lying in the Northeast quarter of Section 19 and West half of Section 20, Township 2 North, Range 1 East of the Willamette Meridian, described as follows:

Portions of Tract E, Lot 8, Lot 9, Lot 10 and Lot 12 of that Port of Vancouver Binding Site Plan recorded in Book 53 of Surveys, at Page 141, records of said county, together with bedlands of the Columbia River, described as follows:

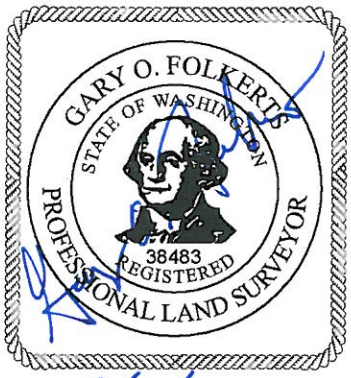
(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the most Southerly corner of Lot 9 of said Binding Site Plan, said corner also being an angle point on the Easterly line of Tract E of said Binding Site Plan and a point on the Southwesterly line of Lot 10 of said Binding Site Plan; thence along the East line of said Lot 9 and the Southwesterly line of said Lot 10 North 30° 25' 37" East 19.79 feet to the **Point of Beginning**; thence continuing along said East line and Southwesterly line North 30° 25' 37" East 94.41 feet to the most easterly corner of said Lot 9; thence along the easterly extension of the Northerly line of said Lot 9 South 59° 21' 27" East 74.61 feet; thence South 30° 11' 28" West 191.81 feet; thence North 63° 19' 37" West 152.13 feet; thence South 27° 17' 57" West 155.92 feet; thence South 05° 40' 44" West 39.58 feet; thence South 61° 43' 01" East 22.47 feet; thence South 24° 35' 09" West 5.54 feet; thence South 62° 39' 54" East 144.39 feet; thence North 67° 31' 17" East 151.57 feet; thence South 62° 35' 00" East 176.85 feet; thence South 27° 25' 00" West 37.00 feet; thence North 62° 35' 00" West 181.86 feet; thence South 67° 31' 17" West 119.40 feet; thence South 27° 32' 15" West 8.61 feet; thence South 87° 13' 52" West 7.43 feet; thence North 62° 37' 45" West 747.33 feet; thence North 28° 47' 14"

West 7.14 feet; thence North 27° 57' 57" East 23.38 feet; thence South 62° 23' 26" East 21.91 feet; thence North 48° 37' 27" East 43.19 feet; thence North 27° 19' 07" East 275.11 feet to a point on the Southerly line of Lot 8 of said Binding Site Plan and the Northerly line of Tract E of said Binding Site Plan; thence along said Southerly line and said Northerly line South 59° 41' 51" East 108.26 feet; thence North 30° 20' 13" East 15.09 feet; thence South 59° 41' 51" East 498.28 feet to the **Point of Beginning.**

Containing 217,756 square feet or approximately 5.000 acres.

Subject to easements and restrictions of record.

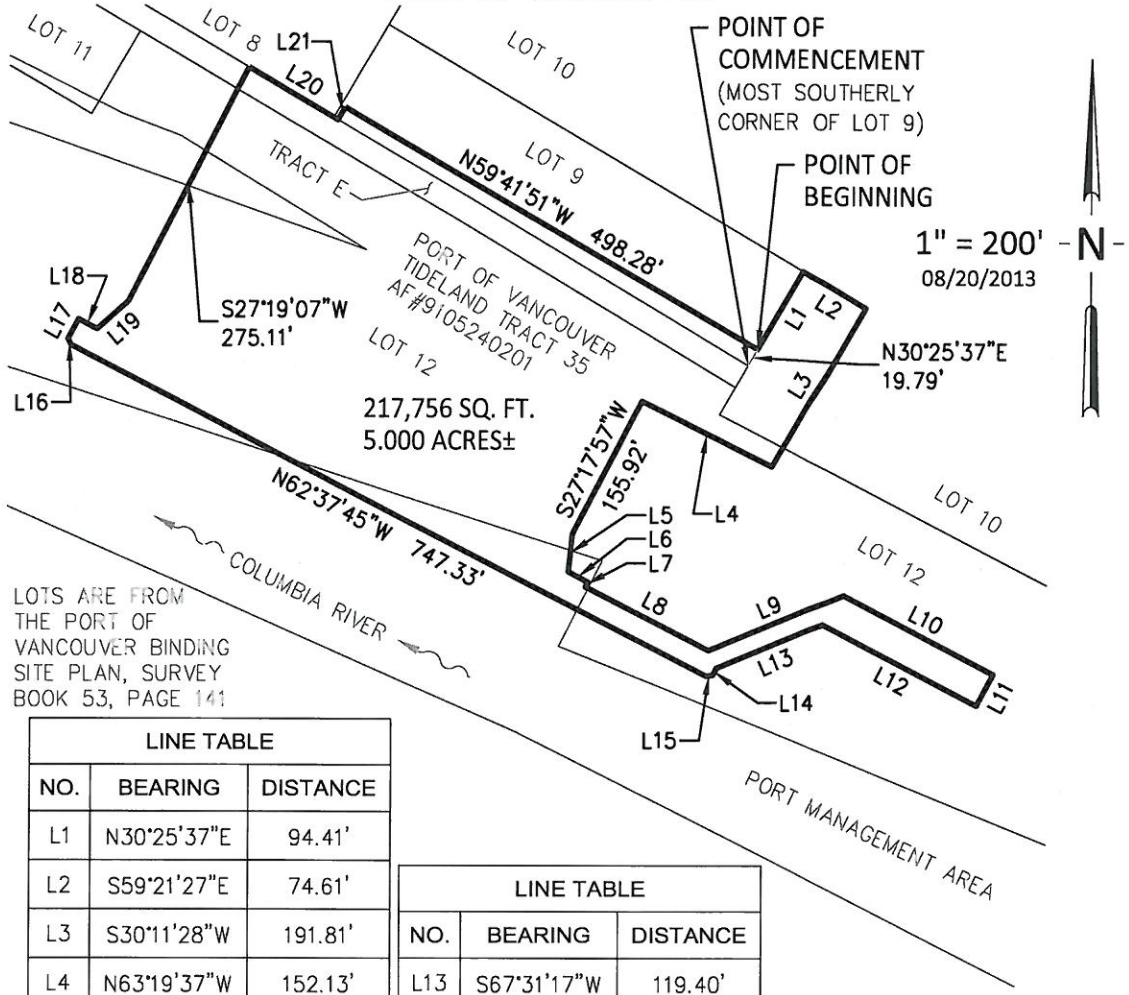


8/21/2013

SKETCH TO ACCOMPANY LEGAL DESCRIPTION

AREA 400 LEASE PARCEL (DOCK AREA)

PORT OF VANCOUVER



LINE TABLE		
NO.	BEARING	DISTANCE
L1	N30°25'37"E	94.41'
L2	S59°21'27"E	74.61'
L3	S30°11'28"W	191.81'
L4	N63°19'37"W	152.13'
L5	S05°40'44"W	39.58'
L6	S61°43'01"E	22.47'
L7	S24°35'09"W	5.54'
L8	S62°39'54"E	144.39'
L9	N67°31'17"E	151.57'
L10	S62°35'00"E	176.85'
L11	S27°25'00"W	37.00'
L12	N62°35'00"W	181.86'

LINE TABLE		
NO.	BEARING	DISTANCE
L13	S67°31'17"W	119.40'
L14	S27°32'15"W	8.61'
L15	S87°13'52"W	7.43'
L16	N28°47'14"W	7.14'
L17	N27°57'57"E	23.38'
L18	S62°23'26"E	21.91'
L19	N48°37'27"E	43.19'
L20	S59°41'51"E	108.26'
L21	N30°20'13"E	15.09'

8/21/2013

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15622LD6 REV 1
8/20/13
btm

LEGAL DESCRIPTION
TSJV PIPELINE EASEMENT
PORT OF VANCOUVER

An easement over real property situated in the City of Vancouver, Clark County, Washington, being portions of the Patrick Markey and Henry Van Allman Donation Land Claims and lying in the Northeast quarter of Section 19 and the Northwest quarter of Section 20, Township 2 North, Range 1 East of the Willamette Meridian described as follows:

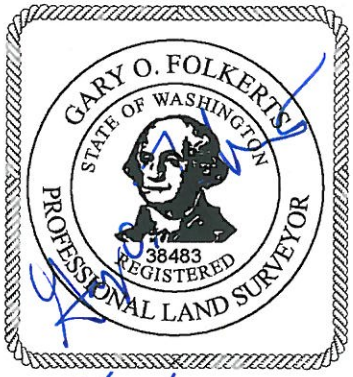
(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the Southwest corner of Lot 1 of that Port of Vancouver Binding Site Plan recorded in Book 53 of Surveys at page 141, said corner also being the Northwest corner of Lot 2 of said Binding Site Plan; thence along the North line of said Lot 2 and the South line of said Lot 1 South 59° 11′ 50″ East 823.17 feet to the Southeast corner of said Lot 1 and Northeast corner of said Lot 2; thence South 58° 01′ 57″ East 1490.93 feet; thence South 46° 35′ 26″ East 37.45 feet to the **Point of Beginning**; thence continuing South 46° 35′ 26″ East 22.81 feet; thence South 72° 09′ 05″ West 52.29 feet; thence South 30° 52′ 03″ West 42.64 feet; thence North 59° 26′ 51″ West 1328.32 feet; thence South 53° 38′ 53″ West 506.54 feet; thence North 54° 31′ 45″ West 13.58 feet; thence South 34° 35′ 33″ West 630.61 feet; thence South 55° 24′ 27″ East 13.79 feet; thence South 35° 00′ 51″ West 559.97 feet; thence South 59° 41′ 51″ East 392.03 feet; thence South 27° 19′ 07″ West 26.04 feet; thence North 59° 41′ 51″ West 465.77 feet; thence North 35° 00′ 51″ East 585.75 feet; thence North 45° 37′ 43″ East 163.25 feet; thence North 34° 35′ 33″ East 481.35 feet; thence North 54° 17′ 43″ West 198.21 feet; thence North 72° 55′ 24″ West 534.82 feet; thence North 65° 54′ 17″ West 266.66 feet; thence North 83° 29′ 56″ West 49.28 feet to a point of curvature with a 1000.37 foot radius curve; thence along said curve to the right, through a central angle of 24° 23′ 49″, an arc distance of 425.96 feet; thence North 35° 01′ 15″ East 55.15 feet to a point on the arc of a 945.37 foot radius curve; thence from a tangent bearing of South 59° 20′ 31″ East, along said curve to the left, through a central angle of 02° 26′ 10″, an arc distance of 40.19 feet; thence South 35° 01′ 15″ West 15.10 feet to a point on the arc of a 960.37 foot radius curve; thence from a tangent bearing of South 61° 40′ 17″ East, along said

curve to the left, through a central angle of 21° 49′ 39″, an arc distance of 365.86 feet to a point of tangency; thence South 83° 29′ 56″ East 119.09 feet; thence South 59° 13′ 33″ East 188.83 feet; thence South 72° 55′ 24″ East 541.60 feet; thence South 59° 26′ 51″ East 29.87 feet to a point of curvature with a 754.49 foot radius curve; thence along said curve to the right, through a central angle of 04° 55′ 06″, an arc distance of 64.77 feet to a point of tangency; thence South 54° 31′ 45″ East 150.71 feet; thence North 53° 38′ 53″ East 436.52 feet; thence North 34° 55′ 04″ East 55.58 feet; thence South 59° 10′ 37″ East 1344.64 feet; thence North 30° 48′ 28″ East 19.34 feet; thence North 72° 09′ 05″ East 48.87 feet to the **Point of Beginning**.

Containing 194,730 square feet or approximately 4.470 acres.

Subject to easements and restrictions of record.

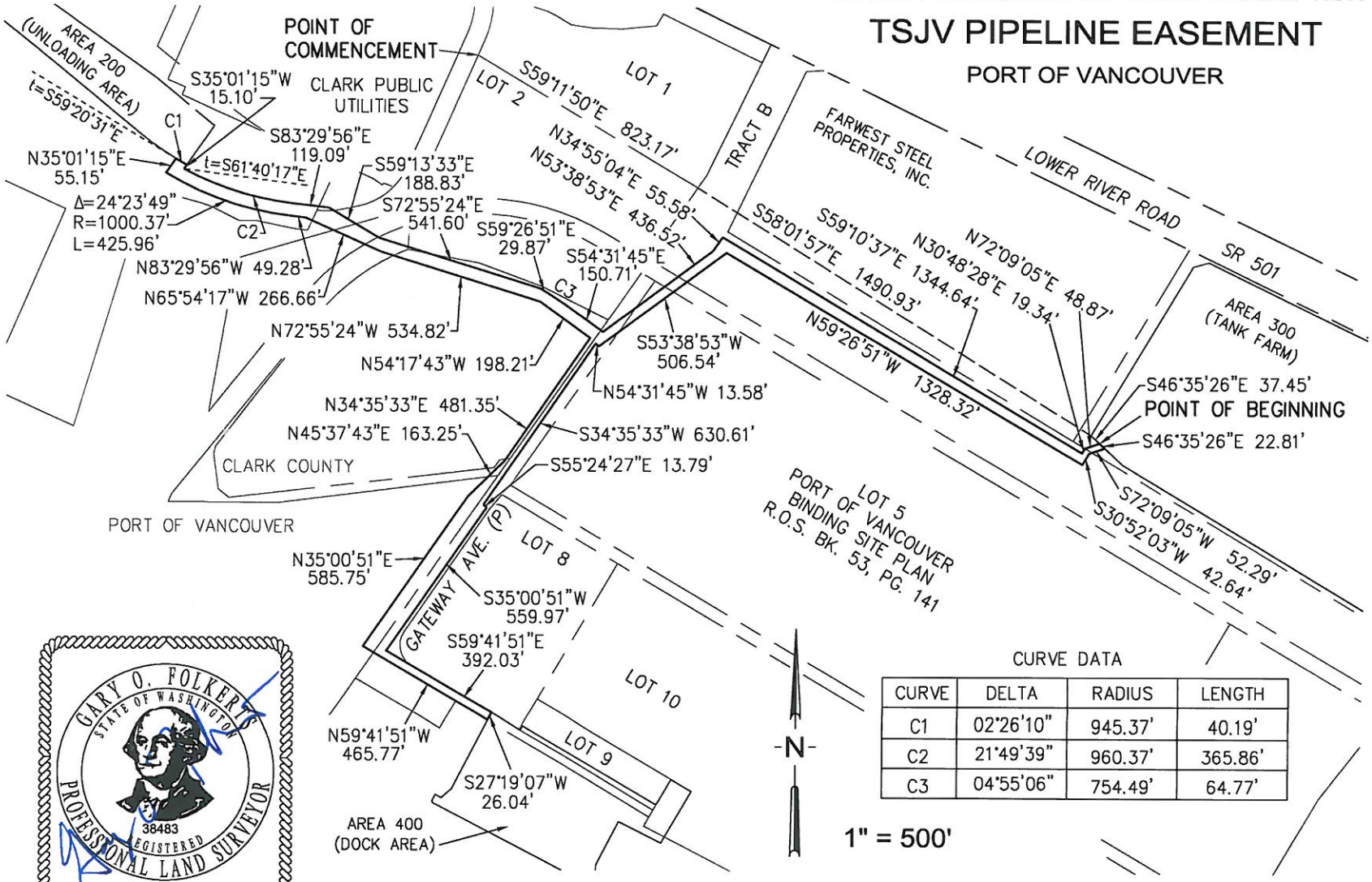


8/21/2013

SKETCH TO ACCOMPANY LEGAL DESCRIPTION

TSJV PIPELINE EASEMENT

PORT OF VANCOUVER



CURVE DATA

CURVE	DELTA	RADIUS	LENGTH
C1	02°26'10"	945.37'	40.19'
C2	21°49'39"	960.37'	365.86'
C3	04°55'06"	754.49'	64.77'

GARY O. FOLKERTS
STATE OF WASHINGTON
38483
REGISTERED
PROFESSIONAL LAND SURVEYOR

8/21/2013

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PAGE 3 OF 3
15622SS6 REV 1

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15622LD5 REV 1
8/20/13
btm

LEGAL DESCRIPTION
TSJV RAIL AREA
PORT OF VANCOUVER

Real property situated in the City of Vancouver, Clark County, Washington, being portions of the Patrick Markey and John Mathews Donation Land Claims and lying in the South half of Section 18 and the North half of Section 19, Township 2 North, Range 1 East of the Willamette Meridian described as follows:

A portion of "Parcel 1" as conveyed to Port of Vancouver by Evergreen Aluminum, LLC by deed recorded under Auditor's File No. 4526464, a portion of "Parcel 1" as conveyed to Port of Vancouver by Alcoa by deed recorded under Auditor's file No. 4547240, a portion of that parcel conveyed to the Port of Vancouver by Clark County Public Utilities by deed recorded under Auditor's File No. 4607518 and a portion of "Parcel 1" as conveyed to the Port of Vancouver by BNSF by deed recorded under Auditor's File No. 4524400, records of said county, described as follows:

(The following description is referenced to the Washington coordinate system of 1983, south zone. Divide the following "grid" distances by a combined scale factor of 1.000042242 to determine "ground" distances.)

Commencing at the Southeast corner of Lot 1 of that Port of Vancouver Binding Site Plan recorded in Book 53 of Surveys at page 141, said corner also being the Northeast corner of Lot 2 of said Binding Site Plan; thence along the North line of said Lot 2 and the South line of said Lot 1 North 59° 11' 50" West 823.17 feet to the Southwest corner of said Lot 1 and Northwest corner of said Lot 2; thence South 74° 49' 47" West 877.26 feet to a point hereinafter referred to as **Point "A"**; thence North 51° 51' 45" West 12.52 feet; thence North 50° 40' 40" West 226.20 feet; thence North 54° 31' 45" West 1651.32 feet; thence South 35° 28' 15" West 58.57 feet to the **Point of Beginning**; thence continuing South 35° 28' 15" West 45.04 feet to a point on the arc of a 782.31 foot radius curve; thence from a tangent bearing of North 55° 29' 36" West, along said curve to the left, through a central angle of 100° 21' 04", an arc distance of 1370.19 feet; thence South 24° 11' 06" West 235.78 feet to a point of curvature with a 741.50 foot radius curve; thence along said curve to the left, through a central angle of 90° 01' 28", an arc distance of 1165.06 feet to a point of tangency; thence

South 65° 50′ 21″ East 1314.77 feet to a point of curvature with a 756.00 foot radius curve; thence along said curve to the left, through a central angle of 68° 14′ 24″, an arc distance of 900.41 feet to a point of tangency; thence North 45° 55′ 15″ East 423.19 feet to a point of curvature with a 683.19 foot radius curve; thence along said curve to the right, through a central angle of 25° 58′ 16″, an arc distance of 309.68 feet to a point of tangency; thence North 71° 53′ 31″ East 124.58 feet; thence South 18° 06′ 29″ East 17.00 feet; thence South 71° 53′ 31″ West 30.86 feet; thence South 66° 41′ 13″ West 93.31 feet to a point of curvature with a 666.44 foot radius curve; thence along said curve to the left, through a central angle of 12° 33′ 43″, an arc distance of 146.11 feet to a point of tangency; thence South 54° 07′ 30″ West 118.70 feet to a point of curvature with a 666.19 foot radius curve; thence along said curve to the left, through a central angle of 08° 12′ 15″, an arc distance of 95.39 feet to a point of tangency; thence South 45° 55′ 15″ West 358.18 feet to a point of curvature with a 788.00 foot radius curve; thence along said curve to the right, through a central angle of 68° 14′ 24″, an arc distance of 938.52 feet to a point of tangency; thence North 65° 50′ 21″ West 1314.77 feet to a point of curvature with a 773.50 foot radius curve; thence along said curve to the right, through a central angle of 90° 01′ 28″, an arc distance of 1215.34 feet to a point of tangency; thence North 24° 11′ 06″ East 249.02 feet to a point on the arc of a 814.31 foot radius curve; thence from a tangent bearing of North 24° 09′ 20″ East, along said curve to the right, through a central angle of 100° 34′ 18″, an arc distance of 1429.37 feet to the **Point of Beginning**.

Subject to easements and restrictions of record.

Also:
Commencing at said "**Point A**"; thence South 35° 01′ 15″ West 42.09 feet to the **Point of Beginning**; thence continuing South 35° 01′ 15 West 80.06 feet to a point on the arc of a 683.19 foot radius curve; thence from a tangent bearing of South 55° 23′ 23″ East, along said curve to the left, through a central angle of 29° 40′ 14″, an arc distance of 353.79 feet to a point of tangency; thence South 85° 03′ 37″ East 77.74 feet; thence South 78° 42′ 02″ East 73.70 feet; thence North 11° 17′ 58″ East 17.00 feet; thence South 77° 08′ 21″ East 63.24 feet; thence North 17° 13′ 10″ East 17.00 feet; thence North 72° 46′ 50″ West 328.32 feet to a point of curvature with a 755.99 foot radius curve; thence along said curve to the right, through a central angle of 15° 54′ 46″, an arc distance of 209.96 feet to the **Point of Beginning**.

Subject to easements and restrictions of record.

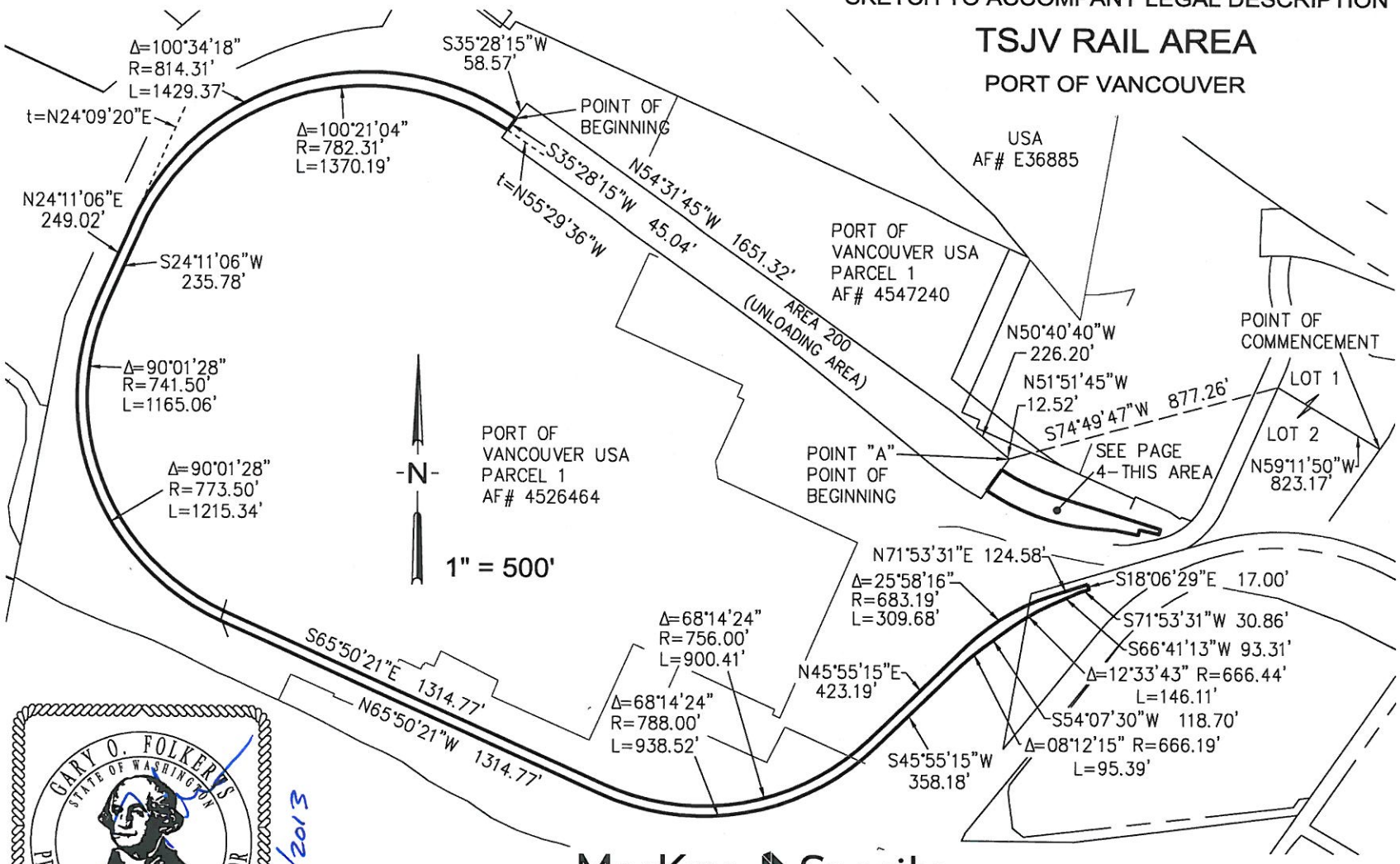
8/21/2013

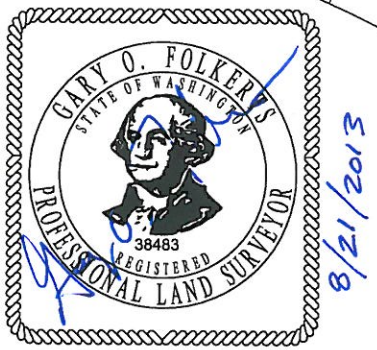
GARY O. FOLKERTS
STATE OF WASHINGTON
38483
REGISTERED
PROFESSIONAL LAND SURVEYOR

SKETCH TO ACCOMPANY LEGAL DESCRIPTION

TSJV RAIL AREA

PORT OF VANCOUVER





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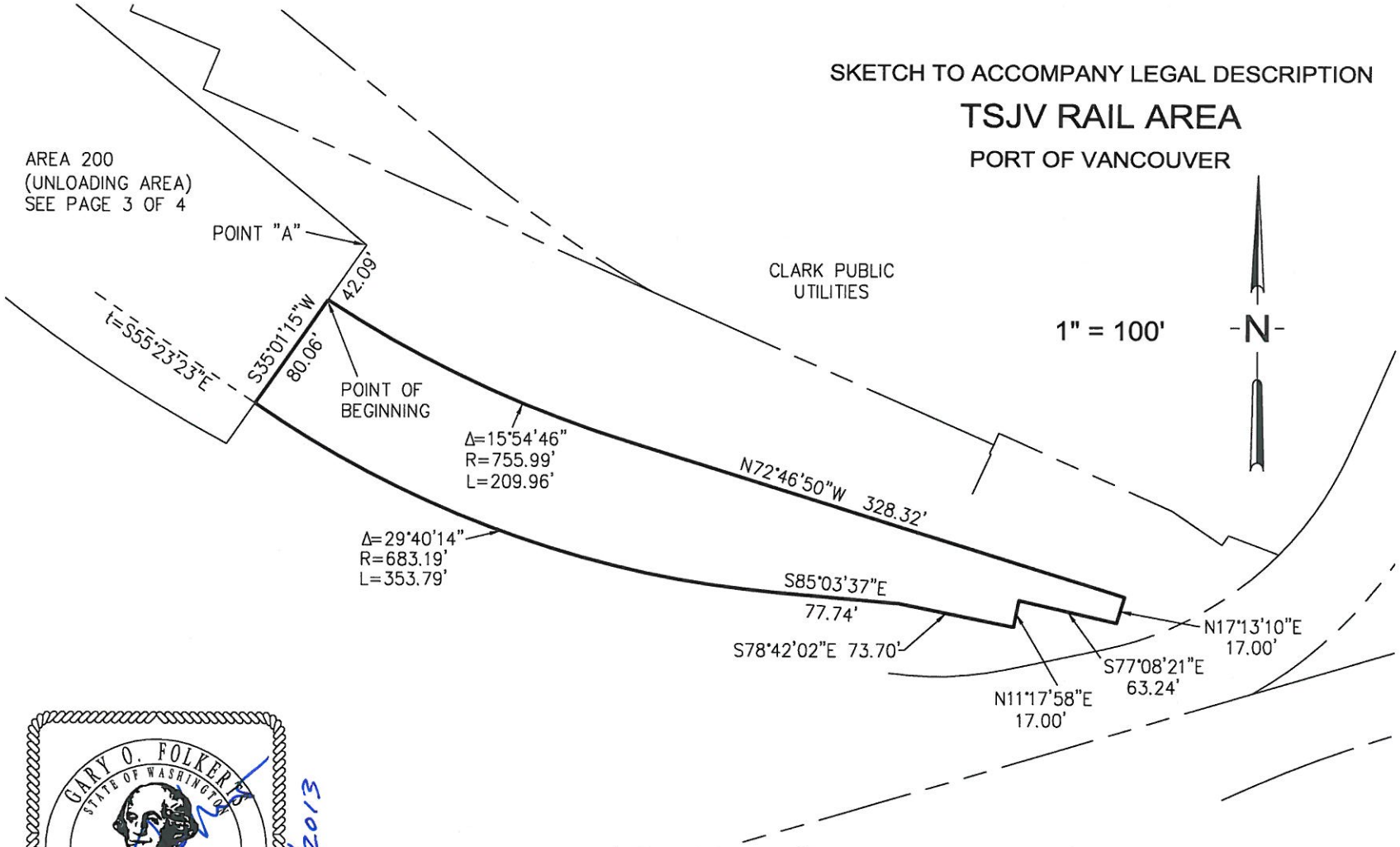
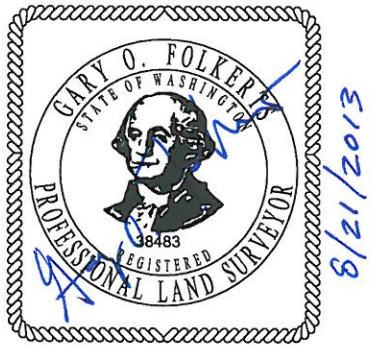
SKETCH TO ACCOMPANY LEGAL DESCRIPTION

TSJV RAIL AREA

PORT OF VANCOUVER





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2.2.2 Ownership Interests

The parcels upon which the Facility is proposed are owned by the Port. The Applicant entered into a lease with the Port for the exclusive use of the property located within the site boundary and non-exclusive easements for the transfer pipeline corridor. A complete copy of the lease has been provided to EFSEC under separate cover. The following pages present the main substantive requirements of the lease.

2.2.2 Ownership Lease

GROUND LEASE

BETWEEN

THE PORT OF VANCOUVER, U.S.A.

AND

TESORO SAVAGE PETROLEUM TERMINAL LLC

Commission Approval Date: July 23, 2013

Effective Date: August 1, 2013

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EXHIBIT "A" OUTLINE OF PREMISES LOCATION WITHIN THE OVERALL PORT PROPERTY

EXHIBIT "B" PREMISES SITE OUTLINE

EXHIBIT "C" LEGAL DESCRIPTION

EXHIBIT "D" ALTERATIONS TO BE MADE BY LESSOR AND LESSEE

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EXHIBIT "F"	RULES AND REGULATIONS
EXHIBIT "G"	GUARANTY
EXHIBIT "H"	TENANT ENVIRONMENTAL QUESTIONNAIRE
EXHIBIT "I"	NEW PRODUCT APPROVAL PROCESS
EXHIBIT "J"	RAIL OPERATIONS
EXHIBIT "K"	FORM OF PIPELINE EASEMENT AGREEMENT
EXHIBIT "L"	HEALTH AND SAFETY
EXHIBIT "M"	CONSENT DECREE
EXHIBIT "N"	RESTRICTIVE COVENANTS
EXHIBIT "O"	FORM OF CARGO COMMODITY PAYMENTS AND MINIMUM ANNUAL GUARANTY AGREEMENT
EXHIBIT "P"	PORT MANAGEMENT AGREEMENT
EXHIBIT "Q"	MONITORING WELLS

GROUND LEASE

THIS GROUND LEASE is made by and between the PORT OF VANCOUVER, a municipal corporation organized and existing under the laws of the State of Washington, hereinafter referred to as "Lessor," and TESORO SAVAGE PETROLEUM TERMINAL LLC, a Delaware limited liability company, hereinafter referred to as "Lessee." Capitalized terms have the meanings set forth in the Glossary of Terms attached hereto as Exhibit "E" or as defined elsewhere in this Lease.

WITNESSETH:

That the Parties do hereby mutually agree as follows:

1. **BASIC LEASE PROVISIONS:** These are provisions of this Lease, except as they may be modified hereafter.

A.	DATE OF GROUND LEASE:	August 1, 2013 (referred to herein as the "Effective Date").
B.	PRELIMINARY AND FINAL PREMISES DESCRIPTIONS:	As of the Effective Date, the Parties have not determined the precise boundaries of the Premises. During the Contingency Period, Lessor and Lessee shall develop mutually agreeable depictions and legal descriptions of the Rail/Rack Area, the Support Areas, the Storage Area, and the Marine Terminal Area (collectively, the "Final Premises"), which shall replace Exhibits "A", "B-1", "B-2" and "B-3" attached hereto on the Effective Date. Until such substitution has occurred, the Premises shall consist of the following (the "Preliminary Premises"): The area outlined on the attached Exhibits "A", "B-1", "B-2" and "B-3", all in "AS-IS" condition, all as described more particularly in Paragraph 2 below, and consisting of: "Rail/Rack Area": Approximately 9.92 acres (432,115 square feet) of land area for construction and operation of a petroleum products unloading facility, including exclusive rail tracks as described in Exhibit "J" and more particularly depicted on Exhibit "B-1". "Support Areas": Approximately 1.54 acres (67,082 square feet) ("Support Area A") and approximately 3.93 acres (171,191 square feet) ("Support Area B") of land for administrative and rail operations support activities for the Facility, more particularly depicted on Exhibit "B-1".

"Storage Area": Approximately 20.84 acres (969,210 square feet) of vacant land to be used for construction and use of petroleum products storage tanks and more particularly depicted on Exhibit "B-2". The possession of the Storage Area will be delivered in two phases (Phase 1, approximately 15.97 acres; and Phase 2, approximately 4.87 acres) as described in Paragraph 3.E below.

"Marine Terminal Area": Approximately 5.76 acres (250,906 square feet) consisting of the berthing areas commonly known as Berth 13 and Berth 14, Terminal 4, to be used exclusively by Lessee for the loading of Petroleum Products onto vessels docked at the Marine Terminal Area from time to time. The Marine Terminal Area is to be used in accordance with the terms of this Lease.

C. TERM:

Initial Lease Term:
The term of this Lease shall commence on the Effective Date, and shall continue for a full one hundred twenty (120) months after the Rent Commencement Date (i.e., ending at midnight on the last day of the calendar month that is a full 120 months after the Rent Commencement Date), unless sooner terminated in accordance with the terms and provisions of this Lease. The period from the Rent Commencement Date until the end of the term of this Lease (including any exercised Extension Terms) is referred to herein as the "Operating Term".

Extension Terms:
Lessee is granted two (2) successive options to extend, each for an additional Extension Term of five (5) years. The Extension Term(s) must be exercised in accordance with the provisions of Paragraph 3.B.

Early Termination:
If any or all of the conditions precedent set forth in Paragraph 2.D has not been satisfied or waived on or before the Conditions Precedent Outside Date, either Lessor or Lessee may terminate this Lease on or before the Conditions Precedent Outside Date by written notice of termination to the other Party, without further cost or obligation, except as set forth expressly herein. The security instrument required by the first paragraph of Paragraph 1.G hereof will be retained by Lessor until all outstanding expenses owed to Lessor are reimbursed in full by Lessee.

D. INITIAL FEES AND RENT:

During the Contingency Period: Thirty Thousand Dollars ($30,000.00) per month during the first eighteen (18) months of the Contingency Period,

and thereafter, until the Conditions Precedent Expiration Date, Fifty Thousand Dollars ($50,000.00) per month ("Contingency Period Fees").

During the Construction Period: Fifty Thousand Dollars ($50,000.00) per month until the Rent Commencement Date ("Construction Period Fees").

On and after the Rent Commencement Date: Five and thirty-two one hundredths cents ($0.0532), multiplied by the annual percentage increases in the Index from the Effective Date until the Rent Commencement Date, per square foot per month ("Base Monthly Rent"), plus Leasehold Tax.

Rent Adjustment:
During the Initial Lease Term and any Extension Term, the Base Monthly Rent shall be increased annually on each anniversary of the Effective Date (each, an "Adjustment Date"). On each annual Adjustment Date, the Base Monthly Rent set forth above shall be adjusted by multiplying the Base Monthly Rent by the percentage increase in the Consumer Price Index All Urban Consumers U.S. City Average (1982-84=100) published by the United States Department of Labor, Bureau of Labor Statistics ("Index"). The percentage increase shall be calculated by comparing the Index that was in effect on the ninetieth (90th) day preceding the Effective Date for the first annual adjustment and prior to the Adjustment Date on each successive annual adjustment to the Index that is in effect on the ninetieth (90th) day preceding the then current Adjustment Date. In the event that the Adjustment Date falls on a day other than the 1st of the month, the adjustment in Base Monthly Rent shall take effect on the first day of the following month.

E.	CURRENT LEASEHOLD TAX RATE:	Twelve and 84/100 percent (12.84%).
F.	ADDITIONAL CHARGES:	Common Area Maintenance ("CAM") charges: $.0054 per square foot, as adjusted below, and as described in Paragraph 5.E. Rail Access Fee ("RAF"): Twenty-Five Dollars ($25.00) per BNSF-delivering carrier Loaded Rail Car, or Fifty Dollars ($50.00) per non-BNSF-delivering carrier Loaded Rail Car, pursuant to the terms outlined in Paragraph 5.C.

CAM charges and the Rail Access Fee shall increase annually on the first day of each January ("CAM Adjustment Date"), beginning on January 1, 2014. On each CAM Adjustment Date, the CAM and RAF charges set forth shall be adjusted by multiplying such CAM and RAF charges by the percentage increase in the Consumer Price Index All Urban Consumers U.S. City Average (1982-84=100) published by the United States Department of Labor, Bureau of Labor Statistics ("Index"). The percentage increase for the first annual adjustment shall be calculated by comparing the Index that is in effect on the 1st day of October preceding January 1, 2013 to the Index that is in effect on the 1st day of October preceding January 1, 2014. Each successive annual adjustment will compare the Index in effect on October 1st prior to the previous CAM Adjustment date to the Index that is in effect on October 1st preceding the current CAM Adjustment Date. No such adjustments shall be less than an increase of Two percent (2%) or more than an increase of Six percent (6%) of the CAM and RAF charges in effect immediately prior to such adjustment.

Rail Maintenance Fee: For the Port's Rail System, as determined by the Port's annual Rail Tariff pursuant to the terms outlined in Paragraph 5.D; the Rail Maintenance Fee is, as of the Effective Date, Four Dollars ($4) per Loaded Rail Car.

Lessee shall be responsible for all individual rail maintenance and repair expenses on all rail spurs and tracks used exclusively by Lessee.

G. LEASE SECURITY AMOUNT:

Bond, letter of credit, or cash in an amount of [redacted] Dollars ([redacted]), as and to the extent required in Paragraph 6.

Additionally, as security for payment of the sums to be paid by Lessee to Lessor under the terms of the MGA Agreement, Lessee shall deliver to Lessor a deed of trust creating, for the benefit of Lessor (or the holders of bonds issued by Lessor or a trustee acting for the benefit thereof), a first position security interest on the improvements and Alterations constituting the Facility (as more particularly described in Paragraph 6.B), or such other security instrument as is proposed by Lessee and is acceptable to Lessor in its sole discretion, until such time as Lessee has paid to Lessor, in respect of Wharfage, Service and Facilities Fees, a total of [redacted]

H.	GUARANTY:	If applicable with respect to an assignee, one or more Parent Company Guaranties, in the form attached hereto as Exhibit "G".
I.	PERMITTED USE:	Rail/Rack Area: (i) Loading and unloading of Petroleum Products by rail, (ii) transfer of such Petroleum Products to and from the Storage Area or the Marine Terminal Area, and (iii) rail operations and other operational and maintenance activities associated with the receipt, loading, unloading and transfer of such Petroleum Products, including but not limited to inspection, repair and storage of rail cars and installation and upgrading of equipment from time to time. Support Areas: Office, administrative and support activities relating to the operation of the Facility, including installation and upgrading of equipment from time to time. Storage Area: (i) Storage and blending of Petroleum Products delivered by rail, or vessel via pipeline, to the Rail/Rack Area, (ii) transfer of such Petroleum Products via pipeline to the Marine Terminal Area, and (iii) operational and maintenance activities associated with the storage, blending and transfer of such Petroleum Products, including installation and upgrading of equipment from time to time. Marine Terminal Area: (i) Loading and unloading of vessels with Petroleum Products delivered to the Premises; and (ii) operational and maintenance activities, including installation and upgrading of equipment from time to time, including equipment used to load and unload Petroleum Products onto and from vessels and the inspection, repair and handling of vessels.
J.	PROPERTY INSURANCE:	Lessee Provided: Maximum Deductible: One Million Dollars ($1,000,000) and five percent (5%) of values per location (i.e., the Rail/Rack Area, the Support Areas, the Storage Area, and the Marine Terminal Area) for the perils of earthquake and flood; and subject to adjustment pursuant to the provisions of Paragraph 15.
K.	LIABILITY INSURANCE:	Minimum Coverage Amounts for Paragraph 15.B: Ten Million Dollars ($10,000,000) per occurrence/ Fifteen Million Dollars ($15,000,000) aggregate; subject to adjustment pursuant to the provisions of Paragraph 15.

Minimum Coverage Amounts for Paragraph 15.D(4) – Employer Liability Act:
One Million Dollars ($1,000,000).

Minimum Coverage Amounts for Paragraph 15.D(5) – Automobile Liability:
One Million Dollars ($1,000,000) per occurrence.

L. POLLUTION LEGAL LIABILITY INSURANCE

Lessee shall also obtain pollution legal liability insurance in the amount of Twenty-Five Million Dollars ($25,000,000) as an extension of the commercial general liability insurance or as a separate policy, and further pursuant to the provisions of Paragraph 15.C.

M. ADDRESSES FOR NOTICE PURPOSES:

Notices to Lessor shall be sent to:

The Port of Vancouver, U.S.A.
3103 NW Lower River Road
Vancouver, WA 98660
Attention: Executive Director
Telephone: 360-693-3611
Facsimile: 360-735-1565

With a copy to:

Alicia Lowe, POV General Counsel
Schwabe, Williamson & Wyatt
700 Washington Street, Suite 701
Vancouver, WA 98660
Telephone: 360-694-7551
Facsimile: 360-693-5574

Notices to Lessee shall be sent to:

Tesoro Savage Petroleum Terminal LLC
c/o Savage Services Corporation
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121
Attention: Group Leader, Oil and Gas Solutions
Email: [redacted]
Facsimile: [redacted]

With a copy to:

Savage Companies
6340 South 3000 East, Suite 600
Salt Lake City, Utah 84121
Attention: General Counsel
Email: [redacted]
Facsimile: [redacted]

And to:

Tesoro Refining & Marketing Company LLC
19100 Ridgewood Parkway

San Antonio, Texas 78259
Attention: Senior Director, Managing Attorney, Commercial
Email: [redacted]
Facsimile: [redacted]

N. BROKERS:

Lessor's Broker: None
Lessee's Broker: None

Lessor shall lease the Premises (as defined below in Paragraph 2) to Lessee, and Lessee shall lease the Premises from Lessor, in accordance with the Terms of this Lease, after Lessor and Lessee execute this Lease, which consists of _____ pages including Exhibits A, B-1, B-2, B-3, C, D, E, F, G, H, I, J, K, L, M, N, O, P, and Q. Any and all exhibits attached hereto are made a part of this Lease and incorporated herein.

2. **PREMISES**:

A. Lessor hereby leases to Lessee and Lessee hereby leases from Lessor, subject to and with the benefit of the terms and conditions of this Lease, including the attached exhibits, the Preliminary Premises, located in the Port District of the Port of Vancouver, hereinafter known as the "Port," located in the City of Vancouver, Clark County, Washington, as described in Paragraph 1.B and as represented by the area outlined on the attached Exhibits "A", "B-1", "B-2", and "B-3" together with the nonexclusive right of ingress and egress to and from the Premises across those portions of the Port dedicated from time to time as streets, roadways, and Common Areas. Lessor further agrees to convey to Lessee one or more nonexclusive pipeline easements for the purpose of constructing and maintaining pipelines to transport Lessee's Petroleum Products between the Rail/Rack Area, the Support Areas, the Storage Area, and the Marine Terminal Area, substantially in the form of Pipeline Easement Agreement attached hereto as Exhibit "K" (each, a "Pipeline Agreement"). Except for the Existing Environmental Conditions as generally described below in Paragraph 2.C, Lessee hereby accepts said Premises in "As-Is" condition. Notwithstanding that Lessee accepts the Premises in "As Is" condition, Lessor shall, prior to the Rent Commencement Date and at Lessor's sole cost and expense, complete the improvements to the Port that are described as "Lessor's Infrastructure Improvements" on Exhibit "D" attached hereto, to enable Lessee to fully utilize the Premises for the Permitted Use.

B. It is understood that the Premises constitute a portion of a multiple occupancy area, including warehouses and office buildings, in the Port. During the term hereof and subject to the covenants, terms and conditions hereof, Lessee, and its agents, employees, customers, invitees, and licensees, shall have the nonexclusive

right to use, in common with Lessor and other lessees of building and unimproved land space in the Port, and their agents, employees, customers, invitees, and licensees, thereto, all Common Areas. Lessee shall use Common Areas in conformity with the reasonable rules and regulations and changes thereto from time to time promulgated by Lessor after written notice of any changes to such rules and regulations has been provided to Lessee. The manner and nature of the installation and maintenance of the Common Areas shall be subject to the sole discretion of Lessor, but in a manner consistent with the requirements of Paragraph 5.E below. Lessor reserves the right from time to time to make changes in the shape, size, location and extent of Common Areas provided that, except as may be required by law or government agencies, no such change shall materially adversely affect Lessee's Permitted Use of the Premises or Lessee's means of access to and from the Premises. Lessor further retains the right to temporarily close Common Areas from time to time in order to prevent a dedication thereof or for the making of repairs or performance of maintenance. No such temporary closures shall prevent Lessee's normal business operations at the Premises or materially adversely and unreasonably affect Lessee's access to and from the Premises.

C. Lessor and Lessee acknowledge that portions of the Premises and portions of the areas to which Lessee may be granted an easement pursuant to a Pipeline Agreement are subject to the Consent Decree, in which the previous land owner agreed to remediate the Premises. Portions of the Premises and portions of the areas to which Lessee may be granted an easement pursuant to a Pipeline Agreement also are subject to the Restrictive Covenants, which require capping of residual contamination and restrict activities that would disturb the contamination. Lessee's possession, including but not limited to Lessee's use and operations, throughout the Term(s) of the Lease, shall be consistent with all requirements of the Consent Decree and Restrictive Covenants, which are incorporated by reference in this Lease. Lessor shall be responsible for proper management of all Existing Environmental Conditions, including in connection with the pre-occupancy construction of improvements on the Premises, all as set forth in Paragraph 11.B hereof. Lessor, with Lessee's cooperation, will obtain the necessary approvals from the Washington Department of Ecology so as to allow Lessor or Lessee to modify any monitoring well location or cap, including modifications to conduct baseline and geotechnical testing, for pre-occupancy construction of improvements and pre-occupancy construction of the tenant improvements necessary for the Permitted Use (provided Lessee presents a reasonable design which is consistent with the Consent Decree and Restrictive Covenants, as well as the other terms and conditions of this Lease) of the Premises under this Lease. Lessee (with Lessor's reasonable cooperation, but at no cost to Lessor) shall be responsible for obtaining any other

licenses, permits and approvals needed for its operations on the Premises, and shall cooperate reasonably with Lessor to ensure that the scope and breadth of such licenses, permits and approvals are adequate for completion of any work to be performed by Lessor under such licenses, permits and approvals.

D. Notwithstanding anything to the contrary set forth herein, the Parties' respective obligations under this Lease (other than: (1) Lessee's obligation to pay the Contingency Period Fee pursuant to Paragraph 4.A; (2) the Parties' obligations to work diligently and in good faith to pursue all necessary licenses, permits and approvals required for the development and construction of the Facility for the Permitted Use; and (3) the indemnity obligations set forth in Paragraphs 11, 13, 16, 23, and 39; each of which such obligations set forth in this Paragraph 2.D shall be absolute and irrevocable as of the Effective Date through the date of any termination based on the failure of the Conditions Precedent) shall be subject to satisfaction or waiver of the following Conditions Precedent on or before the Conditions Precedent Outside Date:

(1) all necessary licenses, permits and approvals have been obtained for the Permitted Use; and

(2) Lessee shall obtain a baseline investigation of environmental conditions at the Premises by an independent, reputable professional environmental consultant to assess the presence of contamination on the Premises prior to Lessee's use of the Premises (the "Baseline Assessment"). The selection of such consultant and the scope of work for the Baseline Assessment shall be approved by Lessor prior to the engagement of the consultant or the initiation of the assessment work. The scope of work shall include the sampling and analysis plan for the Baseline Assessment.

The Condition Precedent in Paragraph 2.D(1) is for the benefit of both Lessor and Lessee. The Condition Precedent in Paragraph 2.D(2) is for the sole benefit of Lessee. If the Conditions Precedent are satisfied or waived by the Party or Parties to whose benefit they run on or before the Conditions Precedent Outside Date, then Lessee shall promptly commence construction of the Facility. If neither Party provides the other Party with a termination notice on or before the Conditions Precedent Outside Date, the Conditions Precedent shall then be deemed satisfied.

During the Contingency Period, Lessor and Lessee shall work diligently and in good faith to: develop and approve depictions and legal descriptions of the Final Premises (the cost of preparation thereof to be borne by Lessor), and such depictions and legal descriptions shall, prior to the Conditions Precedent Expiration Date, be substituted into this Lease as replacement Exhibits "A", "B-1", "B-2" and "B-3" by a mutually executed

amendment to this Lease; and develop and mutually approve milestones and preliminary engineering and construction plans, specifications and designs (to be submitted by Lessee to Lessor for Lessor's review and approval), and rail track plans and specifications, for the development, construction, and operation of the Facility. Notwithstanding anything to the contrary herein, if Lessor is not reasonably satisfied on or before the Conditions Precedent Outside Date that Lessee is prepared to, and intends to, commence construction within [redacted] after the Conditions Precedent Expiration Date, Lessor may terminate this Lease without any further obligations on the part of either Party hereto, except as expressly set forth herein.

E. Lessee's use of the Rail/Rack Area shall be at all times in accordance with and subject to the terms, conditions, and limitations set forth in Exhibit "J" ("Rail Operations") attached hereto.

F. During the first twelve (12) months of the Contingency Period (unless otherwise expressly agreed in writing by the Parties), Lessor may use the Premises, and allow third parties to use the Premises, for any and all purposes other than the Permitted Use, so long as such use does not unreasonably change the condition of the Premises in such a way that would inhibit Lessee's development of the Facility following the Conditions Precedent Expiration Date.

3. **LEASE TERM**:

A. In accordance with the terms and conditions of this Lease, but subject to Paragraph 3.F below, Lessee shall have and hold the Premises commencing on the Conditions Precedent Expiration Date, unless this Lease shall be sooner terminated as herein provided.

B. Provided no Default under any of the provisions or covenants of the Lease has occurred which has not been cured, Lessee is hereby granted the number of successive options set forth in Paragraph 1.C to extend the Term of this Lease, each for an additional Extension Term as set forth in Paragraph 1.C (each of which periods is referred to herein as an "Extension Term"). Lessee shall exercise each option by giving written notice (the "Exercise Notice") to Lessor of its intent to extend the Lease Term no less than One Hundred Eighty (180) days prior to the expiration of the then current Term. Upon the timely exercise of the option to extend and subject to the assent of the Port, which shall not be unreasonably withheld, the Extension Term shall be on the same terms and conditions, except Base Monthly Rent, contained in the Lease. Base Monthly Rent for the Extension Term shall not be less than the Base Monthly Rent provided for herein. Base Monthly Rent shall be in the amount set forth below and there shall be no further options to extend the Term beyond the number of Extension Terms set forth in

Paragraph 1.C. Any attempted exercise of an option to extend the Term shall be null and void and wholly ineffective unless this Lease is still in full force and effect and Lessee shall not be in Default beyond applicable notice and cure periods under the terms of this Lease. For any assignment of this Lease requiring Lessor's approval or consent pursuant to Paragraph 19, Lessor's express approval shall also be required in order for any extension options available to Lessee to be included with the assignment of the Lease, with the same standard of consent (i.e., sole or reasonable discretion) applicable for Lessor's approval of the assignment of the Lease also being applicable to Lessor's approval of the assignment of the extension options. For any assignment of this Lease not requiring Lessor's approval or consent pursuant to Paragraph 19, any extension options available to Lessee shall be assigned automatically with the assignment of the Lease.

C. If Lessee fails to give timely written notice to Lessor of its election to extend the Term, the Term shall expire and this Lease terminate as of the end of the then expiring Term. If the Term is extended as aforesaid, all of the same terms, provisions and conditions set forth in this Lease shall apply, except that the Base Monthly Rent during the Extension Term shall be as set forth in Paragraphs 1.D and 4.

D. If Lessee timely gives written notice to Lessor of Lessee's first or second election to extend the Term, but Lessor elects to withhold its assent to such extension, then Lessee shall have no obligation, notwithstanding the terms of Paragraph 28 below, to pay for removal of the improvements and Alterations made by Lessee to the Premises. Additionally, in such event, Lessor may not, without compensating Lessee for the same (based on the fair market value thereof), enter into a lease, license or other occupancy agreement with a third party for all or any portion of the Premises whereby the Premises and the improvements and Alterations made by Lessee are used by such third party for a use substantially similar to the Permitted Use.

E. Any reference in this Lease to the "Term" or "Term of this Lease" or "Lease Term" shall mean the Initial Term together with any Extension Term accruing pursuant to Paragraph 3.B. If any option to extend the Term is not exercised strictly in accordance with Paragraph 3.B, then all other options to extend the Term shall automatically terminate and be null and void.

F. Lessee acknowledges that a portion of the Premises is, as of the Effective Date, occupied by a third party tenant, whose lease thereof expires on December 31, 2013. Accordingly, notwithstanding anything to the contrary herein, Lessee shall not have access to or possession of the portion of the Storage Area shown on Exhibit

"B-2" as "Storage Area – Phase 2" until written notice from Lessor to Lessee that such portion of the Premises is available (the "Phase 2 Possession Notice Date").

4. **FEES AND RENT:**

A. Lessee agrees to pay, during the Contingency Period, the Contingency Period Fees.

B. Lessee agrees to pay, during the Construction Period, the Construction Period Fees, which will not be credited back to Lessee.

C. Lessee agrees to pay as rental during the Term of this Lease, commencing on the Rent Commencement Date, the Base Monthly Rent set forth in Paragraph 1.D, as adjusted. Lessee also agrees to pay, during the Term of this Lease, commencing on the Effective Date, all Leasehold Taxes, including Leasehold Taxes applied by the Washington State Department of Revenue ("DOR") with respect to the Premises as determined by the DOR under RCW 82.29A.020. Base Monthly Rent and Leasehold Taxes are referred to collectively herein as the "Rent." The current Leasehold Tax Rate is set forth in Paragraph 1.E.

D. The Contingency Period Fee, the Construction Period Fee and the Rent shall be paid in advance on or before the first day of the month in which payment is due. All Additional Charges, including those described in Paragraph 5, shall be paid within no more than thirty (30) days from the date of billing. All payments shall be payable at Lessor's office in Vancouver, Washington without counterclaim, setoff, deduction or defense.

E. If any payment of the Contingency Period Fee, the Construction Period Fee, Rent or Additional Charges due to Lessor is not received within five (5) days from the date herein set for payment, Lessee shall pay to Lessor a late charge in the amount of ten percent (10%) of the payment then due and in arrears and interest on said payment at the "Interest Rate." Interest shall be calculated on outstanding payments from the date first due until received by Lessor. Lessee shall be responsible for any attorney fees or related charges incurred by Lessor for collection of rent. A charge of Seventy-Five and 00/100 Dollars ($75.00) shall be levied for any check received which is returned for insufficient funds.

F. Any Contingency Period Fee, Construction Period Fee or Rent payment for any fractional month during the Term hereof shall be prorated on the number of days in such month and payable on the next applicable payment date.

G. The Base Monthly Rent for each Extension Term shall be equal to the greater of: (i) the Base Monthly Rent payable immediately prior to the commencement of such Extension Term, plus an annual rent

adjustment in accordance with Paragraph 1.D, or (ii) the "Fair Market Rent" for the Premises which shall be determined as follows:

"Fair Market Rent" shall mean the effective flat rental rate per square foot received by landlords of comparable water accessible, heavy industrial land in the Vancouver, Washington, metropolitan area with similar amenities and fixtures, assuming Lessor were to put the space in question (in its then-existing "as-is" condition) on the market for lease to a new lessee, assuming a new lessee with comparable attributes to Lessee. In determining such "Fair Market Rent" there shall be taken into account, among other things, (i) rental rates, (ii) concessions then being given to prospective tenants such as construction and other allowances for tenant improvements, moving and other allowances, and (iii) any expenses that would be incurred by a landlord in connection with a third party lease such as leasing commissions, and (iv) the Base Year being utilized to determine such rent. Items referred to in clauses (ii) through (iv) above are hereinafter collectively referred to as "concessions" and Fair Market Rent shall be reduced to the extent necessary to amortize the amount of such concessions over the full term of the Extension Term. Fair Market Rent as of the date of the Extension Term shall be determined by mutual agreement of Lessor and Lessee not later than thirty (30) days after receipt of the Exercise Notice, subject to arbitration as hereinafter provided. If the Parties are unable to reach agreement as to Fair Market Rent within such thirty (30) day period, the Parties shall submit the dispute to arbitration. The arbitration shall be conducted and determined in Vancouver, Washington in accordance with the then prevailing rules of the American Arbitration Association or its successor for arbitration of real estate valuation disputes, except that the procedures mandated by such rules shall be modified as follows:

(1) Within ten (10) business days after expiration of the thirty (30) day period for mutual agreement on Fair Market Rent, Lessee shall notify Lessor of the name and address of the person to act as arbitrator on Lessee's behalf. The arbitrator shall be a MAI certified real estate appraiser with at least ten (10) years full-time experience who is familiar with the Fair Market Rent of water accessible, heavy industrial land similar to the Premises in Vancouver, Washington. Within ten (10) business days after Lessee identifies in writing its arbitrator, Lessor shall give notice to Lessee specifying the name and address of the person designated by Lessor to act as arbitrator on Lessor's behalf, which person shall be similarly qualified. If Lessor fails to notify Lessee of the appointment of Lessor's arbitrator within the time specified, then the arbitrator appointed by Lessee shall be the arbitrator to determine the Fair Market Rent for the Premises.

(2) If two arbitrators are chosen, the arbitrators so chosen shall meet within ten (10) business days after the second arbitrator is appointed and shall appoint a neutral arbitrator who shall be a competent and impartial person with qualifications similar to those required of the first two arbitrators. If they are unable to agree upon such appointment within five (5) business days, the neutral arbitrator shall be selected by the presiding judge of the Clark County Superior Court.

(3) The Fair Market Rent shall be fixed by the three arbitrators in accordance with the following procedures. Each Party-appointed arbitrator shall state, in writing, such arbitrator's determination of the Fair Market Rent supported by the reasons therefor and shall make counterpart copies for the other Party-appointed arbitrator and the neutral arbitrator. The Party-appointed arbitrators shall arrange for a simultaneous exchange of their proposed Fair Market Rent determinations. The role of the neutral arbitrator shall be to select whichever of the two proposed determinations of Fair Market Rent most closely approximates the neutral arbitrator's own determination of Fair Market Rent. The neutral arbitrator shall have no right to propose a middle ground or any modification of either of the two proposed determinations of Fair Market Rent. The determination of Fair Market Rent that the neutral arbitrator chooses as that most closely approximating the neutral arbitrator's determination of the Fair Market Rent shall constitute the decision of the arbitrators and shall be final and binding upon the Parties. The arbitrators shall have no power to modify the provisions of this Lease.

(4) The neutral arbitrator's decision shall be made not later than thirty (30) days after the submission by the arbitrators of their proposals with respect to the Fair Market Rent. The Parties have included these time limits in order to expedite the proceeding, but they are not jurisdictional, and the neutral arbitrator may for good cause allow reasonable extensions or delays, which shall not affect the validity of the award. Absent fraud, collusion or willful misconduct by the neutral arbitrator, the award shall be final, and judgment may be entered in any court having jurisdiction thereof.

(5) Each Party shall pay the fees and expenses of its respective arbitrator and both Parties shall share the fees and expenses of the neutral arbitrator equally.

(6) The entire arbitration process, beginning after expiration of the thirty (30) day period for mutual agreement on Fair Market Rent, shall be completed in not more than sixty-five (65) days.

Notwithstanding the foregoing, in the event that the Parties have modified the terms of the MGA Agreement such that a mutually agreeable MGA (as defined in the MGA Agreement) has been established and

agreed upon for the entirety of the applicable Extension Term or Extension Terms, the Base Monthly Rent for such Extension Term or Extension Terms shall not be subject to such Fair Market Rent adjustment, but shall continue to be subject to annual rent adjustment in accordance with Paragraph 1.D.

H. This is intended to be a net lease, meaning that Lessee shall pay all expenses of every type relating to the Premises after the Conditions Precedent Expiration Date, and all Contingency Period Fees, Construction Period Fees, Rent and Additional Charges shall be received by Lessor without setoff, offset, abatement, or deduction of any kind except as provided herein. **Under no circumstances or conditions, whether now existing or hereafter arising or whether beyond the present contemplation of the Parties, shall Lessor be expected or required to make any payment of any kind whatsoever or be under any obligation or liability under the Lease except as expressly set forth in the Lease.**

5. **ADDITIONAL CHARGES**: Upon commencement of the Construction Period, Lessee shall timely make all payments owing by Lessee under this Lease in addition to either (as the case may be) the Construction Period Fees or Rent ("Additional Charges"), including but not limited to the following:

A. charges for all utilities and services furnished to the Premises and assessments for utilities and services furnished to the Premises. "Utilities" include, but are not limited to, water, natural gas, electricity, sewer and refuse disposal, storm water collection and treatment, garbage and recycling, trackage for Lessee's exclusive use, and monthly inspection fees for any trackage for Lessee's exclusive use. "Services" include, but are not limited to, landscaping, paving, parking lot striping, catch basin repair and maintenance, irrigation, security and fire protection and monitoring systems and all associated operation services. Lessee shall also pay for all charges for maintenance associated with the Premises. Lessor has the first right to supply any of such Utilities to Lessee and, if Lessor elects to do so, Lessee shall purchase and pay for the same as an Additional Charge at the same rate schedule charged other users in the Port; provided that such rate shall not exceed the rates available from other suppliers of the same utility in the Vancouver area. Payments for all Utilities provided by third parties shall be made by Lessee directly to such providers. If Lessor furnishes a utility to the Premises and such utility is not separately metered, then Lessor shall apportion the utility charges, and the charges associated therewith, on an equitable basis, in its reasonable discretion. In no event shall Lessor be liable for the interruption or failure in the supply of any Services or Utilities to the Premises, whether or not being furnished by Lessor, provided, however, that, in the case of

Utilities furnished by Lessor, Lessor shall use diligent efforts to restore such Services and/or Utilities as soon as reasonably possible.

B. any insurance premiums to be reimbursed by Lessee to Lessor pursuant to Paragraph 15.

C. a Rail Access Fee in the amount specified in Paragraph 1.F. This fee shall be billed to the Lessee each month and shall be calculated by the actual railcar traffic as reported by BNSF, Lessor's exclusive rail operator.

D. a Rail Maintenance Fee for the common rail system internal to the Port in an amount to be determined by Lessor's annual rail tariff. Lessee shall also be responsible for individual rail maintenance and repair expenses on all rail spurs and tracks used exclusively by Lessee.

E. as a component of Additional Charges, a monthly CAM (as defined below) fee during each calendar year, or portion thereof, during the term of this Lease. Lessee shall pay the amount stated in Paragraph 1.F, which amount is subject to adjustment as described in Paragraph 1.F. Any amount collected by Lessor that exceeds any given year's total CAM expenses will be deposited in a reserve account and used towards any following year's total CAM capital improvements. During the Term hereof, Lessor shall repair, maintain and keep the Common Areas in good order, repair and condition, including without limitation, utilities and roads (including roads and utility lines within the Premises which are not exclusively used by Lessee and which are not maintained by the utility service provider). Common Area Maintenance ("CAM") expenses shall include, but not be limited to, all costs and expenses incurred by Lessor for the management, administration, maintenance, upkeep, and operation of the Common Areas, including, but not limited to, the costs and expenses of water, natural gas, electricity, sewer and refuse disposal, storm water collection and treatment, garbage and recycling, landscaping, paving, parking lot striping, catch basin repair and maintenance, irrigation, fire protection and monitoring systems, fencing, storage area screenings, common lighting, signage, security shacks, security card access, security guards and services, Common Area liability insurance, and the cost of capital improvements made to comply with the law or to reduce future expenses and all charges associated therewith. Administration costs and expenses shall include but not be limited to maintaining records of CAM expenses.

F. any charges, costs, and expenses that Lessor pays or agrees to pay under this Lease, together with all interest and other charges that may accrue thereon in the event of the failure of Lessee to pay those items, and all

other damages, costs, expenses, and sums that Lessor may suffer or incur, or that may become due, by reason of any Default of Lessee under this Lease.

G. any charges, costs, and expenses that Lessee pays or agrees to pay under any other agreement with Lessor, including but not limited to the MGA Agreement and any berthing agreement and/or trackage agreement.

H. any and all rentals and charges due the State of Washington under the Port Management Agreement as such applies to the Premises and as required by the DNR.

6. **LEASE SECURITY**: Lessee shall, upon execution of this Lease, and prior to occupancy, file with Lessor a bond, letter of credit or cash in accordance with RCW 53.08.085, as amended. The terms and document of the security instrument shall be subject to the reasonable approval of Lessor, and shall extend for a period of sixty (60) days subsequent to the Term of this Lease. The initial amount of security shall be as set forth in Paragraph 1.G. In the event of an exercise of an option to renew as provided in Paragraph 3.B or the execution of an Amendment to the Lease, subsequent security amounts shall increase and readjust in proportion to any subsequent increase in Rent or as reasonably determined by the Port Commission. Additional security corresponding to such increase shall be filed with Lessor within thirty (30) days after the effective date of the increase in Rent and prior to cancellation of any bond or letter of credit issued pursuant to this Paragraph. Upon any Default by Lessee in its obligations under this Lease, Lessor may collect on the security to offset any liability of Lessee to Lessor. Collection on the security shall not relieve Lessee of liability, shall not limit any of Lessor's other remedies, and shall not reinstate or cure the Default or prevent termination of the Lease because of the Default.

If a guaranty is required by Paragraph 1.H in connection with an assignment of this Lease, the assignee's parent company shall execute a guaranty in the same form as that attached hereto as Exhibit "G".

7. **POSSESSION**: Lessee has examined the Premises and, by taking possession, accepts them "as is" in their present condition without obligation or liability on the part of Lessor, to make any Alterations, improvements, repairs or maintenance except to the extent set forth expressly herein with respect to Existing Environmental Conditions and to the extent, if any, specifically set forth in writing and included herein or as an exhibit attached to this Lease.

8. **USE OF PREMISES**:

A. Lessee shall occupy and use the Premises for the Permitted Use set forth in Paragraph 1.I and shall not use the Premises for any other purpose without the prior written consent of Lessor. Lessee shall use the entire

Premises for the Permitted Use continuously during the entire term of this Lease, commencing on the Rent Commencement Date, except for: (i) periods of time (not exceeding twelve (12) months) that Lessee is prevented from using the Premises due to Force Majeure or damage or destruction of improvements, so long as following any damage or destruction, Lessee is using diligent efforts to make repairs or restoration of such improvements; or (ii) temporary closures (not exceeding thirty (30) days) as may be necessary for repairs or remodeling or for reasons beyond Lessee's control. Should Lessee use, or permit or suffer the use of, the Premises for any business or purpose other than the Permitted Use without the prior written consent of Lessor, except for temporary closures permitted by this Lease, Lessee shall be deemed in Default under the terms of this Lease. Except for Petroleum Products and those Hazardous Substances listed in Exhibit "H" (as the list may be modified during the Term through the new product approval process described in Exhibit "I"), it is further understood and agreed that the Premises shall not be used to store, distribute or otherwise handle flammable or Hazardous Substances.

B. Lessee agrees that it will not make or permit any unusual disturbance, noise, vibration, dust or other condition in, on or about the Premises, which would tend to create a Nuisance or unreasonably disturb Lessor or any other tenant of Lessor.

C. Lessee shall not use the Premises in such a manner as to increase the rates of insurance to the Premises or adjacent premises, without prior written approval of Lessor, and if permitted, Lessor may charge to Lessee as additional charges the full amount of any resulting premium increases incurred by Lessor or any of its adjacent tenants.

D. No invasive testing (except to the extent expressly approved by Lessor in conjunction with the Baseline Assessment and any approved geotechnical testing) or construction activities shall be conducted at the Premises during the Contingency Period.

E. During the MGA Term, so long as Lessee has, by the date that is [redacted] full months following the Rent Commencement Date (measured, at such time, based on a rolling 6-month average commencing on the second anniversary of the Rent Commencement Date), and each month thereafter, based on a rolling 6-month average, achieved and sustained an average throughput volume of [redacted] barrels per day of Petroleum Products (such period of time during the MGA Term with sustained throughput over [redacted] being referred to herein as the "Exclusive Period"), Lessor agrees not to lease any premises (other than the Premises that are subject to this Lease) located within the Port to a third party that will be permitted (directly or

indirectly) to operate a crude oil by Rail Facility for Unit Trains (the "Exclusive Use"), it being the intention of the Parties that Lessee shall during the Exclusive Period have the exclusive right in the Port to operate and conduct on the Premises a business for the Exclusive Use. If, thereafter, Lessee fails to maintain such throughput volume for a period of twelve (12) months or longer, the Exclusive Period and the right of first opportunity with respect to the Second PBR Facility (defined below) shall automatically terminate, and the Exclusive Use shall be of no further force and effect.

If the Facility achieves an average throughput volume that exceeds [redacted] barrels per day (measured on a rolling 12-month basis), and Lessor desires to develop another facility for the Exclusive Use (the "Second PBR Facility"), then Lessee shall have a right of first opportunity to lease additional real property from Lessor for the Second PBR Facility, either by (a) expanding the Premises and thereby adding additional throughput capacity, or (b) adding a facility at the Port that is separate from the Premises. If Lessee achieves an average throughput volume that exceeds [redacted] barrels per day (measured on a rolling 12-month basis) and Lessor desires to develop a Second PBR Facility, then Lessor shall give written notice to Lessee indicating the same, and Lessee shall have thirty (30) days following receipt of such written notice to accept or decline to enter into negotiations for the Second PBR Facility (the "Exercise Date"). If Lessee timely elects to enter into such negotiations, then Lessor and Lessee shall negotiate diligently and in good faith to reach and enter into a definitive agreement governing the development of the Second PBR Facility. If the Parties are unable to enter into such a definitive agreement within six (6) months following the Exercise Date, or if Lessee elected not to exercise its right of first opportunity (or failed to timely do so), then and only then shall Lessor be permitted to commence negotiations with third parties concerning the Second PBR Facility, and such Second PBR Facility will not be subject to the Exclusive Use. If Lessee has elected not to exercise its right of first opportunity (or failed to timely do so) at any point during the Lease Term, the right of first opportunity shall automatically terminate and be of no further force and effect for the balance of the Lease Term.

In the event that Lessor suffers or permits any use of the Port that is in violation of Lessee's Exclusive Use during a period in which Lessee has achieved and maintained an average throughput volume of [redacted] barrels per day of crude oil (measured on a rolling 12-month basis), Lessee shall be entitled to all remedies at law or in equity, including, should such violation remain for a period of twelve (12) months or longer in duration, the right to terminate this Lease with reservation of Lessee's remedies at law or at equity.

A portion of the Premises is owned by the DNR and is subject to the Port Management Agreement. Lessee shall be responsible throughout the Term to comply with the terms of the Port Management Agreement insofar as it applies to the Premises.

9. **WATERBORNE COMMODITIES; OPERATIONS AT MARINE TERMINAL AREA**:If applicable, Lessee agrees that throughout the Term of this Lease it will use commercially reasonable efforts, in conjunction with Lessor, to promote and aid the movement of cargo through the Port. Lessee further agrees that movements of Lessee's waterborne commodities, if any, shall be made through Lessor's port facilities if such routing is competitive with other ports.

B. The portion of the Premises described as the "Marine Terminal Area" includes Berths 13 and 14 in Terminal 4 (collectively, the "Berth"). Lessee shall have exclusive use of the Berth, as shown on Exhibit "B-1"/ "B-2" attached hereto, together with the nonexclusive rights of vehicular ingress and egress over and across those areas of the Port designated for driveway usage between the Berth and the balance of the Premises. Lessee shall use the Berth and the Marine Terminal Area solely in conjunction with the operation of the Facility for loading and unloading of Petroleum Products. The use of the Berth is subject to the following terms, conditions and requirements:

(1) Lessee shall be solely responsible for all capital improvements, replacement, maintenance and repair of the docks located in the Berth area, all at Lessee's sole expense.

(2) Lessor shall, at Lessor's sole cost and expense, perform all dredging necessary to provide continuous, safe access to the Berth and the dock located in the Berth area, and shall maintain the Berth's established depth to be the same as or deeper than the federal navigation channel depth plus two feet (2') for vessel under keel clearance.

If at any time during the Term, Lessee conducts or causes to be conducted a hydrographic survey of the Berth, and such survey reveals that the depth of the Berth has not been maintained in accordance with the preceding Paragraph 9.B(2), then Lessor shall, within ninety (90) days after the date on which such hydrographic survey is provided to Lessor, cause dredging to be completed to the required depth at Lessor's sole cost and expense; provided, however, that the period provided for Lessor to complete the dredging shall be extended if, during such 90-day period, dredging is prohibited either by the Army Corps of Engineers or the Washington State Department of Natural Resources.

(3) Lessee or its agent shall be the sole arbiter with respect to vessels having the right to tie up to the dock whether working cargo or idle. Notwithstanding the foregoing, Lessee shall allow vessels to dock under emergency conditions, provided that Lessee may require such vessel to vacate the Berth at the earliest possible time.

(4) Lessor retains the right to permit or refuse cargoes, other than Petroleum Products which have been approved in accordance with the requirements of this Lease, vessel stores (food and supply products) and fuel necessary for the operation of vessels. Permission for Lessee to handle any such other cargo may be granted or withheld by Lessor in Lessor's sole and absolute discretion, and shall be granted in writing (if at all) prior to the handling, transshipping, loading, unloading, storage or other presence of such other cargo at the Berth. Lessor shall not be liable to Lessee or any third party for any loss, damage, claim or liability arising from Lessor's failure to permit any such other cargo. Any other cargo so approved shall be subject to Lessor's terminal tariff.

(5) Lessee shall prepare and submit to Lessor timely reports including: (i) vessel schedules, (ii) vessel length overall and gross registered tons, (iii) time at berth, (iv) amount of product handled in barrels, and (v) such other information as may be reasonably required for Lessor's prudent and safe operation of the Port. Lessee considers the quantities of specific types of Petroleum Products, and the bills of lading relating thereto, to constitute a trade secret, as defined in RCW 19.108.010(4). Except to the extent reasonably determined by Lessor to be required by law to be disclosed by Lessor (including, without limitation, pursuant to the Washington Public Records Act), Lessor agrees to maintain the confidentiality of such information; provided, however, that Lessor shall provide reasonable notice to Lessee of any request for information that Lessor is required by law to disclose so that Lessee may seek legal protection for the information, and Lessor shall cooperate with Lessee in Lessee's efforts to prevent disclosure of such information. If Lessee is unable to obtain such protection, Lessor may disclose the information, but only to the extent required by law. The Parties agree to share information reasonably related to the performance of this Agreement, excluding trade secrets and such other proprietary information that is confidential, and to cooperate reasonably with all contractors, entities and other persons associated with such activities as permitting and repair work at the Berth.

(6) Lessor shall have the right to audit all of Lessee's reports of tonnage for Petroleum Products transported through the Berth.

(7) Lessor reserves to itself a right of access and/or easement upon, over, across and beneath the Berth for access, subject to Lessee's security processes, together with the right to grant, to third parties, utility easements upon, over, across, and beneath the Berth, provided that such easements do not interrupt or materially interfere with Lessee's operations pursuant to this Lease.

(8) Lessee shall operate the Berth in a prudent manner in accordance with all statutes, ordinances, and applicable regulations in effect, including but not limited to rules and regulations promulgated by the U.S. Coast Guard. Lessor shall not impose rules or regulations relating to the operation of the Berth that would have the effect of interrupting or materially interfering with Lessee's safe operation of the Berth.

(9) Terminal tariff fees invoiced to the vessel shall be paid to and collected by Lessor from the vessel or its agents. Lessor shall receive all dockage, vessel security fees and MFSA safety fees, per Lessor's terminal tariff; to the extent that Lessee receives such fees from any vessel, Lessee shall promptly remit such fees to Lessor.

10. **GENERAL COMPLIANCE WITH ALL LAWS**: In its use of the Premises, Lessee agrees to comply with all applicable federal, state and municipal laws, ordinances and regulations and Lessor shall have the right to review all related documents. In the event Lessor requires copies of any such documents, Lessee will be reimbursed for any associated reasonable costs. Lessor's right to review Lessee's documents does not imply that Lessor has accepted any responsibility for accuracy, completeness, or legal compliance. Lessee shall pay any fees for any federal, state or municipal inspections and/or certificates required for use and occupancy of the Premises. Further, Lessee shall pay all licenses, fees, and taxes covering the business conducted on the Premises, together with all taxes and assessments on the property of Lessee on the Premises. Lessee shall notify Lessor of any violation of any local, state, and federal laws, ordinances, regulations, permits, plans, and approvals.

11. **PRESENCE AND USE OF HAZARDOUS SUBSTANCES**:

A. **Use, Storage, and Disposal**: Except as expressly permitted by the terms of Paragraph 8.A above, Lessee shall not use, transport, store, treat, generate, sell or dispose of any Petroleum Products or Hazardous Substances on or in any manner that affects the Premises, Pipeline Agreement areas, or surrounding properties. "Affects the Premises, Pipeline Agreement areas, or surrounding properties" shall include but not be limited to allowing any Petroleum Products or Hazardous Substances to migrate off the Premises or Pipeline Agreement areas,

or the Release of any Petroleum Products or Hazardous Substances into adjacent surface waters, soils, sediments, groundwater or air.

B. **Deed Restricted Areas**: As set forth in Paragraph 2.C, the Parties acknowledge that portions of the Premises and portions of the areas to which Lessee may be granted an easement pursuant to a Pipeline Agreement are the subject of the Consent Decree and subject to the Restrictive Covenants, and that construction on such areas may require disturbing the environmental caps and may generate soil or groundwater contaminated with Hazardous Substances that will require special handling and disposal. Lessor and Lessee understand that disturbance or removal of portions of the environmental caps is required for pre-occupancy construction and pre-occupancy tenant improvements for Lessee's Permitted Use and such removal or disturbance of a cap requires prior approval by the Washington Department of Ecology. Lessor, with Lessee's cooperation (which shall include, without limitation, Lessee's presentation of a reasonable design which is consistent with the Consent Decree and Restrictive Covenants, as well as the other terms and conditions of this Lease), will obtain approval from the Washington Department of Ecology that will allow Lessor or Lessee to modify the cap for: (i) Baseline Assessment and geotechnical testing, (ii) pre-occupancy construction, (iii) pre-occupancy tenant improvements, and (iv) the Permitted Use of the Premises under this Lease. Without limiting Lessor's responsibility for Existing Environmental Conditions, Lessor will be responsible for characterization and proper disposal (in compliance with Environmental Laws and as required by the Washington Department of Ecology) of contaminated media generated in connection with the pre-occupancy construction necessary for Lessee's Permitted Use. Lessor's obligation shall not extend to any new Releases of Petroleum Products or Hazardous Substances to the extent such Petroleum Products or Hazardous Substances are first brought onto the Premises by Lessee or Lessee's employees, contractors or agents during the Term of the Lease. Lessor represents and warrants to Lessee that there are monitoring wells on the Premises in the locations described on Exhibit "Q" attached hereto. To the extent that such monitoring wells are described on Exhibit "Q," and such monitoring wells are required to be relocated, then Lessee will be solely responsible for costs associated with all monitoring well relocation required in conjunction with Lessee's development of the Facility and Permitted Use of the Premises; to the extent that such monitoring wells are not described on Exhibit "Q" and are required to be relocated, the costs associated with such monitoring well relocation shall be borne by Lessor.

C. **Compliance with Environmental Laws**: Lessee shall, at its sole cost and expense, comply with all Environmental Laws, including but not limited to all permits applicable to the Premises and issued to Lessee. Pursuant to this Paragraph 11.C, Lessee shall, at its sole cost and expense, comply with the terms of the National Pollutant Discharge Elimination System ("NPDES") Western Washington Phase II Municipal Stormwater Permit issued to Lessor and any other applicable permit covering stormwater or other discharges from the Premises. Lessee agrees to comply with the requirements of Lessor's Stormwater Management Program ("SWMP") and Illicit Discharge Detection and Elimination policy ("IDDE") as required by the NPDES Western Washington Phase II Municipal Stormwater Permit. Lessor agrees to make the NPDES permit, SWMP, and IDDE available to Lessee on the Lessor's website.

D. **Environmental Audits**: The Port of Vancouver environmental department conducts periodic environmental audits of leased premises. These environmental audits do NOT imply compliance with state or federal regulations. Lessee agrees to cooperate with the Port's environmental department in its conducting environmental audits of the Premises and Pipeline Agreement areas and to comply with the Port's requests made pursuant to the environmental audit results for the Premises and Pipeline Agreement areas. In addition, Lessee shall provide an updated Tenant Environmental Questionnaire at Lessor's request.

E. **Monitoring**: Lessor or its designated agents may, at Lessor's sole discretion and at reasonable times, enter upon the Premises for the purpose of (1) monitoring Lessee's activities conducted thereon, and (2) conducting environmental testing and sampling to determine compliance with Environmental Laws and the terms of this Lease; provided Lessor shall not unreasonably interfere with the conduct of Lessee's business. If such monitoring discloses a Release of Petroleum Products or Hazardous Substances (except to the extent caused by Lessor, its employees, agents, or contractors, or by any other tenant of Lessor or by a railroad serving the Port that is not carrying Petroleum Products for Lessee or the Facility), a violation by Lessee of Environmental Laws or a Default by Lessee of its obligations under this Lease, the cost of such monitoring, testing and sampling shall be paid by Lessee. In addition, within five (5) days of Lessor's written request, Lessee shall provide Lessor with a detailed written description of Lessee's generation, use, sale, transportation, storage, treatment and disposal of Petroleum Products or Hazardous Substances on or which may otherwise affect the Premises, Pipeline Agreement areas, or the surrounding properties. Lessor's discretionary actions pursuant to this subparagraph shall not substitute for any

obligation of Lessee hereunder, or constitute a release, waiver or modification of Lessee's obligations otherwise specified in this Lease.

F. **Notifications**: Lessee shall notify Lessor of the presence or Release of Hazardous Substances or the Release of Petroleum Products on or that may affect the Premises, Pipeline Agreement areas, or the surrounding properties immediately following a Release caused by Lessee, its employees, agents, or contractors, or upon Lessee's discovery of a Release caused by Lessor, its employees, agents, or contractors, by any other tenant of Lessor, or by a railroad serving the Port that is not carrying Petroleum Products for Lessee or the Facility, or of the presence of such Hazardous Substances (other than Permitted Hazardous Substances). Lessee shall provide Lessor with the following documentation:

(1) copies of any notifications submitted by Lessee to any governmental entity relating to the Release or presence of Hazardous Substances or Release of Petroleum Products on the Premises or Pipeline Agreement areas at the same time they are submitted to the appropriate governmental authorities;

(2) any inspection report, complaint, order, fine, request, notice, or other correspondence from any entity, pursuant to any Environmental Law, that may affect the Premises, Pipeline Agreement area, or the surrounding properties, within ten (10) days of receiving such documentation;

(3) all reports, manifests, material safety data sheets ("MSDS"), or any other documentation related to Lessee's compliance with Environmental Laws at the Premises, upon written request by the Port.

G. **Environmental Assessment**: Lessee shall, upon written request from Lessor made at any time during the Term of this Lease or within sixty (60) days thereafter, based on a sufficient reason to believe there has been a Release of Petroleum Products or Hazardous Substances other than by Lessor, its employees, agents or contractors, by any other tenant of Lessor or by a railroad serving the Port that is not carrying Petroleum Products for Lessee or the Facility, or violation by Lessee of Environmental Laws, provide Lessor with an environmental assessment prepared by a qualified professional mutually agreed upon by Lessor and Lessee, which assent shall not be unreasonably withheld. In the event of refusal by Lessee to assent within twenty-four (24) hours of an emergency or within seven (7) days of a non-emergency, Lessor shall unilaterally select the qualified professional to perform said assessment. The environmental assessment shall, at a minimum, (1) certify that a diligent investigation of the Premises and Pipeline Agreement areas has been conducted, including a specific description of the work performed, and (2) either (a) certify that diligent investigation of the Premises and Pipeline Agreement areas has

revealed no evidence of a Release of Petroleum Products or Hazardous Substances or violation of Environmental Laws, or (b) if a Release or violation of Environmental Laws is detected, identify and describe: (i) the types and levels of Petroleum Products or Hazardous Substances detected; (ii) the physical boundaries of any actual Release, including property other than the Premises; (iii) to the extent determinable, the person or parties that caused the Release; (iv) the actual and potential risks to the environment from such Release or violation; and (v) the procedures and actions necessary to remedy the Release or violation in compliance with Environmental Laws. If such environmental assessment discloses a Release of Petroleum Products or Hazardous Substances that is caused, at least in part, by Lessee, its employees, agents or contractors, a violation by Lessee of Environmental Laws or a Default by Lessee of its obligations under this Lease, Lessee shall pay the expense of obtaining the environmental assessment.

H. **Hold Harmless and Indemnity**: Lessee shall defend (with attorneys approved in advance and in writing by Lessor), indemnify and hold Lessor and its agents harmless from any damages, loss, claim, fine or penalty arising from (i) the Release of Petroleum Products or Hazardous Substances that is caused, at least in part, by Lessee, its employees, agents or contractors, whether or not within the Premises, (ii) any violation of Environmental Laws, (iii) a default by Lessee of the provisions of this Paragraph 11, or (iv) any exacerbation of Existing Environmental Conditions affecting the Premises, Pipeline Agreement areas, or the surrounding properties, to the extent caused by Lessee or by Lessee's employees, contractors or agents. Such obligation shall include, but shall not be limited to, environmental response and remedial costs, other cleanup costs and charges, environmental consultants' fees, attorneys' fees, civil and criminal fines and penalties, laboratory testing fees, claims by third parties and governmental authorities for death, personal injuries, property damage, business disruption, Lessor's lost business and sales, natural resource damages and any other costs, and Lessor's expenses as provided in subparagraph 11.G. Lessee's obligations pursuant to this subparagraph shall survive expiration or other termination of this Lease.

Lessor shall defend (with attorneys approved in advance and in writing by Lessee), indemnify and hold Lessee and its agents harmless from any damages, loss, claim, fine or penalty arising from (i) the Existing Environmental Conditions, or (ii) a violation of Environmental Laws to the extent caused by Lessor or by Lessor's employees, contractors or agents. Such obligation shall include, but shall not be limited to, environmental response and remedial costs, other cleanup costs, environmental consultants' fees, attorneys' fees, fines and penalties,

laboratory testing fees, claims by third parties and governmental authorities for death, personal injuries, property damage, business disruption, lost profits, natural resource damages and any other costs. Lessor's obligations pursuant to this subparagraph shall survive expiration or other termination of this Lease.

I. **Assignments and Subleases**: Lessor may withhold its consent to any assignment, sublease, or other transfer if the proposed transferee's use of the Premises may involve the use, transportation, storage, treatment, generation, sale or disposal of Petroleum Products or Hazardous Substances (other than Permitted Hazardous Substances).

J. **Lessor's Remedies**: Notwithstanding any other provision of this Lease, and without prejudice to any other right or remedy available to Lessor at law, in equity or under this Lease, Lessor, in the event of a Release of Hazardous Substances not caused solely by Lessor, a violation by Lessee of Environmental Laws, or a Default by Lessee of the provisions of this Paragraph 11, shall be entitled to any or all of the following rights and remedies, at Lessor's option:

(1) To terminate this Lease if Lessee has failed, following a Release that is caused, at least in part, by Lessee, its employees, agents or contractors, a violation by Lessee of Environmental Laws, or a Default by Lessee of the provisions of this Paragraph 11, to diligently and timely take such actions as are required (a) by any governmental agency having jurisdiction to remediate the Release (or cause the remediation by the party responsible therefore), (b) by any governmental agency having jurisdiction to cure the violation of Environmental Laws, or (c) to remedy the Default of the provisions of this Paragraph 11 by responding in accordance with the requirements of this Lease.

(2) To recover damages as described in, and to be indemnified as provided in, subparagraph H.

(3) If Lessee has failed to act diligently and to Lessor's satisfaction, to enter upon the Premises and cure any such Release, violation or Default, and, to the extent such Release is not caused by Lessor, its employees, agents or contractors, by any other tenant of Lessor, or by a railroad serving the Port that is not carrying Petroleum Products for Lessee or the Facility, either (i) charge to Lessee as Additional Charges an amount sufficient to recover the cost of such cure, together with interest thereon at the Interest Rate, or (ii) if Lessor does not elect to terminate this Lease, increase Rent by such amount as will permit Lessor to fully recover the cost of such cure, together with interest thereon at the Interest Rate, during such portion of the unexpired Term of this Lease as Lessor

may deem proper. Such election by Lessor shall be without prejudice to any other right or remedy provided to Lessor at law, in equity or in this Lease.

The remedy provisions provided in Subsections (1), (2) and (3) above shall not apply to the Rail/Rack and Pipeline Agreement areas defined above in paragraph I.I., except to the extent caused by Lessee, its employees, agents or contractors.

K. **EPA Identification Number**: Lessee shall also provide to Lessor Lessee's Environmental Protection Agency Identification Number to dispose of Hazardous Substances if Lessee has one. Lessee shall also provide to Lessor copies of all of Lessee's disposal manifests.

L. **Vacation of the Premises**: Prior to vacation of the Premises, in addition to all other requirements under this Lease, Lessee shall remove any Petroleum Products or Hazardous Substances placed on the Premises during the term of this Lease or Lessee's possession of the Premises, and shall demonstrate such removal to the Port's satisfaction. This removal and demonstration shall be a condition precedent to the Port's payment of any Lease security to Lessee upon termination or expiration of this Lease. As a component of Lessee's requirements under this paragraph, Lessee agrees to cooperate with the Port's environmental department in conducting an environmental exit audit of the Premises and Pipeline Agreement areas and to comply with the Port's requests made pursuant to the environmental exit audit results.

M. **Exit Contamination Assessment**:

(1) Prior to vacation of the Premises upon the expiration or earlier termination of this Lease, without limitation of other applicable requirements under this Lease, Lessee will have an environmental assessment conducted on the Premises and Pipeline Agreement areas by an independent, reputable professional environmental consultant reasonably approved by Lessor to assess the presence of contamination on the Premises and Pipeline Agreement areas as of the termination of this Lease to compare its condition at that time with the condition established by the Baseline Assessment (such assessment, the "Exit Contamination Assessment").

(2) The scope of work for the Exit Contamination Assessment shall be timely, and in any event within 20 days of Lessee's notice to Lessor of the identity of the consultant and the proposed scope of work, reviewed and approved by Lessor, acting reasonably, prior to its initiation and it shall be intended to address whether there have been (a) Releases on the Premises or Pipeline Agreement areas, (b) violations of Environmental Laws in Lessee's or its Related Parties' use or occupancy of the Premises and Pipeline Agreement areas, or

(c) exacerbation of Existing Environmental Conditions, which were caused or suffered by Lessee or its Related Parties after the Effective Date.

(3) If the Exit Contamination Assessment reveals: (a) Releases on the Premises or Pipeline Agreement areas that materially worsen the condition of the Premises or Pipeline Agreement areas when compared to Existing Environmental Conditions; (b) violations of Environmental Laws in Lessee's or its Related Parties' use or occupancy of the Premises or Pipeline Agreement areas; or (c) exacerbation of Existing Environmental Conditions that materially worsens the condition of the Premises when compared to Existing Environmental Conditions; and provided and to the extent that such Releases, violations or exacerbation were caused or suffered, in whole or in part, by Lessee or its Related Parties after the Effective Date of this Lease, then Lessee shall be responsible to remediate or clean up the Premises and Pipeline Agreement areas to the extent caused or suffered by Lessee or any Related Party, such that the Premises and Pipeline Agreement areas, from an environmental condition perspective, are in the same condition upon termination of this Lease and Lessee's surrender of the Premises and Pipeline Agreement areas, as when the Premises and Pipeline Agreement areas were delivered to Lessee (with the exception of, and to the extent of, any conditions caused by Lessor, its employees, agents or contractors, by any other tenant of Lessor or by a railroad serving the Port that is not carrying Petroleum Products for Lessee or the Facility). Except to the extent of any exacerbation, Lessee shall have no obligation to remediate or clean up any Existing Environmental Conditions.

(4) Lessor reserves the right to conduct its own exit contamination assessment of the Premises and Pipeline Agreement areas at Lessor's expense.

12. **RESERVATIONS BY LESSOR**:

A. Lessor reserves to itself a right and easement (and the right to grant easements to third parties, including utility providers) upon, over and beneath the Premises for the construction, maintenance, repair and replacement of roadways, non-exclusive railroad tracks and all surface, overhead or underground utilities to include, but not be limited to, storm water treatment devices and/or structures, provided that Lessor's activities do not unreasonably interfere with Lessee's Permitted Use. Lessee shall, upon reasonable notice from Lessor, provide access to areas identified by Lessor for these purposes, including but not limited to removing any obstructions (other than permanent structures which have been installed with the approval of Lessor) from these areas. This reservation includes the responsibility of Lessor to repair any physical damage done to the Premises incidental to the exercise of

its rights under this reservation. Lessor shall make reasonable efforts to cooperate with Lessee in the exercise of Lessor's rights under this Paragraph 12.A and, to the extent possible, shall schedule any non-emergency work in advance.

B. Lessor reserves the right to enter upon and inspect the Premises at any and all reasonable times during the Term of this Lease, and during the last six (6) months of the Term (or any applicable Extension Term) to show the Premises to prospective tenants or purchasers. Any such inspection shall be conducted in such a manner as not to unduly interfere with Lessee's operations. The right of inspection shall not impose any obligation on Lessor to do so, nor shall Lessor incur any liability for not making inspections. During the last six (6) months of the Term, or any applicable Extension Term thereof, Lessor may place upon the Premises the usual "for rent," "for lease," and "available" notices advertising the availability of the Premises for lease which notices Lessee shall permit to remain thereon without molestation. Prior to vacation of the Premises, Lessee agrees to cooperate with Lessor's facilities department in conducting an exit audit of the Premises and to comply with Lessor's reasonable requests made pursuant to the exit audit results.

C. Lessor reserves the right for Lessor and Lessor's agents to enter upon the Premises to conduct any remedial action, monitoring, audit, and investigation, including but not limited to soil and sediments tests, groundwater tests, cap inspections, well drilling and well relocation that may be required for any purpose. Lessee shall, upon reasonable notice from Lessor, provide access to areas identified by Lessor for these purposes, including but not limited to removing any obstructions from these areas. Notwithstanding of the foregoing, (i) Lessor shall use reasonable efforts to minimize interference with Lessee's business and operations on the Premises (including the scheduling of any non-emergency work in advance), and (ii) Lessee shall not be required to move, demolish or alter any building or other improvements located on the Premises for which Lessor has provided its written consent to facilitate Lessor's actions under this Paragraph 12.C, unless the need to conduct any remedial action, monitoring, audit, and investigation is caused by Lessee's operations or is required by the Consent Decree or other applicable law or regulation.

D. Except to the extent, if any, otherwise expressly provided in this Lease, Lessor reserves to itself any water rights that may be appurtenant to or required for the Premises or for any business or other activities thereon, and such water rights will belong to Lessor upon expiration or termination of the Lease. Lessee shall not submit any application for water rights with respect to wells in the Port, without first obtaining Lessor's prior written

consent. If Lessee acquires any interest in water rights with respect to wells in the Port, Lessee shall not seek to convey, assign, encumber or otherwise transfer such interest apart from this Lease.

13. **MAINTENANCE AND REPAIR:**

A. Lessee shall, at its sole cost and expense, take or cause to be taken good care of the Premises and the Alterations during the Term of this Lease, it being understood that Lessor shall not be required to make any repairs to the Premises or the Alterations during the Term hereof, except to the extent of any damage to improvements, Alterations or fixtures located on the Premises which is caused by Lessor's employees, agents or contractors, or for which Lessor is expressly responsible under the terms of this Lease. Without limiting the generality of the foregoing sentence, Lessee aggress to maintain, repair and replace the Alterations, all sidewalks, vaults, sidewalk hoists, roads and curbs on the Premises (including keeping the same free and clear of rubbish, ice and snow), and all water, sewer, and gas connections, pipes, and mains which service the Premises shall comply with all applicable laws with respect thereto. Lessee's obligation to maintain all water, sewer, and gas connections, pipes, and mains shall apply to, but not be limited to, water lines and faucets within the Premises, sanitary sewer and drain lines extending to the sewer/septic connections, and all plumbing fixtures. Lessee is responsible for any discharge that damages or fouls the septic tank, sewer, or drain line systems serving the Premises. If the Premises' sanitary system includes a holding tank or is served by a septic system, Lessor will conduct an annual inspection and complete any necessary maintenance and pumping. Lessee is responsible for any maintenance expenses resulting from the annual inspection and shall remit payment to Lessor within thirty (30) days of the date of invoice. At the end or other termination of this Lease, Lessee shall deliver to Lessor the Premises with all Alterations thereon in good repair and condition, ordinary wear and tear, depreciation, and casualty and condemnation loss being excepted (provided that the foregoing shall not abrogate Lessee's obligations under Paragraphs 14.I and 28 hereof).

B. Lessee shall, at its sole cost and expense, take good care of the Premises, make all repairs and replacements thereto, interior and exterior, structural and non-structural, ordinary and extraordinary, foreseen and unforeseen, and shall maintain and keep the Premises in first class condition and in good order and repair, and Lessor shall not be responsible for the foregoing. Lessee shall indemnify, defend, protect and hold Lessor harmless of and from any and all claims or demands: (i) upon or arising out of the failure of Lessee to perform the covenant contained herein, or (ii) arising out of any accident, injury or damage to any person or property which shall or may happen in or upon the Premises or any part thereof, or upon the sidewalks about the Premises, except to the extent

such accident, injury or damage is caused by Lessor, its employees, agents, or contractors. Lessee shall keep the Premises free and clear of any and all mechanics' liens or other similar liens or charges incidental to work done or material supplied in or about the Premises.

C. If Lessor is required to make any repairs to the Premises by reason of Lessee's negligent acts or omission to act or failure to perform its obligations under this Lease, then Lessor may add the cost of such repairs plus a fifteen percent (15%) administrative fee as an Additional Charge next owing from Lessee, which cost shall become due upon billing by Lessor.

D. In the event of damage or destruction to the Premises required by the terms of this Lease to be covered by insurance, or which happens to be covered by insurance maintained by either Party, the provisions of this Paragraph 13 shall not apply and the obligations of the Parties shall be controlled by Paragraph 17 of this Lease.

14. **ALTERATIONS**:

A. Lessee shall not make any Alterations to the Premises (other than those described conceptually on Exhibit "D" to the extent subsequently approved by Lessor for actual construction) without the prior written consent of Lessor having first been obtained; provided, however, that in the event that the Alteration is an immaterial, insubstantial or ordinary non-structural repair or replacement that does not require a permit and that clearly and convincingly will not affect or impact (i) the terms of the Restrictive Covenants or the Consent Decree, (ii) adjacent tenants or property owners, or (iii) any other obligations of Lessee under this Lease, Lessor's consent shall not be required.

B. Lessee shall, prior to making any Alteration that requires Lessor's consent under Paragraph 14.A, submit to Lessor the plans and specifications for such Alteration and obtain Lessor's prior written approval, such approval not to be unreasonably withheld so long as it does not affect, alter, or expand the Permitted Use. All Alterations shall be substantially in accordance with the plans, specifications, and elevations approved in writing by Lessor in advance thereof and shall be completed with all reasonable dispatch. No Alterations shall interfere with any easements and/or utilities.

C. In order to facilitate coordination of the development and construction of any approved Alterations and to provide for efficient communications between the Parties in the day-to-day implementation of certain other provisions of this Agreement, the Parties shall form a project team (the "Project Team") consisting of at least two (2) members appointed by Lessor and two (2) members appointed by Lessee. As of the Effective Date, Curtis Shuck

and Monty Edberg shall be Lessor's Project Team members, and Rick Weyen and Kent Avery shall be Lessee's Project Team members. At any time during the Term that Alterations are being designed, developed, or implemented, the Project Team shall meet on a weekly basis, including by teleconference as appropriate under the circumstances, or such other frequency as the Parties may agree to in writing, to keep one another apprised of the progress of the applicable Alterations, so as to minimize disruptions or delay in the completion of such Alterations and the other terms and conditions of this Agreement. Such coordination should include coordinated scheduling (including the review and recommendations for modifications thereof) of the timing and location of the applicable Alterations or activities to be performed on or about the Premises in order to effectuate the intent of this Paragraph.

D. Lessee warrants that any Alterations, whether done with or without Lessor's consent, shall be completed lien-free and in a good and workmanlike manner with new materials; will be performed in complete compliance with local, state and federal building, fire and other codes and construction guidelines, including but not limited to the Americans with Disabilities Act, if applicable, and all other applicable covenants, terms and conditions hereof (and proof of such compliance shall be provided to Lessor); and that all workmanship and materials shall be free from defects, and that all fixtures erected or installed by Lessee shall be new or completely reconditioned. Proof of compliance shall include providing to Lessor copies of certificates and permits issued by local, state and federal building, fire and other code and construction agencies. Further, Lessee shall provide Lessor with updated "as-built" drawings. Lessee may deliver said drawings to Lessor electronically or on disk, and a hard copy shall also be provided.

E. No electrical wiring, communications (including telephonic), or other electrical apparatus, including air conditioning equipment, shall be installed, maintained or operated on said Premises except with the approval of, and in a manner satisfactory to Lessor. In no event shall Lessee overload the electric circuits from which Lessee obtains current. Any additional air conditioning required as a result of heat generating equipment, special lighting or other equipment installed by Lessee shall be installed and operated, only with Lessor's prior written approval, at Lessee's sole expense.

F. Lessee shall be required to provide lien releases to Lessor from contractors and other individuals performing work on the Premises for Lessee promptly following the completion of such work. Lessee will notify Lessor in advance of intended work on the Premises, obtain any required approval from Lessor and all applicable

governmental bodies, and, if required by Lessor, will provide Lessor with financial assurances or bonding, as required by Lessor. Lessor shall be entitled to post notices of non-responsibility on the Premises.

G. Any sign, decoration, awning or canopy, or advertising matter to be installed by Lessee shall comply with all regulation requirements of the State of Washington, Clark County or City of Vancouver (or any other appropriate governmental agency). In addition Lessee shall not install any sign, decoration, awning or canopy, or advertising matter without prior written approval by Lessor. Lessee shall submit a written and graphic description of the proposed sign, decoration, awning or canopy, or advertising matter to Lessor in requesting approval and shall be responsible for obtaining any permits required for such installation.

H. Lessor will respond to all written requests for approval of proposed Alterations within thirty (30) days of the receipt of Lessee's request accompanied by plans and specifications for any such proposed Alterations. Lessee shall be responsible to pay any of Lessor's out-of-pocket expenses related to review and approval of any proposed Alterations. However, in the event the proposed Alterations are so complex or involved that thirty (30) days is inadequate for the appropriate review, Lessor shall have such additional time as is reasonable. Lessee acknowledges that Port Commission approval may also be required and that Lessor shall have reasonable additional time to obtain said approval.

I. All Alterations and improvements made by Lessee shall become the property of Lessor unless there is a written agreement to the contrary attached to this Lease or agreed to by the Parties in writing at a later date. Lessor shall have the option, at the expiration or termination of this Lease to require Lessee to remove the Alterations and improvements at Lessee's expense; provided, however, that (i) such election to remove must be made with respect to all or none of the Alterations and improvements, and Lessor may not require Lessee to remove some, but not all of the same (unless both Parties otherwise mutually agree at the time); and (ii) if the Alterations and improvements, as of the expiration or termination of this Lease, remain economically and operationally viable (as determined by an independent third party expert mutually selected by or acceptable to the Parties, if Lessor and Lessee are unable to agree on whether the Alterations and improvements are then economically viable, taking into consideration future uses of the Premises which are both economically and operationally viable), then Lessee shall not be required to remove the Alterations and improvements. In the event that Lessor does not require removal, the Alterations and improvements shall be surrendered to Lessor as part of the Premises in accordance with the terms of this Lease.

J. All Lessee's trade fixtures (including, but not limited to, shelving, portable partitions, modular offices, and cabinets), furnishings and other moveable personal property shall remain the property of Lessee and may be removed on or before the termination of this Lease, or any renewal thereof, provided Lessee shall make any repairs necessary to restore the Premises to its original condition upon such removal. If not removed by Lessee upon expiration of this Lease or any extension thereof, Lessor shall have the option to require Lessee to remove such items at Lessee's expense or to treat such items as abandoned. In the event Lessor treats such items as abandoned, they shall become the property of Lessor.

15. **INSURANCE:**

A. **Property Damage:**

(1) If Lessee's use of the Premises requires improvements to be constructed on-site, the construction is at the risk of Lessee until final completion of Lessee's construction. Lessee shall purchase and maintain Builders Risk insurance upon the work at the site to the full insurable value until Lessee's final construction completion. This insurance shall cover the interests of the Port, designers of Lessee's work, Lessee, its contractor, subcontractors and sub-subcontractors in the work at the project site, all of whom shall be listed as additional insureds. The interests of any loss payees shall be automatically included for coverage. Said insurance will insure against the "all-risk" perils including earthquake and flood for physical loss and damage. The insurance shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property, including, but not limited to, fees of designers and other professionals. If not covered under the "all risk" insurance, Lessee shall maintain similar property insurance on portions of the work stored on and off the site or in transit when such portions of the work are to be included in a progress payment application. Losses up to the deductible in Paragraph 1.J shall be the sole responsibility of Lessee.

(2) Lessee shall, at all times, maintain "all risk" property insurance (including boiler and machinery insurance) upon any buildings and facilities, including any permanent additions and improvements thereto, of which the Premises form a part with coverage for perils as set forth on the Causes of Loss - Special Form, with a coverage extension for the perils of earthquake, windstorm and flood coverage, in an amount equal to the full replacement cost thereof. Such insurance shall contain an agreed valuation provision in lieu of any co-insurance clause, an ordinance and law endorsement, debris removal coverage and a waiver of subrogation endorsement. All policies or certificates of insurance, indemnity bonds and similar securities protecting the Premises from damage

shall name Lessor as a loss payee, as its interests may appear. Any and all payments from said policies or certificates of insurance, indemnity bonds and similar securities shall be made jointly payable to Lessor and Lessee, deposited in an account satisfactory to Lessor and Lessee during the Term of this Lease for application toward any required repairs or restorations, and made available to Lessee for use in making repairs or restorations. Further, Lessee shall notify Lessor within five (5) days of Lessee's receipt of notification of any modification or cancellation of any insurance contract. Lessee shall provide Lessor with replacement coverage acceptable to Lessor prior to the applicable modification or cancellation taking effect, and in no event more than thirty (30) days of Lessee's notification to Lessor of such modification or cancellation of any insurance contract or indemnity bond. Lessee shall be solely responsible for the insurance premium and any deductible (which shall not exceed the Maximum Deductible set forth in Paragraph 1.J or in such amount as shall be adopted by the Port Commission from time to time, which amount shall be consistent with industry standards).

(3) Lessor may, from time to time, require qualified appraisals to be made of the Premises and any and all improvements thereon. Lessee will cooperate with Lessor's appraiser to access and evaluate the Premises upon reasonable notice to Lessee. Upon the establishment of any new insurance premium or deductible, Lessor will advise Lessee by written notice. Lessee shall, within thirty (30) days, submit to Lessor evidence of such increased coverage.

(4) Lessee shall maintain "all risk" property insurance upon any building improvements and personal property owned by Lessee with coverage for perils as set forth on the Causes of Loss - Special Form, with a coverage extension for the perils of earthquake, windstorm and flood coverage, in an amount equal to the full replacement cost thereof. Such insurance shall contain an agreed valuation provision in lieu of any co-insurance clause, an ordinance and law endorsement, debris removal coverage and a waiver of subrogation endorsement.

B. **Liability**:

(1) Lessee shall maintain, with financially sound and reputable insurers (see Paragraph D(1) below), commercial general liability insurance written on an "occurrence" policy form with coverage at least as broad as ISO CGL form CG 0001, including contractual liability insurance coverage, against claims for bodily injury, property damage, personal injury, products and completed operations, and advertising injury occurring on or about the Premises or in any way relating to or arising out of Lessee's use or occupancy of the Premises with minimum limits as provided in Paragraph 1.K or in such amount as shall be adopted by the Port Commission from

time to time, which amount shall be consistent with industry standards but in no event shall be less than the Minimum Coverage Amount set forth in Paragraph 1.K. Lessor and its "Related Parties" shall be named as additional insureds with coverage at least as broad as form ISO CG 2026 – Designated Person or Organization (or other comparable endorsement), without modification, affording coverage regardless of the additional insureds' concurrent negligence. Such insurance shall be endorsed to provide that the insurance shall be primary to and not contributory to any similar insurance carried by Lessor, and shall contain a severability of interest or cross liability clause. Further, Lessee shall notify Lessor within five (5) days of Lessee's receipt of notification of any modification or cancellation of any insurance contract or indemnity bond. Lessee shall provide Lessor with replacement coverage acceptable to Lessor prior to the applicable modification or cancellation taking effect, and in no event more than thirty (30) days of Lessee's notification to Lessor of such modification or cancellation of any insurance contract or indemnity bond. Lessor retains the right to increase the coverage amount upon receipt of notice, as required in Paragraph 14, that Lessee intends to make Alterations to the Premises.

(2) In the event that Lessee's use of the Premises requires improvements to be constructed on-site, Lessee shall also provide Contractor's Pollution Liability insurance in the amount of Five Million Dollars ($5,000,000) per claim and in the aggregate covering Lessee's general contractor and all sub-contractors of every tier during the construction of an improvement. This insurance shall be kept in effect until final completion of the project. In the event that the insurance is written on a claims made basis, the retroactive date shall be before the start of the project. Lessor shall be named as an additional insured on this coverage.

C. **Pollution Legal Liability**: Lessee shall also obtain pollution legal liability insurance against claims for bodily injury, property damage (including third party claims), natural resource damages, and clean up and defense costs occurring on or about the Premises or in any way relating to or arising out of Lessee's use or occupancy of the Premises and use of the Pipeline Easement areas, in the amount specified in Paragraph 1.L as an extension of the commercial general liability insurance or as a separate policy. Such policy or policies shall include coverage for sudden and accidental releases as well as any gradual releases arising in any way from Lessee's occupancy of and operations at the Premises. Lessor and its Related Parties shall be named as additional insureds with coverage at least as broad as form ISO CG 2026 – Designated Person or Organization (or other comparable endorsement), without modification, affording coverage regardless of the additional insureds' concurrent negligence. Such insurance shall be endorsed to provide that the insurance shall be primary to and not contributory

to any similar insurance carried by Lessor, and shall contain a severability of interest or cross liability clause. Further, Lessee shall notify Lessor within five (5) days of Lessee's receipt of notification of any modification or cancellation of any insurance contract or indemnity bond. Lessee shall provide Lessor with replacement coverage acceptable to Lessor prior to the applicable modification or cancellation taking effect, and in no event more than thirty (30) days of Lessee's notification to Lessor of such modification or cancellation of any insurance contract or indemnity bond. Lessor has assessed the pollution legal liability coverage amount specified in Paragraph 1.L based on the site conditions investigated by Lessor and the operational information provided by Lessee. A copy of the Tenant Environmental Questionnaire is attached as Exhibit "H". Lessee agrees that it shall provide notice to Lessor of any change in the site conditions or site operations, including without limitation changes in Hazardous Substances handled at the Premises as provided through the new product approval process described in Exhibit "I" thirty (30) days prior to any such change. Lessor retains the right to increase the coverage amount upon its knowledge that Lessee intends to: (i) change its operations, (ii) change its use or other handling of Petroleum Products or Hazardous Substances at the Premises, or (iii) make Alterations to the Premises.

D. **Miscellaneous:**

(1) Lessee's insurance carrier, for all insurance referenced in this Lease, shall be a reputable insurance company reasonably acceptable to Lessor and licensed to do business in the State of Washington. Lessee's insurance carrier(s) shall have a minimum A-VIII rating as determined by the then current edition of Best's Insurance Reports published by A.M. Best Co.

(2) Lessee shall provide Lessor with certificates of insurance, with a copy of additional insured endorsement in favor of Lessor attached, prior to or at occupancy, concurrently with the execution of this Lease and upon each renewal thereafter, to establish that Lessee's insurance obligations have been met and that the policies are not subject to cancellation or material change without at least thirty (30) days advance written notice to Lessor.

(3) Lessor reserves the right to inspect and require full copies of all insurance policies to be provided to Lessor.

(4) Lessee shall provide workers' compensation coverage (including all coverage mandated by any federal law) pursuant to all statutory requirements as may apply and any other insurance coverage required by law. It is the sole responsibility of Lessee to determine the laws applicable to Lessee's employees and

contractors and the employees and contractors of Lessee's agents operating the Facility. At no time shall Lessor incur any costs or liability due to Lessee's failure to obtain and maintain all insurance coverage required pursuant to applicable law. Lessee further agrees to maintain Employer Liability Act ("ELA") or stop gap insurance coverage of at least the Minimum Coverage Amount set forth in Paragraph I.K. In the event that the workers at the Facility are employed by one or more contractors of Lessee rather than by Lessee directly, Lessee shall not be required to maintain such coverage, but shall require such contractor or contractors to maintain such coverage for all workers at the Facility.

(5) Lessee shall provide Automobile Liability insurance with coverage at least as broad as Business Automobile Liability ISO form CA 0001, covering all owned, non-owned and hired automobiles brought on the Premises, with coverage of at least the Minimum Coverage Amount set forth in Paragraph I.K.

(6) Notwithstanding anything in this Lease to the contrary, neither Party, nor its Related Parties, nor, in case of Lessee, its sublessees, shall be liable to the other Party or to any insurance company (by way of subrogation or otherwise) insuring the other Party, for any loss or damage to any building, structure or other property (whether real or personal) arising from any cause that (i) would be insured against under the terms of any property insurance required to be carried hereunder, or (ii) is insured against under the terms of any property insurance actually carried, regardless of whether the same is required hereunder, even though such loss or damage might have been occasioned by the negligence of such Party or its Related Parties. Each Party shall notify their respective insurance companies of this waiver of any rights of subrogation that such companies may have against Lessor or Lessee, as the case may be and shall obtain any necessary endorsement to avoid such waiver's invalidating the policy in whole or in part. Further, neither Lessor nor any Related Party of Lessor shall be liable for any such damage caused by other lessees or persons in, upon or about the Premises, or caused by operations in construction of any private, public or quasi-public work.

(7) Lessor and Lessee each hereby waive, and in no event shall either Party be liable to the other for, any lost profits, damage to business, or any form of special, indirect of consequential damages.

(8) Lessee shall be solely responsible for all losses up to the applicable deductible.

16. **RELEASE AND INDEMNIFICATION COVENANTS:**

A. Lessee releases Lessor and all officials and employees of Lessor from, and covenants and agrees that neither Lessor nor any Related Party of Lessor shall be liable for, and Lessee agrees to defend, indemnify and

hold Lessor and its Related Parties (hereinafter the "Lessor Indemnitee" or "Lessor Indemnitees") harmless against, any and all claims, actions, proceedings, damages, liabilities, costs, and expenses incurred (including, without limitation, all attorneys' fees and expenses arising in connection with each such claim, action or proceeding) from or in connection with: (i) the conduct, operation or management of the Premises or of any business therein, or any work or thing whatsoever done, or any condition created therein or thereon, (ii) any act, omission, or negligence of Lessee or any of its sublessees or licensees or its or their partners, directors, officers, agents, employees, invitees or contractors; (iii) any incident, injury or damage whatever occurring in, at or upon the Premises; and/or (iv) any breach or Default by Lessee in the full and prompt payment and performance of Lessee's obligations under this Lease, except that (1) Lessee's indemnity shall not apply to any loss, damage, injury or death to the extent attributable to the negligence or intentional misconduct of Lessor or Lessor Indemnitees (provided, however, that in such event the indemnity shall remain valid for all other Lessor Indemnitees); (2) if and to the extent that this Lease is subject to Section 4.24.115 of the Revised Code of Washington, it is agreed that where liability for damages arising out of bodily injury to persons or damage to property is caused by or results from the concurrent negligence of (a) the Lessor Indemnitee or Lessor Indemnitee's agents or employees, and (b) the Lessee or its Related Parties, Lessee's obligations of indemnity under this Paragraph 16 shall be effective only to the extent of the Lessee's negligence; and (3) liability for any loss, claim, fine or penalty arising from the Release of Petroleum Products or Hazardous Substances or any violation of Environmental Laws shall be governed by the terms of Paragraph 11.H of this Lease.

B. In case any action shall be brought against any Lessor Indemnitee in respect of which indemnity may be sought against Lessee, such Lessor Indemnitee shall promptly notify Lessee in writing and Lessee shall assume the defense thereof, including the employment of counsel and the payment of all expenses incident to such defense. Such Lessor Indemnitee shall have the right to employ separate counsel in any such action and participate in the defense thereof, but the fees and expenses of such counsel shall be paid by such Lessor Indemnitee unless the employment of such counsel has been authorized by Lessee or counsel for Lessee shall have advised Lessor in writing that there exists actual or potential conflicts of interest which make representation by the same counsel inappropriate. Lessee shall not be liable for any settlement of any such action without its consent but, if any such action is settled with the consent of Lessee or if there be final judgment for the plaintiff of any such action, Lessee

agrees to indemnify and hold harmless Lessor Indemnitees from and against any loss or liability by reason of such settlement or judgment.

C. Lessee specifically and expressly waives any immunity that may be granted Lessee under the Washington State Industrial Insurance Act, Title 51 RCW, or its successor. Further, the indemnification obligation under this Lease shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable to or for any third party under all workers' compensation act (including, but not limited to, the Washington State Industrial Insurance Act, disability benefits acts or other employee benefits acts.

D. Lessor shall indemnify and hold harmless Lessee and its Related Parties ("Lessee Indemnitee" or "Lessee Indemnitees") from and against any and all third party claims for bodily injury and/or property damage arising from or in connection with: (i) any accident, injury or damage whatever occurring in, at or upon the Common Areas; (ii) any act, omission, or negligence of Lessor or its or their officers, agents, employees, invitees or contractors; and/or (iii) any breach or Default by Lessor in the full and prompt performance of Lessor's obligations under this Lease; together with all costs, expenses and liabilities incurred or in connection with each such claim or action or proceeding brought thereon, including, without limitation, all attorneys' fees and expenses at trial and upon appeal, except that (1) Lessor's Indemnity shall not apply to bodily injury, death and/or property damage to the extent attributable to the negligence or intentional misconduct of Lessee or Lessee Indemnitee(s) (provided, however, that in such event the indemnity shall remain valid for all other Lessee Indemnitees); (2) if and to the extent that this Lease is subject to Section 4.24.115 of the Revised Code of Washington, it is agreed that where liability for damages arising out of bodily injury to persons or damage to property is caused by or results from the concurrent negligence of (a) a Lessee Indemnitee or Lessee Indemnitees, and (b) the Lessor or the Lessor's agents or employees, Lessor's obligations of indemnity under this paragraph shall be effective only to the extent of the Lessor's negligence; (3) liability for any loss, claim, fine or penalty arising from the Release of Petroleum Products or Hazardous Substances or any violation of Environmental Laws shall be governed by the terms of Paragraph 11.H of this Lease and not by this Paragraph 16.D; and (4) liability for property damage arising from a fire or other casualty shall be governed by Paragraph 17 of this Lease and not by this Paragraph 16.D.

E. The indemnification provisions of this Paragraph 16 shall survive the expiration or earlier termination of this Lease, and are independent of, and will not limit or be limited by, any insurance obligations in this Lease (whether or not complied with).

17. **DAMAGE OR DESTRUCTION:**

A. In the event the Premises or any portion thereof shall be damaged or destroyed by fire or any other insured casualty, or any other insured peril whatsoever, at any time during the term of this Lease, then and in such event, unless the damage exceeds fifty percent (50%) of the replacement cost thereof or will take more than one year to repair, Lessee will or will cause to repair and restore the buildings and improvements in substantially the same location and condition before damage occurred.

B. In the event Lessee elects, undertakes, or is required to rebuild, the proceeds of any insurance policies which are required hereunder shall be first devoted exclusively to the repair and restoration of the damaged or destroyed buildings and improvements located on the Premises and the expenditure of such sum by Lessee for the restoration thereof shall be considered full compliance with the covenant to repair and restore. All property insurance proceeds on Lessee's buildings and improvements owned by Lessee, whether or not used to repair or restore said damage, shall be paid to Lessor and Lessee jointly. All property insurance proceeds on Lessor provided site improvements shall be paid to Lessor.

C. In the event the Premises or any portion thereof is damaged or destroyed to an extent exceeding fifty percent (50%) of the replacement cost thereof, or if Lessor reasonably determines that repair or restoration of any damage cannot be completed within one year, or if there is less than three (3) years remaining in the Term, Lessee shall have the option to elect either to repair and restore the buildings and improvements located on the Premises to substantially the same location and condition as existed before damage occurred or to terminate this Lease. In the event Lessee elects to terminate this Lease: (i) Lessee shall give Lessor written notice of such termination within forty-five (45) days of the date of damage, and (ii) Lessor shall be entitled to any casualty insurance proceeds necessary to repair or replace the improvements or Alterations to the extent affected by such damage or destruction. If Lessee is not in Default under this Lease, any prepaid or unearned rent shall be returned to Lessee.

D. In the event the Premises or any portion thereof is damaged or destroyed, to whatever extent, but Lessor and Lessee agree to maintain this Lease during the time of repair and restoration, Lessee shall be entitled to a reduction of Rent equal to that portion of the Premises unusable as a result of the damage and/or destruction so long as Lessee is at all times diligently pursuing such repair or restoration to completion.

18. **SUBORDINATION AND ATTORNMENT:**

A. Lessor shall have the absolute right to sell, transfer, convey, assign and encumber its interest in this Lease and its estate in the Premises (called "Lessor's Interest"), or any part thereof (including, but not limited to, Lessor's reversion), and to delegate all or any portion of its obligations hereunder, from time to time as it sees fit, without obtaining any approval from Lessee.

B. This Lease shall be subject and subordinate to any encumbrances and to any extensions or renewals thereof which are now, or may hereafter be placed by Lessor, its successors or assigns, upon the whole or any part of Lessor's property and which includes the Premises. Promptly upon request by Lessor and without expense to Lessor, Lessee shall execute and deliver any instrument which may be reasonably required by Lessor or its current or prospective lender, bondholders or the trustee for Lessor's bonds, or the holder of the secured party's interest in any loan (collectively "Mortgagee") with regard to the Premises in confirmation of such subordination. If Lessee shall fail at any time to execute and deliver any such subordination, Lessor, in addition to any other remedy available to it in consequence thereof, may execute and deliver such instrument as the attorney-in-fact of Lessee; and Lessee hereby appoints Lessor as attorney-in-fact for such limited purpose.

C. In the event that Lessor sells or assigns its interest or estate absolutely, Lessee shall be bound to the purchaser or assignee under all of the covenants, terms and conditions of this Lease for the balance of the Term with the same force and effect as if such purchaser or assignee was the lessor under the Lease and Lessee hereby attorns to such purchaser or assignee as its landlord, such attornment to be effective and self-operative without the execution of any further instrument on the part of either of the Parties hereto immediately upon such purchaser's or assignee's succeeding to the interest or estate of Lessor. Specifically, on receipt of a notice from Mortgagee that Rents should be paid to Mortgagee, Lessee shall pay all Rents to Mortgagee or its designee directly. If the Mortgagee succeeds to the interest of Lessor under the Lease, Mortgagee shall not be: (i) liable for any act or omission of Lessor or any prior landlord; (ii) liable for the return of any Security Deposit unless such deposit has been delivered to Mortgagee by Lessor or is in an escrow fund available to Mortgagee; (iii) subject to any offsets or defenses that Lessee might have against any prior landlord (including Lessor); (iv) bound by any rent or additional rent that Lessee might have paid for more than the current month to any prior landlord (including Lessor); (v) bound by any amendment, modification, or termination of the Lease made without Mortgagee's consent; (vi) personally liable under the Lease, Mortgagee's liability hereunder being limited to its interest in the Premises; or (vii) bound by

any notice of termination given by Lessor to Lessee without Mortgagee's prior written consent thereto. If during the pendency of foreclosure proceedings or otherwise, there is appointed by the court a receiver for the property of which the Premises are a part, Lessee hereby attorns to the receiver as its landlord during the pendency of such foreclosure proceeding, such attornment to be effective and self-operative without the execution of any further instrument on the part of either Party.

D. If requested by any Mortgagee, or any ground lessor, Lessee will agree to give such Mortgagee or ground lessor, a reasonable opportunity to cure any Default by Lessor under this lease.

19. **ASSIGNMENT OR SUBLEASE**:Except as specifically provided in this Paragraph 19, Lessee shall not assign, in whole or in part, this Lease or any extension thereof, nor shall Lessee rent or sublease all or any part of the Premises, to a third party, without the prior written consent of Lessor, which shall not be unreasonably withheld or delayed so long as the Permitted Use and all other terms and conditions hereof (other than the identity of Lessee) remain unchanged following such assignment, and so long as Lessee demonstrates to Lessor's sole satisfaction that the proposed assignee (i) has the financial ability to pay and perform the obligations of Lessee under this Lease, and (ii) has the ability and experience to operate the Facility for the Permitted Use, and no rights hereunder in or to said Premises shall pass by operation of law or other judicial process or through insolvency proceedings. Notwithstanding the foregoing, if the assignment is the direct result of a change of ownership or control of the business operated by Lessee at the Premises by a non-third-party merger or consolidation of Lessee (including an internal merger or consolidation of the Lessee or a division(s) thereof) or a transfer to an affiliate of Lessee or an entity owned or controlled by Tesoro Corporation, a Delaware corporation, or Savage Companies, a Utah corporation, Lessor's consent shall not be required. The rights and obligations hereof shall extend to and be binding upon Lessor's and Lessee's respective permitted successors and assigns as the case may be. Lessee will furnish Lessor with copies of all such assignment, sublease or rental documents. For the purposes of this Lease, any change of fifty percent (50%) or more of the beneficial ownership of the Lessee including sale, liquidation or other disposition of corporate stock or limited liability company units (or a sale of substantially all of the assets) will be considered an assignment. Should Lessor consent to any assignment made by Lessee solely for the purposes of obtaining a loan or other consideration from a third party (as opposed to a merger, consolidation, sale of assets, corporate stock or limited liability units), then Lessor's consent shall be made in accordance with a mutually agreed

Consent to Assignment. Upon any assignment of this Lease or sublease of the Premises, Lessee shall continue to be obligated under this Lease.

B. If Lessor refuses to consent to an assignment, Lessee's sole remedy shall be the right to bring declaratory action to determine whether Lessor was entitled to refuse such assignment under the terms of this Lease.

C. The granting of consent to any assignment or sublease shall not constitute a waiver of Lessor's discretion to approve or disapprove any future request for permission to assign or sublease in accordance with the requirements of Paragraph 19.A. Acceptance of rent or other performance by Lessor following an assignment or sublease, whether or not Lessor has knowledge of such assignment or sublease, shall not constitute consent to the same nor a waiver of the requirement to obtain consent to the same.

D. Unless otherwise agreed in writing, the initial Lessee and any assignee of Lessee shall remain liable for the full performance of all obligations of Lessee hereunder during the entire Term of this Lease.

E. A minimum handling and transfer fee ("Transfer Fee") of Two Thousand Five Hundred and 00/100 Dollars ($2,500.00) shall be payable by Lessee to Lessor if Lessee requests that Lessor's consent to a proposed assignment (including an assignment to a creditor for security purposes), sublease or modification of this Lease. Such Transfer Fee shall be submitted to Lessor at the same time that Lessee requests Lessor's consent to the proposed sublease, assignment or modification. If Lessor's reasonable and customary attorneys' fees exceed the Transfer Fee, then Lessee agrees to reimburse Lessor for such additional reasonable and customary attorneys' fees. Lessee's failure to remit this additional amount within sixty (60) days of the mailing of notice of such charges shall constitute a Default under this Lease.

F. In the event Lessee fails or refuses to pay Rent or Additional Charges when due or is otherwise in Default as defined in Paragraph 23 of this Lease, any sublessee of Lessee shall direct all rental and other payments under the sublease directly to Lessor upon written notice from Lessor and without liability to the original Lessee. In the event Lessor elects to terminate the Lease due to a Default by Lessee, any sublease previously agreed to shall, at Lessor's sole discretion, automatically become a direct lease between Lessor and the sublessee, subject to all terms and conditions of this Lease (including bond, security and insurance requirements) without further action by any Party.

20. **LEASEHOLD MORTGAGES**:Lessee shall have the right, in addition to any other rights granted and without any requirement to obtain Lessor's consent, to mortgage or grant a security interest in Lessee's interest in

this Lease, the Premises and the Alterations, and in any subleases, under one or more leasehold mortgages or pursuant to a sale-leaseback financing arrangement to one or more Lending Institutions (as defined in Paragraph 20.B) and/or under one or more purchase-money leasehold mortgages to a Lending Institution, and to assign this Lease and any subleases to a Lending Institution as collateral security for such leasehold mortgages or pursuant to the sale-leaseback financing arrangement, on the condition that all rights acquired under such leasehold mortgages or pursuant to the sale-leaseback financing arrangement shall be subject to each and all of the covenants, conditions, and restrictions set forth in this Lease and to all rights and interests of Lessor, none of which covenants, conditions, restrictions, rights, or interests is or shall be waived by Lessor by reason of the right given to mortgage or grant a security interest in Lessee's interest in this Lease and the Premises and the Improvements, except as expressly provided otherwise. During any period of time that Lessor's deed of trust to secure the payment of the WS&F Lien Amount is an encumbrance against the improvements and Alterations located on the Premises, any Permitted Leasehold Mortgage (defined below) shall be subject and subordinate to Lessor's deed of trust.

B. Any mortgage or sale-leaseback financing arrangement made pursuant to this paragraph is referred to as a "Permitted Leasehold Mortgage," and the holder of or secured party under a Permitted Leasehold Mortgage is referred to as a "Permitted Leasehold Mortgagee." The Permitted Leasehold Mortgage that is prior in lien or interest among those in effect is referred to as the "First Leasehold Mortgage," and the holder of or secured party under the First Leasehold Mortgage is referred to as the "First Leasehold Mortgagee." For the purposes of any rights created under this paragraph, any so-called wraparound lender that is a Lending Institution shall be considered a First Leasehold Mortgagee. If a First Leasehold Mortgage and a Permitted Leasehold Mortgage that is second in priority in lien or interest among those in effect are both held by the same Permitted Leasehold Mortgagee, the two Permitted Leasehold Mortgages are collectively referred to as the "First Leasehold Mortgage." A "Permitted Leasehold Mortgage" includes, without limitation, mortgages and trust deeds as well as financing statements, security agreements, sale-leaseback instrumentation, and other documentation that the lender may require. The words "Lending Institution", as used in this Lease, mean (1) a bank (state, federal or foreign), trust company (in its individual or trust capacity), insurance company, credit union, savings bank (state or federal), pension, welfare or retirement fund or system, real estate investment trust (or an umbrella partnership or other entity of which a real estate investment trust is the majority owner), federal or state agency regularly making or guaranteeing mortgage loans, investment bank, subsidiary of a Fortune 500 company (such as General Electric Capital Corporation), real

estate mortgage investment conduit, or securitization trust; (2) any issuer of collateralized mortgage obligations or any similar investment entity (provided that either (a) at least certain interests in such issuer or other entity are publicly traded or (b) such entity was or is sponsored by an entity that otherwise constitutes a Lending Institution or has a trustee that is, or is an Affiliate of, any entity that otherwise constitutes a Lending Institution), or any Person acting for the benefit of or on behalf of such an issuer; (3) any Person actively engaged in commercial real estate financing and having total assets (on the date when its Leasehold Mortgage is executed and delivered, or on the date of such Leasehold Mortgagee's acquisition of its Leasehold Mortgage by assignment, but excluding the value of any Leasehold Mortgage encumbering this Lease) of at least Five Hundred Million and 00/100 Dollars ($500,000,000.00); (4) any Person that is a wholly owned subsidiary of or is a combination of any one or more of the foregoing Persons; or (5) any of the foregoing when acting as trustee, agent, or administrative agent for other lender(s) or investor(s), whether or not such other lender(s) or investor(s) are themselves Lending Institutions. The fact that a particular Person (or any Affiliate of such Person) is a partner, member, or other investor of the then Lessee shall not preclude such Person from being a Lending Institution and a Leasehold Mortgagee provided that: (a) such entity has, in fact, made or acquired a bona fide loan to Lessee secured by a Leasehold Mortgage or is a Mezzanine Lender; (b) such entity otherwise qualifies as Lending Institution and a Leasehold Mortgagee (as applicable); and (c) at the time such entity becomes a Leasehold Mortgagee, no Default exists under this Lease, unless simultaneously cured.

C. If a Permitted Leasehold Mortgagee sends to Lessor a true copy of its Leasehold Mortgage, together with written notice specifying the name and address of the Permitted Leasehold Mortgagee, then as long as such Permitted Leasehold Mortgage remains unsatisfied of record or until written notice of satisfaction is given by the holder to Lessor, the following provisions shall apply (in respect of such Permitted Leasehold Mortgage):

(1) Except as expressly provided otherwise below, a Leasehold Mortgagee shall not be bound by any cancellation, termination, surrender, acceptance of surrender, amendment, or modification of this Lease without in each case the prior consent in writing of the Permitted Leasehold Mortgagee. Nor shall any merger result from the acquisition by, or devolution upon, any one entity of the fee and the leasehold estates in the Premises.

(2) Lessor shall, upon serving Lessee with any notice, whether of Default or any other matter, simultaneously serve a copy of such notice on the Permitted Leasehold Mortgagee, and no such notice to

Lessee shall be deemed given unless a copy is so served on the Permitted Leasehold Mortgagee in the manner provided in this Lease for giving notices.

(3) In the event of any Default by Lessee under this Lease, each Permitted Leasehold Mortgagee has the same period as Lessee has, plus thirty (30) days, after service of notice on it of such Default, to remedy or cause to be remedied or commence to remedy and complete the remedy of the Default complained of for such default, and Lessor shall accept such performance by or at the instigation of such Permitted Leasehold Mortgagee as if the same had been done by Lessee. Each notice of non-monetary Default given by Lessor will state the amounts of whatever Rent or Additional Charges are then claimed to be in default, if any.

(4) If Lessor elects to terminate this Lease by reason of any Default of Lessee, the Permitted Leasehold Mortgagee, in addition to the rights granted under the preceding paragraph, shall also have the right to postpone and extend the specified date for the termination of this Lease as fixed by Lessor in its notice of termination, for a period of six months, provided that the Permitted Leasehold Mortgagee shall cure or cause to be cured any then-existing defaults in payment of Rent and Additional Charges and meanwhile pay the Rent and Additional Charges, and provided further that the Permitted Leasehold Mortgagee shall forthwith take steps to acquire or sell Lessee's interest in this Lease by foreclosure of the Permitted Leasehold Mortgage or otherwise and shall prosecute the same to completion with all due diligence. If, at the end of the six-month period, the Permitted Leasehold Mortgagee is actively engaged in steps to acquire or sell Lessee's interest, the time of the Permitted Leasehold Mortgagee to comply with the provisions of this Paragraph 20.C shall be extended for such period as is reasonably necessary to complete such steps with reasonable diligence and continuity.

(5) Lessor agrees that the name of the Permitted Leasehold Mortgagee may be added to the "Loss Payable Endorsement" of any and all insurance policies required to be carried by Lessee or Lessor.

(6) Lessor agrees that in the event of termination of this Lease by reason of any Event of Default by Lessee, Lessor will enter into a new lease of the Premises with the Permitted Leasehold Mortgagee or its nominee, for the remainder of the Term, effective on the date of such termination, at the Rent and Additional Charges and on the terms, provisions, covenants, and agreements contained in this Lease and subject only to the same conditions of title as this Lease is subject to on the date this Lease is executed, and to the rights, if any, of any parties then in possession of any part of the Premises, provided:

a) The Permitted Leasehold Mortgagee or its nominee shall make written request on Lessor for such new lease within fifteen (15) days after the date of termination indicated in the notice of termination given to Permitted Leasehold Mortgagee and such written request shall be accompanied by payment to Lessor of Rent and Additional Charges then due to Lessor under this Lease.

b) The Permitted Leasehold Mortgagee or its nominee shall pay to Lessor, at the time the new lease is executed and delivered, any and all Rent and Additional Charges that would be due at the time of the execution and delivery of the new lease pursuant to this Lease but for such termination, and in addition any expenses, including reasonable attorneys' fees, to which Lessor shall have been subjected by reason of such Default.

c) The Permitted Leasehold Mortgagee or its nominee shall ensure that any security and guaranty(ies) are in full force and effect, and shall perform and observe all covenants contained in this Lease on Lessee's part to be performed and further shall remedy any other conditions that Lessee under the terminated Lease was obligated to perform; and upon execution and delivery of such new lease, any subleases, security that may have been assigned and transferred previously by Lessee to Lessor, as security under this Lease, shall then be held by Lessor as security for the performance of all the obligations of Lessee under the new lease.

d) Lessor shall not warrant possession of the Premises or the Improvements to Lessee under the new lease.

e) Such new lease shall be expressly made subject to the rights, if any, of Lessee under the terminated Lease.

f) Lessee under such new lease shall have the same right, title, and interest in and to the Alterations on the Premises as Lessee had under the terminated Lease.

g) Nothing contained in this Lease requires the Permitted Leasehold Mortgagee or its nominee to cure any Default that occurs as a result of the status of Lessee, such as Lessee's bankruptcy or insolvency, or to discharge any lien, charge, or encumbrance against Lessee's interest in this Lease junior in priority to the lien of the Permitted Leasehold Mortgage.

h) The First Leasehold Mortgagee shall be given notice of any arbitration or other proceeding or dispute by or between the Parties and shall have the right to intervene and be made a party to any such arbitration or other proceeding. In any event, each Permitted Leasehold Mortgagee shall receive notice of, and a copy of, any award or decision made in the arbitration or other proceeding.

i) Any award or payment in condemnation or eminent domain in respect of the improvements shall be paid to the First Leasehold Mortgagee for the benefit of the Parties and applied in the manner specified in this Lease.

j) No fire or casualty loss claims shall be settled and no agreement will be made in respect of any award or payment in condemnation or eminent domain without in each case the prior written consent of the First Leasehold Mortgagee.

k) Except as otherwise provided in this Paragraph 20, no liability for the payment of Rent or Additional Charges or the performance of any of Lessee's covenants and agreements shall attach to or be imposed on the Permitted Leasehold Mortgagee (other than any obligations assumed by the Permitted Leasehold Mortgagee), all such liability (other than any obligations assumed by the Permitted Leasehold Mortgagee) being expressly waived by Lessor.

l) Lessor, within 10 days after request in writing by Lessee or any Permitted Leasehold Mortgagee, shall furnish a written statement, duly acknowledged, that this Lease is in full force and effect and unamended, or if there are any amendments, such statement will specify the amendments, and that there are no Defaults by Lessee that are known to Lessor, or if there are any known Defaults, such statement shall specify the Defaults Lessor claims exist.

m) No payment made to Lessor by any Permitted Leasehold Mortgagee shall constitute agreement that such payment was, in fact, due under the terms of this Lease; and the Permitted Leasehold Mortgagee having made any payment to Lessor pursuant to Lessor's wrongful, improper, or mistaken notice or demand shall be entitled to the return of any such payment or portion, provided it shall have made demand not later than one year after the date of its payment.

n) Lessor, on request, shall execute, acknowledge, and deliver to each Permitted Leasehold Mortgagee an agreement prepared at the sole cost and expense of Lessee, in form satisfactory to the Permitted Leasehold Mortgagee and Lessor, among Lessor, Lessee, and the Permitted Leasehold Mortgagee, agreeing to all the provisions of this paragraph.

o) Lessor shall at no time be required to subordinate its fee simple interest in the Premises to the lien of any leasehold mortgage, nor to mortgage its fee simple interest in the Premises as collateral

or additional security for any leasehold mortgage. Lessor shall attorn to any Permitted Leasehold Mortgagee or any other person who becomes Lessee by, through, or under a Permitted Leasehold Mortgage.

p) If Lessee is declared bankrupt or insolvent and this Lease is thereafter lawfully canceled or rejected, Permitted Leasehold Mortgagee or its nominee, shall accept the existing lease in bankruptcy.

q) If Lessor declares bankruptcy and Lessor's bankruptcy trustee rejects this Lease when there is a Permitted Leasehold Mortgagee, Lessee's right to elect to terminate this Lease or to retain its rights pursuant to 11 USC §365(h)(1) shall be exercised by the Permitted Leasehold Mortgagee.

21. **ESTOPPEL CERTIFICATE**: Lessee and Lessor shall each, at any time and from time to time without charge, and within ten (10) days after written request therefor by the other Party, complete, execute, and deliver to the requesting Party a written statement concerning the terms of this Lease, whether it is in full force and effect, if there are any Defaults hereunder, and such other information as may be required by the requesting Party, but only as typically provided in an estoppel certificate.

22. **[INTENTIONALLY DELETED]**.

23. **LIENS**: Except for the deed of trust granted by Lessee to Lessor to secure the payment of the WS&F Lien Amount and any Permitted Leasehold Mortgage, Lessee shall keep the Premises and Lessee's leasehold interest therein free and clear of, and shall indemnify, defend and hold harmless Lessor against, all liens, charges, mortgages, and encumbrances which may result from any act or neglect of Lessee, including but not limited to liens for utility charges and mechanics and materialman liens, and all expenses in connection therewith, including attorneys' fees; it being expressly agreed that Lessee or any transferee, assignee, delegate or sublessee shall have no power or authority to create any such lien, charge, mortgage or encumbrance except with the prior written approval of Lessor. Nothing herein shall prevent Lessee from litigating any Lien not believed by Lessee to be valid, providing that (i) such contest will not expose Lessor to civil or criminal liability, fine or penalty, (ii) such contest will not subject the Premises to sale, forfeiture, foreclosure or interference, and (iii) Lessee provides to Lessor security, reasonably satisfactory to Lessor against any loss or injury by reason of such contest and prosecutes the contest with due diligence.

24. **DEFAULT OR BREACH**:

Time is of the essence of this Lease. Each of the following events shall constitute an event of default and breach ("Default") of this Lease:

A. If Lessee, or any successor or assignee of Lessee while in possession, shall file a petition in bankruptcy or insolvency or for reorganization under any Bankruptcy Act, or shall voluntarily take advantage of any such Act by answer or otherwise, or shall make an assignment for the benefit of creditors.

B. If involuntary proceedings under any bankruptcy law or insolvency act shall be instituted against Lessee, or if a receiver or trustee shall be appointed for all or substantially all of the property of Lessee, and such proceedings shall not be dismissed or the receivership or trusteeship vacated within one hundred twenty (120) days after the institution or appointment.

C. If Lessee shall fail to pay to Lessor Rent or Additional Charges when due, taking into account any grace period for payment provided hereunder.

D. If Lessee shall fail to provide a bond or other security in violation of Paragraph 6 and maintain it throughout the Term of this Lease and sixty (60) days thereafter.

E. If Lessee shall fail to provide the insurance required under Paragraph 15.

F. If Lessee shall fail to occupy and use the Premises continuously during the Term of this Lease in violation of Paragraph 8.A.

G. If this Lease or the interest of Lessee under this Lease shall be assigned, sublet or otherwise transferred to or shall pass to or devolve on any other person or party, voluntarily or involuntarily, except in the manner expressly permitted in this Lease.

H. If Lessee shall fail to perform or comply with any other term or condition of this Lease, and if the non-performance shall continue for a period of twenty (20) days after notice of non-performance given by Lessor to Lessee or, if the performance cannot be reasonably accomplished within the twenty (20) day period, Lessee shall not in good faith have commenced performance within the twenty (20) day period and shall not diligently proceed to completion of performance within a reasonable time thereafter.

I. If any default or event of default of Lessee shall arise under any Pipeline Agreement and continue beyond any applicable notice or cure period available to Lessee thereunder.

H. Lessor shall use commercially reasonable efforts to mitigate its damages following a Default by Lessee hereunder.

In the event that Lessor fails to perform or comply with any term or condition of this Lease, and if the non-performance shall continue for a period of twenty (20) days after notice of non-performance given by Lessee to

Lessor or, if the performance cannot be reasonably accomplished within the twenty (20) day period, Lessor shall not in good faith have commenced performance within the twenty (20) day period and shall not diligently proceed to completion of performance within a reasonable time thereafter, then Lessee shall have all rights and remedies available at law or in equity as a result of Lessor's breach.

25. **EFFECT OF DEFAULT:**

In the event of any Default by Lessee under this Lease, Lessor shall have the following rights and remedies:

A. In the event of any Default by Lessee or any person claiming under, by, or through Lessee, or any threatened or attempted Default by such person, Lessor shall be entitled to pursue an injunction against such person enjoining such Default (other than an injunction to cause Lessee to continuously operate the Premises pursuant to the terms of Paragraph 8.A). Nothing herein contained precludes Lessor from pursuing any other remedies available hereunder or at law or equity to Lessor for such breach, including eviction and the recovery of damages.

B. Lessor shall have the right to terminate this Lease, as well as all right, title and interest of Lessee under this Lease, by giving to Lessee not less than thirty (30) days notice of the termination effective on a date specified in the notice. No act of Lessor or its agents shall be deemed a termination of this Lease and no agreement of Lessor to terminate this Lease shall be valid, effective, or enforceable unless in writing and signed by Lessor. On the termination date specified in the notice, this Lease, and the right, title and interest of Lessee under this Lease, shall terminate in the same manner and with the same force and effect, except as to Lessee's liability, as if such termination date was the end of the Term originally set forth in this Lease.

C. Lessor may elect, but shall not be obligated, to make any payment required of Lessee in this Lease or to comply with any agreement, term, or condition required by this Lease to be performed by Lessee. Lessor shall have the right to enter the Premises for the purpose of curing any such Default and to remain until the Default has been cured. In either case, Lessor may charge to Lessee as Additional Charges the amount of such payment or the cost of such compliance or cure, together with interest thereon at the Interest Rate from the date of such payment. Any such cure by Lessor shall not be deemed to waive or release the Default of Lessee or the right of Lessor to take any action as may be otherwise permissible under this Lease in the case of any Default.

D. Lessor may re-enter the Premises immediately and remove the personal property and personnel of Lessee, and store the property in a public warehouse or at a place elected by Lessor, at the expense of Lessee. **Lessor may also remove any third party's property, and store the same in a public warehouse or other place**

elected by Lessor at the third party's expense, after Lessor has contacted the third party owner and given said third party owner ten (10) days' notice of Lessor's intent to remove the property. After re-entry, Lessor may terminate this Lease on giving thirty (30) days' notice of termination to Lessee. Without the notice, re-entry will not terminate this Lease.

E. After re-entry, Lessor may relet the Premises or any part of the Premises for any term without terminating this Lease, at the rent and on the terms as Lessor may choose. Lessor may make Alterations and repairs to the Premises. The duties and liabilities of the Parties upon the reletting of the Premises as provided in this paragraph shall be as follows:

(1) In addition to Lessee's liability to Lessor for breach of this Lease, Lessee shall be liable for all expenses of the reletting, for the Alterations and repairs made, and for the difference between the rent and additional charges received by Lessor under the new lease agreement, and the Rent and Additional Charges that are due for the same period under this Lease.

(2) To the fullest extent permitted by law, Lessor shall have the right to apply the rent received from reletting the Premises to any amount as Lessor may decide in Lessor's sole discretion, including but not limited to any or all of the following: (a) the interest owed by Lessee to Lessor under this Lease, (b) attorneys' fees and costs owed by Lessee to Lessor under this Lease, (c) expenses of the reletting and alterations and repairs made, (d) Rent or Additional Charges due under this Lease, or (e) future Rent or Additional Charges under this Lease as they become due.

(3) If the new Lessee does not pay a rent installment promptly to Lessor, and the rent installment has been credited in advance of payment to the indebtedness of Lessee other than Rent, or if rentals from the new Lessee have been otherwise applied by Lessor as provided for in this subparagraph E and during any rent installment period or less than the rent payable for the corresponding installment period under this Lease, Lessee shall pay Lessor the deficiency, separately for each rent installment deficiency, and before the end of that period. Lessor may at any time after reletting terminate this Lease for the breach on which Lessor had based the re-entry and subsequently relet the Premises, and in such event the provisions of subparagraph G hereof shall apply.

F. Lessor shall be entitled to recover damages from Lessee for any Default by Lessee, without prejudice to any of Lessor's other rights or remedies hereunder or at law or equity, including Lessor's right to terminate this Lease. If this Lease is terminated for any reason, Lessee's liability to Lessor for damages shall

survive such termination. In the event of termination as a result of any Default by Lessee, Lessor shall be entitled to recover immediately without waiting until the due date of any future Rent and/or Additional Charges or until the date fixed for expiration of the Term, the following amounts as damages determined as of the date of termination:

(1) Any Rent, Additional Charges and late charges due under the Lease as of the date of termination, together with interest thereon at the Interest Rate from the date each sum became due through the date of termination;

(2) Notwithstanding anything to the contrary herein and notwithstanding the exercise of any other rights and remedies of Lessor, including but not limited to the right to re-enter the Premises as set forth herein, any excess of the value of all of Lessee's obligations under this Lease, including the obligation to pay Rent and Additional Charges, from the date of termination until the end of the Term remaining immediately prior to such termination, over the reasonable rental value of the Premises for the same period figured as of the date of termination, plus the loss of reasonable rental value of the Premises as of the end of the Term resulting from Lessee's Default, the net result to be discounted to the date of termination at the rate of five percent (5%) per annum;

(3) The reasonable costs of re-entry and re-letting including without limitation the cost of any clean-up, refurbishing, removal of Lessee's property and fixtures, and any other expense occasioned by Lessee's failure to quit the Premises upon termination or to leave them in the required condition, and any remodeling costs, broker commissions and advertising costs, together with interest thereon at the Interest Rate from the date such costs are incurred by Lessor until paid; and

(4) Any other damages recoverable at law, in equity or under this Lease, including but not limited to any doubling of damages permitted under RCW 59.12.170.

The foregoing damages shall bear interest at the Interest Rate from the termination date until paid.

G. Lessor's rights and remedies shall be cumulative and may be exercised and enforced concurrently. Any right or remedy conferred upon Lessor under this Lease shall not be deemed to be exclusive of any other right or remedy it may have. In the event of a Default in the payment of Additional Charges, Lessor shall have all the rights and remedies provided at law, in equity or in this Lease for a Default in the payment of Rent.

26. **CONDEMNATION OR TERMINATION BY COURT ORDER:**

A. If all or any part of the Premises are condemned by any public body, and the part not taken is not suitable for continued operation of Lessee's business (as determined by Lessee and Lessor after consultation, or, if Lessor and Lessee are unable to agree, as determined by a court of competent jurisdiction), Lessee may, at its option, terminate this Lease as of the date of such taking, and, if Lessee is not in Default under any of the provisions of this Lease on said date, any Rent or Additional Charges prepaid by Lessee shall be promptly refunded to Lessee. Upon such termination, the entire estate and interest of Lessee in the Premises shall cease and Lessee shall have no further rights or obligations hereunder, except for any rights and obligations intended to survive the expiration or termination of this Lease, including (without limitation) the obligations of Lessee pursuant to Paragraph 28; provided, however, that if only a portion of the Premises is condemned, then Lessee's obligations for repair and restoration of any improvements located on the Premises shall apply only to the portion of the Premises that is surrendered to Lessor and is not the subject of the condemnation action.

B. In the event that any court having jurisdiction in the matter shall render a decision which has become final and which will prevent the performance by Lessor of any of its obligations under this Lease, then either Party hereto may terminate this Lease by written notice, and all rights and obligations hereunder (with the exception of any undischarged rights and obligations that accrued prior to the effective date of termination and any rights and obligations intended to survive the expiration or termination of this Lease) shall thereupon terminate. If Lessee is not in Default under any of the provisions of this Lease on the effective date of such termination, any Rent or Additional Charges prepaid by Lessee shall, to the extent allocable to any period subsequent to the effective date of termination, be promptly refunded to Lessee.

C. In every case of taking or sale of the Premises, or any part thereof to which this Paragraph 26 is applicable; (i) the net proceeds (excluding any portion thereof which is attributable to Lessee's trade fixtures and equipment, which shall belong to Lessee so long as Lessee is not then in Default hereunder, and any separate award to Lessee for relocation costs) shall be applied following order of priority until the net proceeds are exhausted:

(1) First, to Lessor, to the extent of the Land Award;

(2) Second, to Lessee, to the extent of the Building Leasehold Award;

(3) Last, to Lessor, to the extent of any remaining net proceeds; and

(ii) if this Lease is not terminated pursuant to Paragraph 26.A, the Rent shall be reduced proportionately to the reduction in the square footage of the Premises as a result of the taking. If a court that is authorized to fix and determine the condemnation award fails to fix and determine, separately and apart, the Land Award and Building Leasehold Award, such amounts shall be determined and fixed by agreement between Lessor and Lessee (or if Lessor and Lessee are unable to agree, shall be determined by a proceeding in the court in which the eminent domain proceeding is brought).

27. **HOLDING OVER**: In the event Lessee for any reason shall hold over after the expiration of this Lease, without written consent by Lessor, such holding over shall not be deemed to operate as a renewal or extension of this Lease, but shall only create a tenancy terminable at will at any time by Lessor. In this event the Rent owing from Lessee to Lessor shall equal one hundred fifty percent (150%) of the Base Monthly Rent during the last month prior to the holdover period, unless otherwise agreed. If Lessee, with written consent of Lessor, holds over after the expiration or sooner termination of this Lease, the resulting tenancy shall be on a month-to-month basis, upon agreed upon Rent terms. Lessee shall continue to be bound by all other pertinent provisions of this Lease.

28. **SURRENDER OF PREMISES**: Prior to the vacation of the Premises, and in addition to the requirements in Paragraph 11, Lessee shall promptly surrender possession of the Premises, and shall deliver all keys that it may have to any and all parts of the Premises. The Premises shall be surrendered to Lessor in the same condition in which the Premises were received, reasonable wear and tear excepted, and in the state of repair and maintenance required by the terms of this Lease. All Alterations and improvements allowed by Lessor shall be surrendered to Lessor in the same condition in which they were made, reasonable wear and tear excepted, and in the state of repair and maintenance required by the terms of this Lease, unless Lessor elects to permit or require Lessee to remove some or all of such improvements or Alterations (to the extent Lessor may require such removal pursuant to the terms hereof). Lessor may, at its option, exercised within ten (10) days after termination notice or expiration of this Lease, require Lessee expeditiously to remove any or all improvements and fixtures placed on the Premises by Lessee and which would otherwise remain the property of Lessor. In addition to all other requirements under this Lease, including but not limited to Paragraphs 11.L and 12.B, Lessor may require Lessee to repair any physical damage resulting from such removal, or Lessor may elect to do so itself and charge the cost to Lessee with interest at fifteen percent (15%) per annum from the date of expenditure, which shall be payable by Lessee forthwith on demand.

29. **JOINT AND SEVERAL LIABILITY:**

A. Each and every party who signs this Lease, other than in the representative capacity, as Lessee, shall be jointly and severally liable hereunder.

B. It is understood and agreed that for convenience the word "Lessee" and verbs and pronouns in the singular number and neuter gender are uniformly used throughout this Lease, regardless of the number, gender or fact of incorporation of the party who is, or of the parties who are, the actual Lessee or Lessees under this Agreement. In construing this Lease, if the context so requires, the singular pronoun shall be taken to mean and include the plural, the masculine, the feminine and the neuter, and that generally all grammatical changes shall be made, assumed and implied to make the provisions hereof apply equally to entities and individuals.

30. **RULES AND REGULATIONS:** Lessor, for the proper maintenance of the Premises, the rendering of good service thereon, and the providing of safety, order and cleanliness thereof, may make and enforce such rules and regulations as Lessor may reasonably deem necessary or appropriate for such purposes but not inconsistent with the covenants, terms and conditions of this Lease. Lessor's Rules and Regulations attached hereto as Exhibit "F" and the Health and Safety Guidelines for the Facility, prepared by Savage Corporation, in its capacity as the operator of the Facility, attached hereto as Exhibit "L" are acknowledged by Lessee as current and binding. Lessee reserves the right from time to time to modify the Health and Safety Guidelines, and shall provide a copy of such modified Health and Safety Guidelines to Lessor within thirty (30) days after Lessee's implementation thereof, which implementation shall not be subject to Lessor's review, consent, or approval. In addition, a final Facility Operation and Safety Plan shall be mutually approved prior to operation of the Facility.

31. **CAPTIONS AND PARTICULAR PROVISIONS:**

A. The captions in this Lease are for convenience only and do not in any way limit or amplify the provisions of this Lease.

B. If any term or provision of this Lease or the applications thereof to any person or circumstances shall, to any extent, be invalid or unenforceable, the remainder of this Lease or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect.

32. **NON-DISCRIMINATION:**

A. Lessee agrees that in the performance of this Lease it will not discriminate by segregation or otherwise against any person or persons because of sex, race, creed, age, color or national origin.

B. It is agreed that Lessee's non-compliance with the provisions of this clause shall constitute a Default of this Lease following the lapse of any applicable notice and cure periods without a cure. In the event of such noncompliance, Lessor may take appropriate action to enforce compliance, may terminate this Lease, or may pursue such other remedies as may be provided by law.

33. **NOTICES:** All notices hereunder may be delivered (personally or by reliable overnight courier) or mailed. If mailed, they shall be sent by certified or registered mail to the address set forth in Paragraph 1.M or to such other address as either party hereto may hereafter from time to time designate in writing. Notices sent by mail shall be deemed to have been given three (3) days after the date on which properly mailed, postage prepaid, certified mail, return receipt requested. Notices delivered by reliable overnight courier service shall be deemed to have been given one (1) business day after the date on which deposited with such overnight courier service, properly addressed to the address set forth in Paragraph 1.M or to such other address as either party hereto may hereafter from time to time designate in writing, with charges paid for next business day delivery. Lessee shall also provide information to Lessor regarding Lessee's billing address if it is different from the notice listed above. Lessee shall also provide emergency contact information to Lessor within thirty (30) days of this Lease going into effect and shall keep such information current throughout the Term of this Lease.

34. **ATTORNEY'S FEES AND COURT COSTS:** In case suit or action is instituted to enforce compliance with any of the terms of this Lease, the losing Party agrees to pay the prevailing Party a reasonable attorney's fee before or at trial or any appeal, together with all costs and expenses incurred in connection with such actions, including the reasonable cost of searching the records to determine the condition of title at the time suit is commenced.

35. **SUCCESSORS AND ASSIGNS:** All rights, remedies and liabilities herein given to or imposed upon either of the Parties hereto shall inure to the benefit of and bind the executors, administrators, successors and assigns of such Parties. Nothing herein shall or is intended to confer upon any person, other than the Parties and their respective successors and assigns, any rights, remedies, obligations or liabilities.

36. **WAIVER**: Lessor shall not be deemed to have waived any rights under this Lease unless the waiver is given in writing and signed by Lessor. No delay or omission on the part of Lessor in exercising any right shall operate as a waiver of the right or any other right. A waiver by Lessor of a provision of this Lease shall not prejudice or constitute a waiver of Lessor's right otherwise to demand strict compliance with that provision or any other provision of this Lease. No prior waiver by Lessor shall constitute a waiver of any of Lessor's rights or of any of Lessee's obligations as to any future transactions.

37. **TOTAL AGREEMENT**: This Lease and the MGA Agreement contain the entire agreement between the Parties. Each Party represents that no promises, representations or commitments have been made by the other as a basis for this agreement which have not been reduced to writing herein. No oral promises or representations shall be binding upon either Party, whether made in the past or to be made in the future, unless such promises or representations are reduced to writing in the form of a modification to this Lease executed with all necessary legal formalities by the Commission of the Port of Vancouver. This Lease shall be construed without regard to any presumption or other rule requiring construction against the Party causing this Lease to be drafted.

38. **PROVISION OF FINANCIAL INFORMATION**: Within twenty (20) days' notice, and/or upon reasonable request, Lessee shall provide Lessor with current financial information concerning Lessee or any assignee, sublessee or guarantor, including financial statements certified, reviewed or compiled by a certified public accountant, if available, or, in the absence thereof, a balance sheet and income statement and other up-to-date financial information certified by Chief Financial Officer or other appropriate officer of Lessee or such assignee, sublessee or guarantor, as applicable, all as requested by Lessor; provided however, that Lessor acknowledges that such financial information with regard to a non-public company is Confidential Information and is to be used and disclosed only to Lessor's management personnel, Lessor's management company, attorneys and accountants for Lessor's internal purposes and to third parties only for the purpose of financing, refinancing, or sale of any portion of the Premises, and then only with reasonable confidentiality restrictions.

This Paragraph 38 does not prohibit either Party from disclosing Confidential Information to the extent such disclosure is required by law. If either Party, or any person to whom either Party transmits Confidential Information pursuant to this Lease, becomes legally compelled to disclose any Confidential Information, including without limitation Confidential Information subject to the Washington Public Disclosure Act, then such Party will provide prompt notice to the other Party prior to any such disclosure so that the other Party may seek a protective

order or other appropriate remedy and/or waive compliance with the provisions of this Paragraph with respect to such disclosure. If such protective order or other remedy is not obtained, or the other Party waives compliance with the provisions of this Paragraph, then the first Party will furnish only that portion of Confidential Information that such Party is advised by written opinion of counsel is legally required and will exercise such Party's best efforts to cooperate with the other Party's efforts to obtain reasonable assurance that confidential treatment will be accorded Confidential Information.

39. **BROKERS**: Nothing contained in this Lease shall impose any obligation on Lessor to pay a commission or fee to any party unless specifically agreed to in writing. Lessee and Lessor each hereby agrees to indemnify, defend and hold the other harmless for, from and against any claim for a compensation or fee by any broker or agent engaged by such party.

40. **COUNTERPARTS**: This Lease may be signed in counterparts. All signatures taken together shall amount to the concurrence of all Parties. In that regard, a photostatic copy of any signature shall have the same effect as the original.

41. **NO OPTION BY SUBMISSION OF LEASE DRAFT**: The submission of this Lease for examination does not constitute a reservation of or option for the Premises to the prospective Lessee and this Lease shall become effective as a Lease only upon execution by both Lessor and Lessee.

42. **APPLICABLE LAW AND VENUE**: This agreement shall be governed by and construed in accordance with the laws of the State of Washington, and in the event of any litigation arising out of or relating to this Lease, the Parties hereto stipulate and agree that the venue of any such action shall be laid in Clark County, Washington.

IN WITNESS WHEREOF, the Parties hereto have signed this Lease as of the 23rd day of July, 2013.

PORT OF VANCOUVER, Lessor

By: _____

President

By: _____

Vice President

By: _____

Secretary

TESORO SAVAGE PETROLEUM TERMINAL LLC, Lessee

By: _____

Title: AUTHORIZED REPRESENTATIVE

Approved as to form:

SCHWABE, WILLIAMSON & WYATT

By: Alicia L Lowe

Alicia L. Lowe, Port Counsel

STATE OF WASHINGTON)
) ss.
County of Clark)

On this day personally appeared before me NANCY I. BAKER, GERALD T. OLIVER, and BRIAN WOLFE, all Commissioners of the PORT OF VANCOUVER, and to me known to be the individuals that executed the foregoing instrument and acknowledged said instrument to be the free and voluntary act and deed of said Port of Vancouver for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this 23rd day of July, 2013.

Notary Public
State of Washington
BETSY LYNN ROGERS
My Appointment Expires Mar 1, 2016

Betsy Lynn Rogers
Print Name Here: Betsy Lynn Rogers
NOTARY PUBLIC in and for the State of Washington
residing at Vancouver
My Commission Expires: March 1, 2016

STATE OF Washington)
) ss.
County of Clark)

On this day personally appeared before me Curtis C. Dowd, to me known to be the Authorized Representative respectively of TESORO SAVAGE PETROLEUM TERMINAL LLC that executed the foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said limited liability company for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument on behalf of said Lessee.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal this 23rd day of July, 2013.

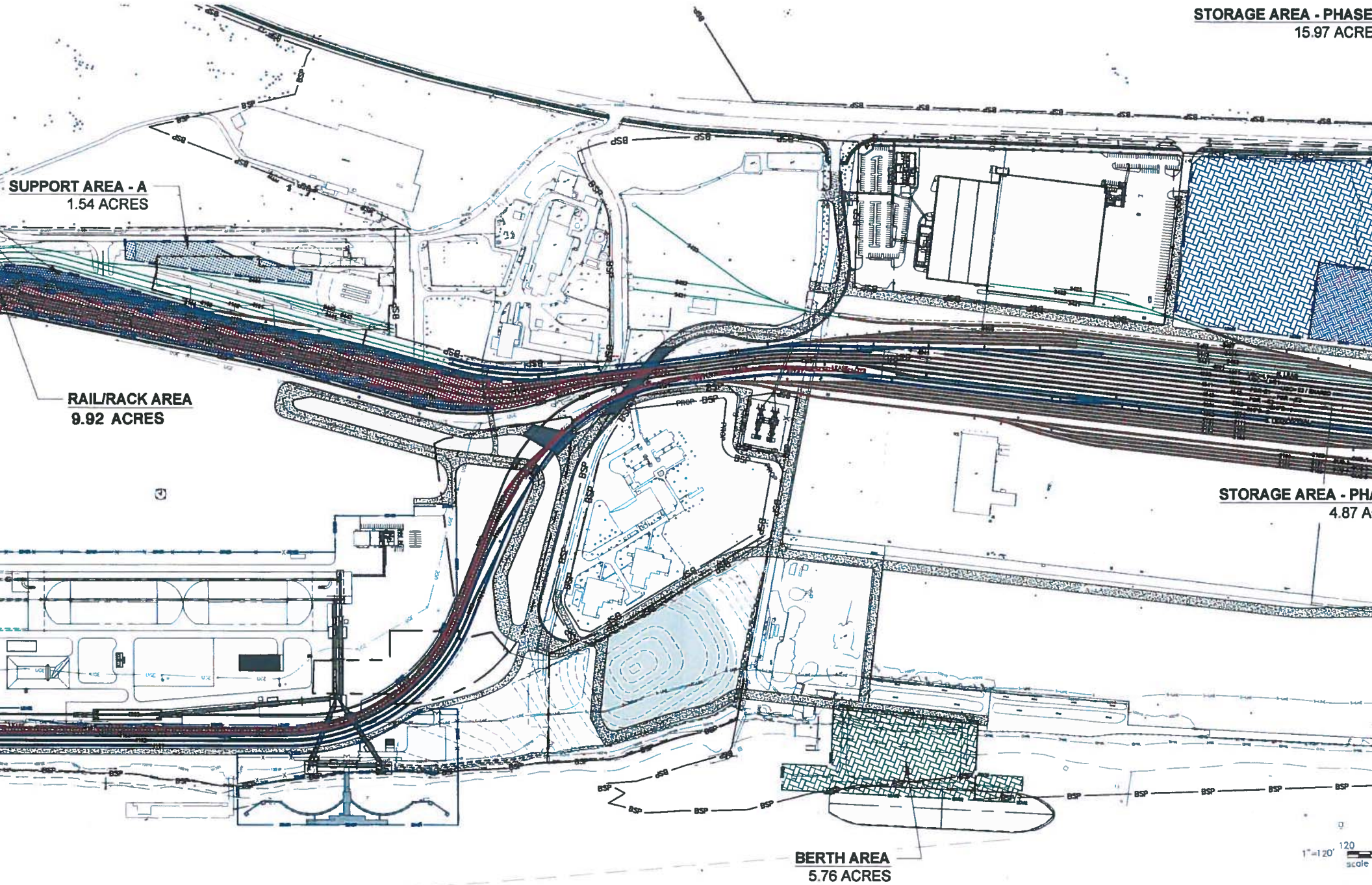
Notary Public
State of Washington
BETSY LYNN ROGERS
My Appointment Expires Mar 1, 2016

Betsy Lynn Rogers
Print Name Here: Betsy Lynn Rogers
NOTARY PUBLIC in and for the State of Washington
residing at Vancouver
My Commission Expires: March 1, 2016

EXHIBIT "A"

OUTLINE OF PREMISES LOCATION WITHIN THE OVERALL PORT PROPERTY

[attached]



CONCEPTUAL: WORK IN PROGRESS

EXHIBIT "B-1"

PREMISES SITE OUTLINE

[attached]

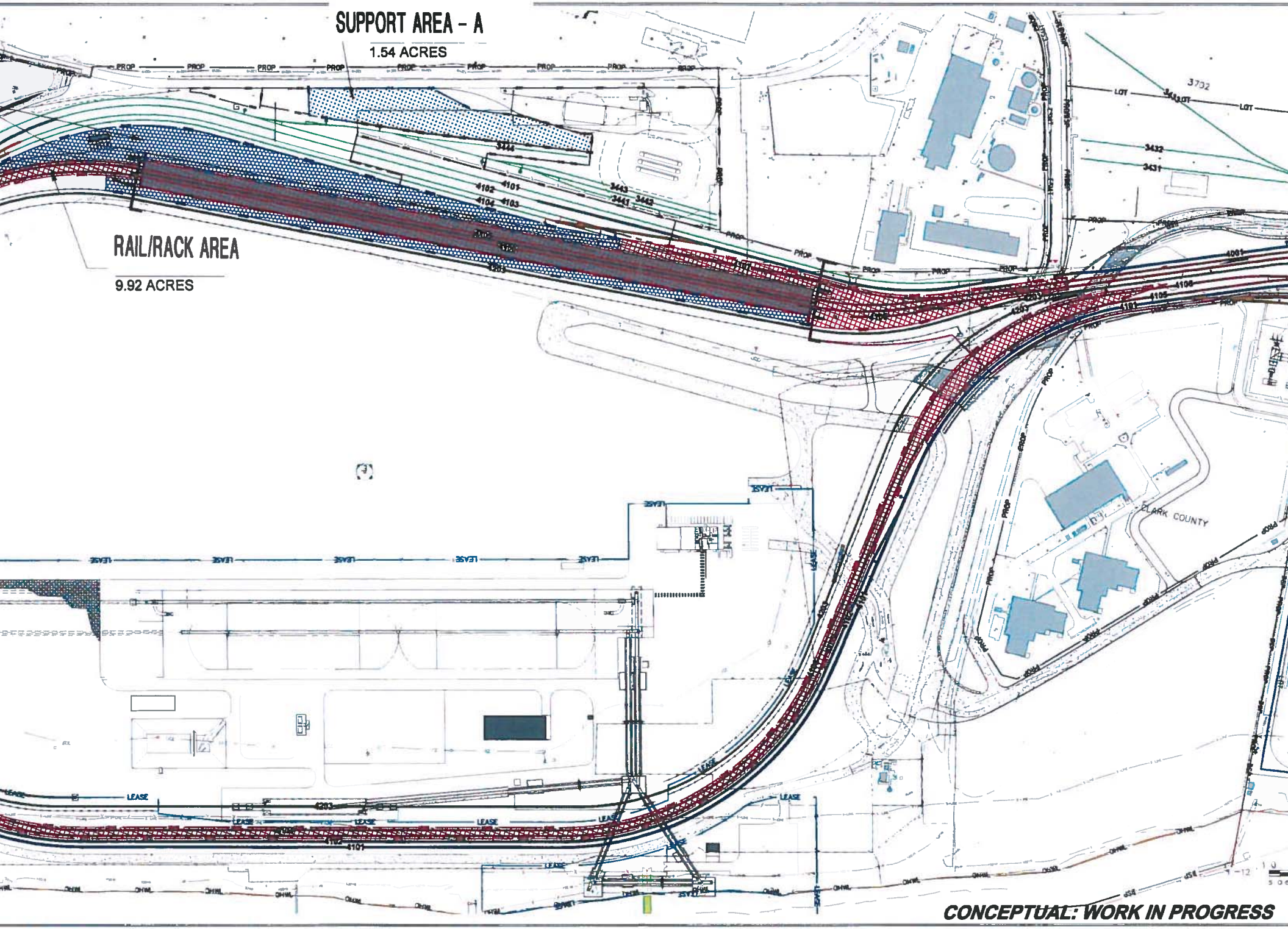

SUPPORT AREA - A
1.54 ACRES
RAIL/RACK AREA
9.92 ACRES
CLARK COUNTY
CONCEPTUAL: WORK IN PROGRESS

EXHIBIT "B-2"

PREMISES SITE OUTLINE

[attached]

EXHIBIT B-2

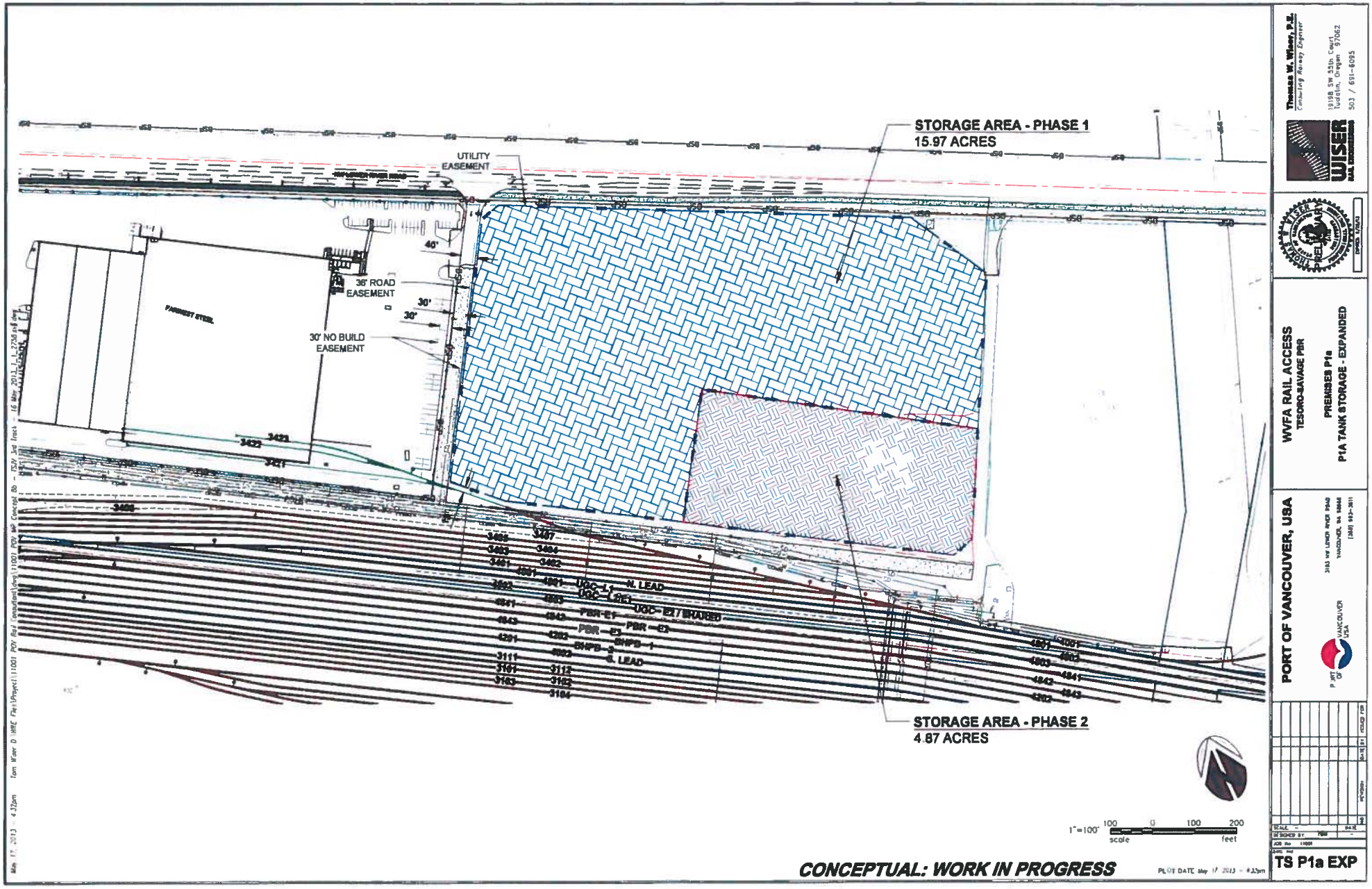

STORAGE AREA - PHASE 1
15.97 ACRES
UTILITY EASEMENT
36' ROAD EASEMENT
30' NO BUILD EASEMENT
40'
30'
30'
FARMER STEEL
3422
3421
3423
3466
3465
3463
3461
3462
3464
3467
4801
4901
4902
4903
4841
4842
4843
4202
4201
3111
3161
3163
3112
3162
3164
UOC-L1
N. LEAD
UOC-L2
UOC-E1/BRADED
PBR-E1
PBR-E2
PBR-E3
SHPB-1
SHPB-2
S. LEAD
STORAGE AREA - PHASE 2
4.87 ACRES
1"=100'
100 0 100 200
scale
feet
CONCEPTUAL: WORK IN PROGRESS
PLOT DATE May 17 2013 - 4:32pm
Thomas W. Wiser, P.E.
Consulting Railway Engineer
19198 SW 55th Court
Tualatin, Oregon 97062
503 / 691-8095
WISER
RAIL ENGINEERING
WVFA RAIL ACCESS
TESORO-SAVAGE PBR
PREMISES P1a
P1A TANK STORAGE - EXPANDED
PORT OF VANCOUVER, USA
3103 NW LEWIS RIVER ROAD
VANCOUVER, WA 98660
(360) 693-3611
VANCOUVER USA
SCALE
DATE
DESIGNED BY
TSW
JOB No.
11001
DWG No.
TS P1a EXP

EXHIBIT "B-3"

PREMISES SITE OUTLINE

[attached]

EXHIBIT B-3

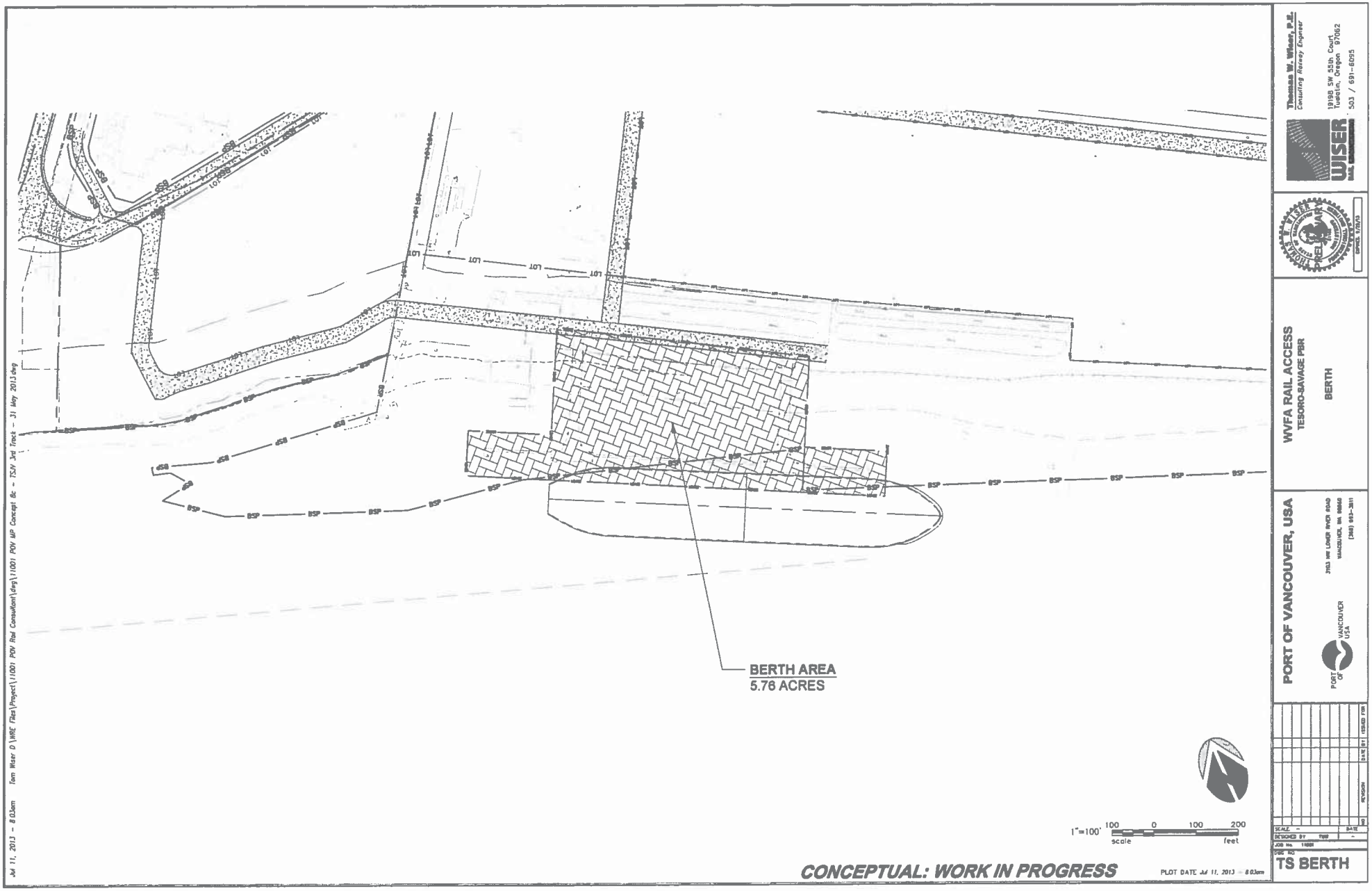

BERTH AREA
5.76 ACRES
1"=100'
100 0 100 200
scale feet
CONCEPTUAL: WORK IN PROGRESS
PLOT DATE Jul 11, 2013 - 8:03am
Jul 11, 2013 - 8:03am Tom Wiser D:\WRE Files\Projects\11001 POV Rail Consultant\dwg\11001 POV MP Concept Bc - TS,JV 3rd Track - 31 May 2013.dwg
Thomas W. Wiser, P.E.
Consulting Railway Engineer
19198 SW 55th Court
Tualatin, Oregon 97062
503 / 691-6005
WISER
WVFA RAIL ACCESS
TESORO-SAVAGE PBR
BERTH
PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
(360) 693-3611
PORT OF VANCOUVER USA
REVISION
DATE BY
ISSUED FOR
SCALE -
DATE
DESIGNED BY TWW
JOB No. 11001
DWG NO.
TS BERTH

EXHIBIT "C"

LEGAL DESCRIPTION

A portion (approximately as shown on Exhibits B-1, B-2, and B-3) of the following described real property:

3/31/09 ALCOA DEED (T-5)

PARCEL I

A TRACT OF LAND LOCATED IN SECTIONS 17, 18, 19 AND 20, TOWNSHIP 2 NORTH, RANGE 1 EAST, WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON. SAID TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHEASTERN CORNER OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC BY DEED RECORDED AS AUDITOR'S FILE 8706250115, RECORDS OF CLARK COUNTY WASHINGTON. SAID POINT BEING A 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED "HILL LS 7591"

THENCE ALONG THE SOUTHERN LINES OF THAT PROPERTY CONVEYED TO THE PORT OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9206090248 THE FOLLOWING COURSES:

SOUTH 65°59'34" EAST, 861.82 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 62°05'21" EAST, 78.63 FEET A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 65°53'48" EAST, 278.45 FEET TO THE SOUTHWESTERN LINE OF THAT PROPERTY CONVEYED TO THE UNITED STATES OF AMERICA AS DESCRIBED IN AUDITOR'S FILE E36885;

THENCE ALONG SAID SOUTHWESTERN SOUTH 40°06'49" EAST, 9.21 FEET THE EASTERN LINE OF THAT PROPERTY CONVEYED TO ALCOA, INC. AS DESCRIBED IN AUDITOR'S FILE 3451521;

THENCE ALONG SAID EASTERN LINE SOUTH 23°47'45" WEST, 526.31 FEET;

THENCE ALONG THE SOUTHERN AND EASTERN LINES OF THOSE PROPERTIES DESCRIBED IN AUDITOR'S FILES 9609250325 AND 9506230321 THE FOLLOWING COURSES:

SOUTH 66°56'33" EAST, 61.43 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 22°18'35" WEST, 26.79 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 66°01'38" EAST, 546.86 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 25°14'59" WEST, 5.80 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 69°29'52" EAST, 1.06 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 24°56'09" WEST, 152.66 FEET TO A POINT OF NON-TANGENT CURVATURE WITH A 220.00 FEET RADIUS CURVE FROM WHICH A RADIAL LINE BEARS NORTH 07°47'59" EAST;

THENCE ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 19°29'02" (THE CHORD BEARS NORTH 88°03'28" EAST, 74.45 FEET) AN ARC DISTANCE OF 74.81 FEET;

THENCE NORTH 78°18'57" EAST, 61.62 FEET TO A POINT OF CURVATURE;

THENCE ALONG THE ARC OF A 220.00 FEET RADIUS CURVE TO THE LEFT THROUGH A CENTRAL ANGLE OF 54°14'23" (THE CHORD BEARS NORTH 51°11'45" EAST, 200.58 FEET) AN ARC DISTANCE OF 208.27 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°04'34" EAST, 471.83 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591" AT A POINT OF CURVATURE;

THENCE ALONG THE ARC OF A 270.00 FEET RADIUS CURVE TO THE LEFT THROUGH A CENTRAL ANGLE OF 38°56'34" (THE CHORD BEARS NORTH 04°36'17" EAST, 180.00 FEET) AN ARC DISTANCE OF 183.51 FEET TO A POINT OF REVERSE CURVATURE;

THENCE ALONG THE ARC OF A 330.00 FEET RADIUS CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 22°54'37" (THE CHORD BEARS NORTH 03°24'42" WEST, 131.08 FEET) AN ARC DISTANCE OF 131.95 FEET;

THENCE NORTH 08°05'38" EAST, 30.56 FEET TO THE SOUTHERN RIGHT-OF-WAY LINE OF LOWER RIVER ROAD AT A POINT OF NON-TANGENT CURVATURE WITH A 497.00 FEET RADIUS CURVE FROM WHICH A RADIAL LINE BEARS SOUTH 02°19'17" EAST;

THENCE ALONG SAID RIGHT-OF-WAY CURVE THROUGH A CENTRAL ANGLE OF 06°58'17" (THE CHORD BEARS SOUTH 88°50'08" EAST, 60.44 FEET) AN ARC DISTANCE OF 60.47 FEET;

THENCE ALONG THE WESTERN LINE OF THAT PROPERTY CONVEYED TO THE PORT OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9105240201 PARCEL 1A THE FOLLOWING COURSES:

SOUTH 08°05'03" WEST, 37.80 FEET TO A POINT OF NON-TANGENT CURVATURE WITH A 270.00 FEET RADIUS CURVE FROM WHICH A RADIAL LINE BEARS SOUTH 81°57'23" EAST;

THENCE ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 22°54'37" (THE CHORD BEARS SOUTH 03°24'41" EAST, 107.24 FEET) AN ARC DISTANCE OF 107.96 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025" AT A POINT OF REVERSE CURVATURE;

THENCE ALONG THE ARC OF A 330.00 FEET RADIUS CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 38°56'34" (THE CHORD BEARS SOUTH 04°36'17" WEST, 220.00 FEET) AN ARC DISTANCE OF 224.29 FEET;

THENCE SOUTH 24°04'34" WEST, 471.83 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025" AT A POINT OF CURVATURE;

THENCE ALONG THE ARC OF A 280.00 FEET RADIUS CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 36°12'35" (THE CHORD BEARS SOUTH 42°10'52" WEST, 174.02 FEET) AN ARC DISTANCE OF 176.95 FEET TO THE NORTHERN RIGHT-OF-WAY OF THE SPOKANE, PORTLAND AND SEATTLE RAILROAD AS DESCRIBED IN AUDITOR'S FILE E24906;

THENCE ALONG SAID RIGHT-OF-WAY LINE SOUTH 73°39'14" WEST, 507.82 FEET TO THE WESTERN LINE OF THE VAN ALMAN DONATION LAND CLAIM;

THENCE THEN ALONG SAID WESTERN LINE SOUTH 09°54'57" WEST, 497.01 FEET TO THE SOUTHERN RIGHT-OF-WAY LINE THE SPOKANE, PORTLAND AND SEATTLE RAILROAD;

THENCE ALONG SAID SOUTHERN RIGHT-OF-WAY NORTH 39°07'39" EAST, 468.36 FEET TO A POINT OF CURVATURE;

THENCE CONTINUING ALONG SAID RIGHT-OF-WAY ALONG THE ARC OF A 739.50 FEET RADIUS CURVE TO THE RIGHT THROUGH A CENTRAL ANGLE OF 33°02'42" (THE CHORD BEARS NORTH 55°39'00" EAST, 420.62 FEET) AN ARC DISTANCE OF 426.50 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025" AT ITS INTERSECTION WITH THE WESTERN LINE OF THAT PROPERTY CONVEYED TO CLARK COUNTY AS DESCRIBED IN AUDITOR'S FILE 9804030486;

THENCE ALONG THE WESTERN AND SOUTHERN LINES OF SAID CLARK COUNTY PROPERTY THE FOLLOWING COURSES:

SOUTH 04°28'45" WEST, 79.82 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025" AT A POINT OF NON-TANGENT CURVATURE WITH A

691.97 FEET RADIUS CURVE FROM WHICH A RADIAL LINE BEARS SOUTH 21°15'02" EAST;

THENCE ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 29°41'58" (THE CHORD BEARS SOUTH 53°53'59" WEST, 354.68 FEET) AN ARC DISTANCE OF 358.68 FEET;

THENCE SOUTH 39°03'00" WEST, 741.81 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025";

THENCE SOUTH 24°08'35" WEST, 28.79 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025";

THENCE SOUTH 89°38'19" EAST, 352.44 FEET TO A ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025";

THENCE NORTH 82°45'01" EAST, 712.86 FEET TO THE WESTERN LINE OF THAT PROPERTY CONVEYED TO THE PORT OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9105240201 PARCEL 1B;

THENCE ALONG SAID WESTERN LINE SOUTH 35°02'02" WEST, 44.85 FEET;

THENCE CONTINUING ALONG SAID WESTERN LINE SOUTH 35°00'15" WEST, 749.59 FEET;

THENCE CONTINUING ALONG SAID WESTERN LINE SOUTH 35°00'15" WEST 1.05 FEET TO THE ORDINARY HIGH WATER LINE OF THE COLUMBIA RIVER;

THENCE ALONG THE ORDINARY HIGH WATER LINE THE FOLLOWING COURSES:

NORTH 89°29'12" WEST, 9.52 FEET;

THENCE NORTH 77°40'26" WEST, 16.60 FEET;

THENCE SOUTH 86°36'31" WEST, 77.49 FEET;

THENCE NORTH 78°50'38" WEST, 173.64 FEET;

THENCE NORTH 84°19'36" WEST, 254.87 FEET;

THENCE NORTH 76°30'55" WEST, 20.14 FEET;

THENCE NORTH 69°05'45" WEST, 310.36 FEET;

THENCE NORTH 73°25'50" WEST, 31.58 FEET;

THENCE NORTH 78°01'48" WEST, 41.07 FEET;

THENCE NORTH 75°14'34" WEST, 70.64 FEET;

THENCE NORTH 67°13'09" WEST, 106.03 FEET;

THENCE NORTH 85°08'56" WEST, 14.42 FEET;

THENCE NORTH 69°41'50" WEST, 102.24 FEET;

THENCE NORTH 62°47'21" WEST, 22.10 FEET;

THENCE NORTH 85°06'24" WEST, 12.19 FEET;

THENCE NORTH 78°40'23" WEST, 23.96 FEET;

THENCE NORTH 68°36'38" WEST, 11.78 FEET;

THENCE NORTH 54°35'29" WEST, 28.64 FEET;

THENCE NORTH 61°34'46" WEST, 105.07 FEET;

THENCE NORTH 70°03'25" WEST, 111.12 FEET;

THENCE NORTH 61°56'51" WEST, 18.49 FEET;

THENCE NORTH 66°35'10" WEST, 27.88 FEET;

THENCE NORTH 71°57'33" WEST, 28.64 FEET;

THENCE NORTH 61°44'43" WEST, 36.12 FEET;

THENCE NORTH 70°11'57" WEST, 27.01 FEET;

THENCE NORTH 75°26'06" WEST, 88.93 FEET;

THENCE NORTH 69°07'46" WEST, 82.68 FEET;

THENCE NORTH 85°00'29" WEST, 9.41 FEET;

THENCE NORTH 79°39'38" WEST, 24.20 FEET;

THENCE NORTH 71°31'12" WEST, 49.99 FEET;

THENCE NORTH 76°56'35" WEST, 34.63 FEET;

THENCE NORTH 79°53'56" WEST, 6.78 FEET;

THENCE NORTH 74°55'38" WEST, 53.64 FEET;

THENCE NORTH 73°16'30" WEST, 41.35 FEET;

THENCE NORTH 69°24'34" WEST, 52.13 FEET;

THENCE NORTH 62°17'46" WEST, 32.15 FEET;

THENCE NORTH 65°47'53" WEST, 33.52 FEET;

THENCE NORTH 63°32'11" WEST, 25.50 FEET;

THENCE NORTH 55°03'48" WEST, 52.98 FEET;

THENCE NORTH 34°13'21" WEST, 10.50 FEET;

THENCE NORTH 48°48'47" WEST, 8.46 FEET;

THENCE NORTH 67°23'10" WEST, 34.95 FEET;

THENCE NORTH 62°28'18" WEST, 21.35 FEET;

THENCE NORTH 60°53'29" WEST, 42.70 FEET;

THENCE NORTH 62°43'59" WEST, 61.76 FEET;

THENCE NORTH 47°54'15" WEST, 13.10 FEET;

THENCE NORTH 57°42'47" WEST, 34.21 FEET;

THENCE NORTH 45°30'34" WEST, 26.68 FEET;

THENCE NORTH 63°11'33" WEST, 91.74 FEET;

THENCE NORTH 63°52'03" WEST, 43.89 FEET;

THENCE NORTH 68°40'24" WEST, 45.31 FEET;

THENCE NORTH 63°18'56" WEST, 41.82 FEET;

THENCE NORTH 55°08'42" WEST, 40.63 FEET;

THENCE NORTH 65°23'25" WEST, 39.33 FEET;

THENCE NORTH 68°13'41" WEST, 36.75 FEET;

THENCE NORTH 59°46'47" WEST, 20.47 FEET;

THENCE NORTH 56°29'02" WEST, 23.33 FEET;

THENCE NORTH 73°15'43" WEST, 30.91 FEET;

THENCE NORTH 65°05'42" WEST, 34.79 FEET TO THE EASTERN LINE OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC AS DESCRIBED IN AUDITOR'S FILE 8706250115;

THENCE ALONG THE EASTERN LINE OF SAID PROPERTY THE FOLLOWING COURSES:

NORTH 24°51'44" EAST, 19.90 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°51'44" EAST, 75.00 FEET;

THENCE SOUTH 67°02'30" EAST, 150.95 FEET;

THENCE SOUTH 24°24'13" WEST, 8.03 FEET;

THENCE SOUTH 65°32'25" EAST, 139.46 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°25'27" EAST, 190.47 FEET TO A BRASS SCREW IN LEAD;

THENCE SOUTH 65°26'27" EAST, 75.44 FEET;

THENCE NORTH 24°33'33" EAST, 16.47 FEET;

THENCE SOUTH 65°26'27" EAST, 3.23 FEET TO A BRASS SCREW IN LEAD;

THENCE NORTH 24°02'00" EAST, 8.74 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 65°37'38" EAST, 30.69 FEET;

THENCE NORTH 24°22'22" EAST, 43.42 FEET;

THENCE SOUTH 66°03'36" EAST, 202.10 FEET;

THENCE SOUTH 21°35'33" WEST, 53.64 FEET;

THENCE SOUTH 66°03'43" EAST, 337.03 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°23'48" EAST, 332.67 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 65°37'48" EAST, 491.35 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 24°34'33" WEST, 17.72 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 65°13'05" EAST, 25.00 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 23°39'31" EAST, 602.51 FEET;

THENCE NORTH 65°35'48" WEST, 483.30 FEET TO A SPINDLE;

THENCE NORTH 09°15'46" WEST, 56.18 FEET TO A SPINDLE;

THENCE NORTH 24°23'13" EAST, 214.67 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 65°27'24" WEST, 22.46 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°16'52" EAST, 40.03 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 65°35'26" WEST, 440.76 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°23'35" EAST, 253.74 FEET TO A BRASS SCREW IN LEAD;

THENCE SOUTH 65°35'08" EAST, 29.66 FEET TO A BRASS SCREW IN LEAD;

THENCE NORTH 19°44'44" WEST, 68.68 FEET;

THENCE NORTH 65°36'36" WEST, 109.69 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°23'37" EAST, 435.28 FEET TO THE POINT OF BEGINNING.

EXCEPTING THERE FROM:

COMMENCING AT THE MOST NORTHEASTERN CORNER OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC BY DEED RECORDED AS AUDITOR'S FILE 8706250115, RECORDS OF CLARK COUNTY WASHINGTON. SAID POINT BEING A 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 15°22'35" EAST, 2,450.69 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591" AND THE TRUE POINT OF BEGINNING;

THENCE SOUTH 65°57'51" EAST, 137.31 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 24°06'06" WEST, 125.67 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 65°57'29" WEST, 137.25 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°04'31" EAST, 125.66 FEET TO THE POINT OF BEGINNING.

BEARINGS BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM OF 1983, SOUTH ZONE AND DISTANCES ARE AT GROUND.

PARCEL II

A TRACT OF LAND LOCATED IN SECTIONS 18 AND 19, TOWNSHIP 2 NORTH, RANGE 1 EAST, AND SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON. SAID TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHEASTERN CORNER OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC BY DEED RECORDED AS AUDITOR'S FILE 8706250115, RECORDS OF CLARK COUNTY WASHINGTON. SAID POINT BEING A 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED "HILL LS 7591"

THENCE NORTH 83°36'37" WEST, 2,411.16 FEET TO A POINT ON THE SOUTHERN LINE OF THE TIDEWATER TRACT BEING THE MOST NORTHERN NORTHWEST CORNER OF THAT PROPERTY CONVEYED TO RUSSELL TOWBOAT AND MOORAGE CO. AS DESCRIBED IN AUDITOR'S FILE 9501260058 AND THE TRUE POINT OF BEGINNING;

THENCE ALONG THE WESTERN LINE OF SAID RUSSELL PROPERTY THE FOLLOWING COURSES:

SOUTH 25°51'55" WEST, 511.44 FEET;

THENCE SOUTH 65°53'18" EAST, 426.16 FEET;

THENCE SOUTH 49°01'37" WEST, 182.34 FEET;

THENCE SOUTH 49°01'33" WEST, 782.97 FEET;

THENCE NORTH 65°32'10" WEST, 53.72 FEET;

THENCE NORTH 08°41'22" WEST, 212.96 FEET;

THENCE NORTH 66°14'51" WEST, 109.99 FEET TO THE SOUTHERN MOST CORNER OF THAT PROPERTY CONVEYED TO VANALCO INC AS DESCRIBED AS PARCEL 1 AUDITOR'S FILE 9501260083;

THENCE ALONG THE EASTERN AND NORTHERN BOUNDARY OF SAID VANALCO PROPERTY THE FOLLOWING COURSES:

NORTH 23°44'52" EAST, 93.21 FEET;

THENCE SOUTH 72°34'32" EAST, 28.67 FEET;

THENCE SOUTH 78°41'13" EAST, 29.76 FEET;

THENCE SOUTH 88°59'26" EAST, 29.49 FEET;

THENCE NORTH 84°48'34" EAST, 28.92 FEET;

THENCE NORTH 68°13'10" EAST, 40.09 FEET;

THENCE NORTH 40°50'00" EAST, 30.39 FEET;

THENCE NORTH 27°26'22" EAST, 49.86 FEET;

THENCE SOUTH 64°08'05" EAST, 96.65 FEET;

THENCE NORTH 25°51'55" EAST, 376.04 FEET;

THENCE NORTH 65°53'18" WEST, 993.55 FEET TO THE SOUTHEASTERN LINE OF THAT PROPERTY CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC AS DESCRIBED IN AUDITOR'S FILE 9104290287;

THENCE ALONG SAID SOUTHEASTERN LINE NORTH 23°15'04" EAST, 606.83 FEET TO A FOUND ½" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "OLSON 9025";

THENCE ALONG THE SOUTHERN LINE OF SAID TIDEWATER TRACT SOUTH 65°25'50" EAST, 1,021.02 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 19.87 ACRES MORE OR LESS.

BEARINGS BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM OF 1983, SOUTH ZONE AND DISTANCES ARE AT GROUND.

PARCEL II-A

AN EASEMENT FOR INGRESS, EGRESS AND UTILITIES AS DISCLOSED UNDER AUDITOR'S FILE NO. 9501260050 AND 9501260056.

PARCEL III

A TRACT OF LAND LOCATED IN NORTHEAST ONE-QUARTER OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST, WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON. SAID TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHEASTERN CORNER OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC BY DEED RECORDED AS AUDITOR'S FILE 8706250115, RECORDS OF CLARK COUNTY WASHINGTON. SAID POINT BEING A 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 15°22'35" EAST, 2,450.69 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591" AND THE TRUE POINT OF BEGINNING;

THENCE SOUTH 65°57'51" EAST, 137.31 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 24°06'06" WEST, 125.67 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 65°57'29" WEST, 137.25 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE NORTH 24°04'31" EAST, 125.66 FEET TO THE POINT OF BEGINNING.

BEARINGS BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM OF 1983, SOUTH ZONE AND DISTANCES ARE AT GROUND.

PARCEL IV

AN EASEMENT FOR PLACEMENT AND MAINTENANCE OF A FENCE AND AS DISCLOSED BY EASEMENT AGREEMENT RECORDED UNDER AUDITOR'S FILE NO. 9005240083.

PARCEL V

AN EASEMENT FOR ACCESS TO GROUNDWATER SAMPLING WELLS AS DISCLOSED BY EASEMENT AGREEMENT RECORDED UNDER AUDITOR'S FILE NO. 9506230325.

PARCEL VI

AN EASEMENT FOR INGRESS, EGRESS AND INSTALLATION AND MAINTENANCE OF UTILITIES AS DISCLOSED BY EASEMENT AGREEMENT RECORDED UNDER AUDITOR'S FILE NO. 9506230327.

PARCEL VII

AN EASEMENT FOR ACCESS AS DISCLOSED BY EASEMENT AGREEMENT UNDER AUDITOR'S FILE NO. 9609250326.

PARCEL VIII

AN EASEMENT FOR INGRESS, EGRESS AND INSTALLATION AND MAINTENANCE OF UTILITIES AS DISCLOSED BY EASEMENT AGREEMENT RECORDED UNDER AUDITOR'S FILE NO. 9804030488.

PARCEL IX

EASEMENTS FOR THE USE OF VARIOUS SHARED FACILITIES, ACCESS THERETO AND OTHER PURPOSES AS DISCLOSED BY DECLARATION OF EASEMENTS, COVENANTS, CONDITIONS AND RESTRICTIONS AND SHARED FACILITIES AGREEMENT RECORDED UNDER AUDITOR'S FILE NO. 8706250113, AS AMENDED BY INSTRUMENT RECORDED AT AUDITOR'S FILE NO. 9501260085

1-29-09 EVERGREEN DEED (T-5)

PARCEL I:

THOSE PORTIONS OF THE JOHN H. MATHEWS DONATION LAND CLAIM AND PATRICK MARKEYS DONATION LAND CLAIM SITUATED IN SECTIONS 18 AND 19, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, IN CLARK COUNTY, WASHINGTON, THE POINT OF BEGINNING BEING THE SECTION CORNER COMMON TO SECTIONS 17, 18, 19, AND 20 IN SAID TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, THAT IS MONUMENTED WITH A 1-1/2" IRON PIPE SIZE PROJECTING 5.6 FEET ABOVE GROUND; SAID SECTION CORNER BEING SOUTH 02°30'12" WEST 273.26 FEET FROM A DONATION LAND CLAIM CORNER COMMON TO THE PATRICK MARKEYS AND H. VAN ALMA DONATION LAND CLAIM THAT IS MONUMENTED WITH A 1-1/2" IRON PIPE SIZE PROJECTING 10.6 FEET ABOVE GROUND; SAID PORTIONS MORE PARTICULARLY DESCRIBED AS A SINGLE PARCEL AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

BEGINNING AT SAID SECTION CORNER; THENCE NORTH 65°35'57" WEST 2013.30 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP AS THE TRUE POINT OF BEGINNING, SAID TRUE POINT OF BEGINNING BEING SOUTH 41°24'54" WEST 439.18 FEET FROM THE BONNEVILLE POWER ADMINISTRATION SUBSTATION SITE MOST NORTHERLY CORNER AND HENDRICKSON DONATION LAND CLAIM CORNER; THENCE SOUTH 24°23'36" WEST 435.25 FEET ALONG THE WEST SIDE OF A WOVEN WIRE FENCE TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 65°27'02" EAST 109.72 FEET ALONG A WOVEN WIRE FENCE TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 19°56'22" EAST 68.47 FEET ALONG A WOVEN WIRE FENCE TO A LEADED BRASS SCREW SET IN CONCRETE; THENCE NORTH 65°32'35" WEST 29.68 FEET TO A LEADED BRASS SCREW SET IN CONCRETE; THENCE SOUTH 24°22'38" WEST 253.80 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 65°35'42" EAST 440.80 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 24°22'01" WEST 40.01 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 65°29'21" EAST 22.49 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 24°22'50" WEST 214.71 FEET TO A 5/8" STEEL PIN WITH BEVEL GEAR TOP; THENCE SOUTH 09°14'16" EAST 56.06 FEET TO STEEL PIN WITH BEVEL GEAR TOP; THENCE SOUTH 65°35'49" EAST 483.24 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 23°38'23" WEST 602.58 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE NORTH 65°18'33" WEST 25.00 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 24°28'09" EAST 17.77 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 65°37'47" WEST 491.32 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 24°24'00" WEST 332.70 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 66°02'32" WEST 337.10 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH

21°38'52" EAST 53.65 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 63°16'23" WEST 202.63 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 24°02'56" WEST 53.17 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 65°57'05" WEST 30.63 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 23°57'32" WEST 8.74 FEET TO A LEADED BRASS SCREW; THENCE NORTH 66°02'28" WEST 3.23 FEET TO A POINT INSIDE BLDG. 36A OPPOSITE THE NORTHWESTERLY CORNER OF BLDG. 36; THENCE SOUTH 23°57'32" WEST 16.63 FEET TO A POINT NORTHWESTERLY OF THE SOUTHEASTERLY CORNER OF BLDG. 36A; THENCE NORTH 65°18'59" WEST 75.21 FEET TO A LEADED BRASS SCREW; THENCE SOUTH 24°35'26" WEST 190.46 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 66°33'49" WEST 139.52 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP BY THE NORTHERLY GATEPOST; THENCE NORTH 25°43'26" EAST 8.01 FEET TO AN INSIDE FENCE CORNER AND A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 66°06'29" WEST 151.08 FEET ALONG A WOVEN WIRE FENCE TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 24°50'40" WEST 74.95 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE SOUTH 24°50'40" WEST 211.30 FEET, MORE OR LESS, TO THE POINT OF INTERSECTION WITH THE CALCULATED JOHN H. MATHEWS DONATION LAND CLAIM LINE WHICH IS NORTH 65°03'32" WEST 1317.02 FEET FROM THE SOUTHEAST CORNER THEREOF; THENCE NORTH 65°03'32" WEST 868.86 FEET, MORE OR LESS, ALONG SAID DONATION LAND CLAIM TO A POINT SOUTH 65°03'32" EAST 1251.08 FEET FROM THE SOUTHWEST CORNER THEREOF; THENCE NORTH 10°35'57" EAST 254.68 FEET, MORE OR LESS, TO A 5/8" IRON ROD WITH PLASTIC CAP; THENCE NORTH 10°35'57" EAST 257.38 FEET TO A 5/8" IRON ROD WITH A PLASTIC CAP ADJACENT TO A WOVEN WIRE FENCE; THENCE NORTH 10°34'25" EAST 526.92 FEET ALONG A WOVEN WIRE FENCE TO A LEADED BRASS SCREW AT A CORNER FENCE POST AND ANGLE POINT OF THE WOVEN WIRE FENCE; THENCE NORTH 23°49'02" EAST 269.16 FEET ALONG A WOVEN WIRE FENCE TO A 5/8" IRON ROD WITH PLASTIC CAP AT A WOVEN WIRE FENCE CORNER; THENCE NORTH 24°39'37" EAST 461.19 FEET TO A U.S.C.E. MONUMENT MARKED "VI-8"; THENCE NORTH 64°22'38" EAST 360.64 FEET TO A U.S.C.E. MONUMENT MARKED "VI-7"; THENCE ALONG A 1175.77 FOOT RADIUS CURVE RIGHT 378.54 FEET WHOSE LONG CHORD BEARS NORTH 75°46'37" EAST 376.91 FEET TO A U.S.C.E. MONUMENT MARKED "VI-6"; THENCE NORTH 29°14'26" EAST 135.35 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP AT A POINT ON THE CURVE OF THE RIGHT OF WAY LINE OF CROWLEY MARITIME CORP. ACCESS ROAD; THENCE ON A 117.00 FOOT RADIUS CURVE TO THE LEFT ALONG SAID RIGHT OF WAY LINE 66.51 FEET, WHOSE LONG CHORD BEARS NORTH 59°03'39" EAST 65.62 FEET TO A 'PK' NAIL AND SHINER MARKING THE POINT OF REVERSE CURVE OF A 50.00 FOOT RADIUS CURVE TO THE RIGHT; THENCE ON SAID 50.00 FOOT RADIUS CURVE TO THE RIGHT ALONG SAID RIGHT OF WAY LINE 71.74 FEET, WHOSE LONG CHORD BEARS NORTH 87°15'17" EAST 65.74 FEET TO A "PK" NAIL AND SHINER MARKING THE BEGINNING OF CURVE ALONG SAID RIGHT OF WAY LINE; THENCE SOUTH 52°38'39" EAST 268.18 FEET TO A 5/8" IRON ROD WITH PLASTIC CAP TO A POINT OF TANGENCY OF A CURVE TO THE LEFT ON THE ACCESS ROAD TO THE HEREIN DESCRIBED PARCEL; THENCE NORTH 37°25'25" EAST 32.03 FEET ACROSS SAID RIGHT OF WAY TO THE POINT OF

TANGENCY ON THE NORTHERLY RIGHT OF WAY LINE OF SAID ROAD TO A 5/8" IRON ROD WITH A PLASTIC CAP; THENCE SOUTH 65°35'19" EAST 562.06 FEET TO THE TRUE POINT OF BEGINNING OF THE HEREIN DESCRIBED PARCEL.

PARCEL II:

AN UNDIVIDED 55% INTEREST IN THE FOLLOWING DESCRIBED PROPERTY:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

A PORTION OF THE PATRICK MARKEYS DONATION LAND CLAIM IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, IN CLARK COUNTY, WASHINGTON;

BEGINNING AT THE SECTION CORNER COMMON TO SECTIONS 17, 18, 19, AND 20; THENCE SOUTH 33°41'06" WEST 1907.59 FEET TO THE TRUE POINT OF BEGINNING, SAID POINT ALSO BEING THE NORTHEASTERLY CORNER OF THAT TRACT CONVEYED TO VANCOUVER SMELTING AND INGOT, INC., DESCRIBED AS A SANITARY SEWER TREATMENT PLANT IN SCHEDULE B-6 IN AUDITOR'S FILE NO. 8706250115, CLARK COUNTY RECORDS; THENCE SOUTH 24°08'30" WEST ALONG THE EAST LINE OF SAID SEWER PLANT PARCEL A DISTANCE OF 125.67 FEET TO THE SOUTH LINE THEREOF; THENCE NORTH 65°57'05" WEST ALONG THE SOUTH TINE OF SAID SEWER PLANT PARCEL A DISTANCE OF 137.25 FEET TO THE WEST LINE THEREOF; THENCE NORTH 24°04'55" EAST ALONG THE WEST LINE OF SAID SEWER PLANT PARCEL A DISTANCE OF 125.66 FEET TO THE NORTH LINE THEREOF; THENCE SOUTH 65°57'19" EAST ALONG THE NORTH LINE OF SAID SEWER PLANT PARCEL A DISTANCE OF 137.38 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL III:

A PARCEL OF PROPERTY IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTHWEST QUARTER OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, SAID

NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE NORTH 65°25'56" WEST ALONG THE SOUTHERLY LINE OF SAID TIDEWATER TRACT 645.61 FEET; THENCE SOUTH 25°51'49" WEST LEAVING SAID SOUTHERLY LINE 598.92 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 25°51'49" WEST 376.06 FEET; THENCE NORTH 64°08'11" WEST 96.65 FEET; THENCE SOUTH 27°26'16" WEST 49.86 FEET; THENCE SOUTH 40°49'54" WEST 30.39 FEET; THENCE SOUTH 68°13'04" WEST 40.09 FEET; THENCE SOUTH 84°48'28" WEST 28.92 FEET; THENCE NORTH 88°59'32" WEST 29.49 FEET; THENCE NORTH 78°41'19" WEST 29.76 FEET; THENCE NORTH 72°34'38" WEST 28.67 FEET; THENCE SOUTH 23°44'46" WEST 93.21 FEET; THENCE NORTH 66°15'14" WEST 727.49 FEET TO THE SOUTHEASTERLY LINE OF SAID TIDEWATER TRACT; THENCE NORTH 23°14'58" EAST ALONG SAID SOUTHEASTERLY LINE 614.15 FEET TO A POINT WHICH BEARS NORTH 65°53'24" WEST FROM THE TRUE POINT OF BEGINNING; THENCE SOUTH 65°53'24" EAST 993.60 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL IV:

A PARCEL OF PROPERTY 40.00 FEET WIDE BEING 20.00 FEET ON EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13 AND THE NORTHEAST QUARTER OF SECTION 24, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTH HALF OF SECTION 18 AND THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE NORTH 65°25'56" WEST ALONG THE SOUTHERLY LINE OF SAID TIDEWATER PARCEL 645.61 FEET; THENCE LEAVING SAID SOUTHERLY LINE SOUTH 25°51'49" WEST 974.98 FEET; THENCE NORTH 64°08'11" WEST 96.65 FEET; THENCE SOUTH 27°26'16" WEST 49.86 FEET; THENCE SOUTH 40°49'54" WEST 30.39 FEET; THENCE SOUTH 68°13'04" WEST 40.09 FEET; THENCE SOUTH 84°48'28" WEST 28.92 FEET; THENCE NORTH 88°59'32" WEST 29.49 FEET; THENCE NORTH 78°41'19" WEST 29.76 FEET; THENCE NORTH 72°34'38" WEST 28.67 FEET; THENCE SOUTH 23°44'46" WEST 93.21 FEET; THENCE NORTH 66°15'14" WEST 541.49 FEET TO A DRAINAGE PIPE AND THE TRUE POINT OF BEGINNING; THENCE SOUTH 23°35'14" WEST ALONG SAID PIPE 221.96 FEET TO THE NORTHEAST BANK OF THE COLUMBIA RIVER AND THE END OF THE ABOVE DESCRIBED CENTERLINE.

PARCEL V:

A PARCEL OF PROPERTY IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTHWEST QUARTER OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST AND

THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST, PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE (LINE REFERRED TO AS LINE "B" FROM HEREON) 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE NORTH 65°25'56" WEST ALONG THE SOUTHERLY LINE OF SAID TIDEWATER TRACT 645.61 FEET; THENCE SOUTH 25°51'49" WEST LEAVING SAID SOUTHERLY LINE 834.08 FEET; THENCE SOUTH 68°51'19" EAST 239.65 FEET; THENCE SOUTH 64°16'05" EAST 52.04 FEET TO THE SOUTHWESTERLY EXTENSION OF SAID LINE "B" AND THE TRUE POINT OF BEGINNING; THENCE SOUTH 64°16'05" EAST 112.23 FEET; THENCE SOUTH 56°01'08" EAST 115.94 FEET; THENCE SOUTH 51°08'50" EAST 320.70 FEET; THENCE SOUTH 28°12'11" EAST 86.38 FEET; THENCE SOUTH 79°25'35" EAST 24.62 FEET TO THE WESTERLY LINE OF THAT TRACT CONVEYED TO VANCOUVER SMELTING AND INGOT, INC. (AS REFERRED TO IN SCHEDULE A) BY DEED RECORDED UNDER AUDITOR'S FILE NO. 8706250115 OF CLARK COUNTY RECORDS; THENCE SOUTH 10°34'25" WEST ALONG SAID WESTERLY LINE 234.86 FEET (HILL RECORD OF SURVEY, BOOK 22, PAGE 154 SOUTH 09°00'40" WEST); THENCE SOUTH 10°35'57" WEST ALONG SAID WESTERLY LINE 216.41 FEET (HILL RECORD OF SURVEY, BOOK 22, PAGE 154 SOUTH 09°00'40"

WEST); THENCE NORTH 26°15'16" WEST 72.91 FEET; THENCE NORTH 06°24'44" WEST 60.47 FEET; THENCE NORTH 14°30'34" EAST 218.85 FEET; THENCE NORTH 00°03'06" WEST 106.25 FEET; THENCE NORTH 28°12'11" WEST 61.91 FEET; THENCE NORTH 51°08'50" WEST 310.89 FEET; THENCE NORTH 56°01'08" WEST 111.36 FEET; THENCE NORTH 64°16'05" WEST 126.57 FEET TO THE SOUTHWESTERLY EXTENSION OF SAID LINE "B"; THENCE NORTH 49°01'27" EAST ALONG SAID SOUTHWESTERLY EXTENSION 43.55 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL VI:

AN EASEMENT FOR MAINTENANCE, REPAIR, REPLACEMENT, OPERATION AND REMOVAL OF A PIPELINE OVER THE FOLLOWING DESCRIBED PROPERTY:

A PARCEL OF PROPERTY IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTHWEST QUARTER OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST AND THE NORTHWEST QUARTER OF SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND

AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE (LINE REFERRED TO AS LINE "B" FROM HEREON) 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE NORTH 65°25'56" WEST ALONG THE SOUTHERLY LINE OF SAID TIDEWATER TRACT 645.61 FEET; THENCE SOUTH 25°51'49" WEST LEAVING SAID SOUTHERLY LINE 834.08 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 68°51'19" EAST 239.65 FEET; THENCE SOUTH 64°16'05" EAST 52.04 FEET TO THE SOUTHWESTERLY EXTENSION OF SAID LINE "B"; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHWESTERLY EXTENSION 43.55 FEET; THENCE NORTH 64°16'05" WEST 33.22 FEET; THENCE NORTH 68°51'19" WEST 241.35 FEET TO A POINT WHICH BEARS SOUTH 25°51'49" WEST FROM THE TRUE POINT OF BEGINNING; THENCE NORTH 25°51'49" EAST 40.14 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL VII:

AN EASEMENT FOR INGRESS, EGRESS, AND UTILITIES OVER THE FOLLOWING DESCRIBED PROPERTY:

A PARCEL OF PROPERTY IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTHWEST QUARTER OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH

88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE CONTINUING SOUTH 49°01'27" WEST ON AN EXTENSION OF SAID SOUTHEASTERLY LINE 740.34 FEET; THENCE NORTH 85°00'25" WEST 32.80 FEET TO A 450.00 FOOT RADIUS CURVE TO THE LEFT; THENCE AROUND SAID 450.00 FOOT RADIUS CURVE TO THE LEFT 109.66 FEET; THENCE SOUTH 81°01'50" WEST 106.38 FEET; THENCE SOUTH 86°42'18" WEST 159.83 FEET; THENCE SOUTH 25°51'49" WEST 68.71 FEET; THENCE NORTH 86"42'18" EAST 196.27 FEET; THENCE NORTH 81°01'50"EAST 109.36 FEET TO A 390.00 FOOT RADIUS CURVE TO THE RIGHT; THENCE AROUND SAID 390.00 FOOT RADIUS CURVE TO THE RIGHT 95.04 FEET; THENCE SOUTH 85°00'25" EAST 58.25 FEET; THENCE NORTH 49°01'27" EAST 1254.53 FEET; THENCE NORTH 49°32'43" EAST 497.36 FEET TO THE CENTERLINE OF LOWER RIVER ROAD AS SHOWN ON THAT RECORD OF SURVEY RECORDED IN BOOK 29 AT PAGE 161 OF CLARK COUNTY RECORDS; THENCE NORTH 53°02'11" WEST ALONG SAID CENTERLINE 61.47 FEET TO A POINT WHICH BEARS NORTH 49°32'43" EAST FROM THE TRUE POINT OF BEGINNING; THENCE SOUTH 49°32'43" WEST 484.51 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL VIII:

AN EASEMENT FOR INGRESS, EGRESS, AND UTILITIES OVER THE FOLLOWING DESCRIBED PROPERTY:

A 40.00 FOOT WIDE PARCEL OF PROPERTY LYING ON THE LEFT (SOUTHEAST SIDE) OF THE FOLLOWING DESCRIBED LINE IN THE JOHN MATHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTHEAST QUARTER OF SECTION 13, TOWNSHIP 2 NORTH, RANGE 1 WEST AND THE SOUTHWEST QUARTER OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN IN CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN, SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET RIGHT, AS PER WSDH

PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET TO A 225.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF SOUTH 81°48'57" WEST INTO SAID 225.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 225.00 FOOT RADIUS CURVE TO THE RIGHT 40.00 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 88°00'00" WEST 302.26 FEET; THENCE ALONG SAID SOUTHEASTERLY LINE SOUTH 89°29'56" WEST 11.39 FEET TO A 285.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF SOUTH 89°20'25" WEST INTO SAID 285.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID SOUTHEASTERLY LINE AND AROUND SAID 285.00 FOOT RADIUS CURVE TO THE LEFT 200.52 FEET; THENCE SOUTH 49°01'27" WEST ALONG SAID SOUTHEASTERLY LINE 488.75 FEET TO AN ANGLE POINT IN SAID TIDEWATER TRACT; THENCE NORTH 65°25'56" WEST ALONG THE SOUTHERLY LINE OF SAID TIDEWATER TRACT 645.61 FEET; THENCE SOUTH 25°51'49" WEST 974.98 FEET; THENCE NORTH 64°08'11" WEST 96.65 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 27°26'16" WEST 49.86 FEET; THENCE SOUTH 40°49'54" WEST 30.39 FEET; THENCE SOUTH 68°13'04" WEST 40.09 FEET; THENCE SOUTH 84°48'28" WEST 28.92 FEET; THENCE NORTH 88°59'32" WEST 29.49 FEET; THENCE NORTH 78°41'19" WEST 29.76 FEET; THENCE NORTH 72°34'38" WEST 28.67 FEET TO THE END OF THE ABOVE DESCRIBED LINE.

PARCEL IX:

A NON-EXCLUSIVE EASEMENT FOR INGRESS AND EGRESS OVER THE FOLLOWING DESCRIBED PROPERTY:

A PARCEL OF PROPERTY IN THE JOHN MATTHEWS DONATION LAND CLAIM AND THE WILLIAM HENDRICKSON DONATION LAND CLAIM IN THE SOUTH HALF OF SECTION 18, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

(THE FOLLOWING COURSES ARE ON A GRID BEARING WASHINGTON STATE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983. A SCALE AND ELEVATION FACTOR OF 1.000049 HAS BEEN APPLIED TO THE MEASURED FIELD DISTANCES.)

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 1 WEST OF THE WILLAMETTE MERIDIAN, SAID NORTHEAST CORNER ALSO BEING THE NORTHEAST CORNER OF THE WILLIAM HATTEN DONATION LAND CLAIM, THE NORTH LINE OF SAID HATTEN DONATION LAND CLAIM BEARING SOUTH 69°29'19" WEST; THENCE SOUTH 20°09'51" EAST 6616.90 FEET TO "A LINE" STATION 10 + 55.06, 75.00 FEET

RIGHT, AS PER WSDH PLANS FOR SR 501, VANCOUVER LAKE TO PIONEER AVENUE IN RIDGEFIELD, APPROVED MAY 17, 1966; THENCE SOUTH 36°57'49" WEST PARALLEL WITH SAID "A LINE" AND A SOUTHWESTERLY EXTENSION THEREOF, 298.85 FEET TO THE CENTERLINE OF LOWER RIVER ROAD, AND THE TRUE POINT OF BEGINNING; THENCE SOUTH 36°57'49" WEST ALONG THE SOUTHEASTERLY LINE OF THAT TRACT CONVEYED TO TIDEWATER ENVIRONMENTAL SERVICES, INC. BY DEED RECORDED UNDER AUDITOR'S FILE NO. 9104290287 OF CLARK COUNTY RECORDS 100.87 FEET; THENCE SOUTH 36°42'57" EAST 61.58 FEET TO THE NORTHWESTERLY LINE OF THAT TRACT CONVEYED TO VANCOUVER SMELTING AND INGOT, INC. (AS REFERRED TO IN SCHEDULE A) BY DEED RECORDED UNDER AUDITOR'S FILE NO. 8706250115 OF CLARK COUNTY RECORDS, SAID POINT BEING ON A 117.00 FOOT RADIUS CURVE TO THE LEFT WITH A TANGENT BEARING OF NORTH 75°20'42" EAST INTO SAID 117.00 FOOT RADIUS CURVE AT THIS POINT; THENCE ALONG SAID NORTHWESTERLY LINE AND AROUND SAID 117.00 FOOT RADIUS CURVE TO THE LEFT 66.51 FEET TO A 50.00 FOOT RADIUS CURVE TO THE RIGHT WITH A TANGENT BEARING OF NORTH 46°09'02" EAST INTO SAID 50.00 FOOT RADIUS CURVE AT THIS POINT (HILL RECORD OF SURVEY, BOOK 22, PAGE 154, DELTA 33°40'07", LENGTH 68.75 FEET, RADIUS 117.00 FEET); THENCE ALONG SAID NORTHWESTERLY LINE AND AROUND SAID 50.00 FOOT RADIUS CURVE TO THE RIGHT, 71.74 FEET (HILL RECORD OF SURVEY, BOOK 22, PAGE 154, DELTA 79°51'27", LENGTH 69.69 FEET, RADIUS 50.00 FEET); THENCE SOUTH 52°38'39" EAST ALONG THE NORTHERLY LINE OF SAID VANCOUVER SMELTING AND INGOT, INC. TRACT 15.64 FEET (HILL RECORD OF SURVEY, BOOK 22, PAGE 154, SOUTH 54°28'10" EAST); THENCE NORTH 36°57'49" EAST 15.48 FEET TO THE CENTERLINE OF LOWER RIVER ROAD; THENCE NORTH 53°02'11" WEST ALONG SAID CENTERLINE 150.00 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM THE NORTHWESTERLY 48.0 FEET AS MEASURED AT RIGHT ANGLES TO SAID SOUTHEASTERLY LINE OF SAID TIDEWATER ENVIRONMENTAL SERVICES, INC., TRACT.

3-31-09 ALCOA WATER RIGHTS DEED (BERTH AREA)

A 200.00 FOOT WIDE STRIP OF LAND LOCATED IN SECTION 19, TOWNSHIP 2 NORTH, RANGE 1 EAST, WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON. THE NORTHWESTERN SIDE-LINE OF SAID STRIP BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHEASTERN CORNER OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC BY DEED RECORDED AS AUDITOR'S FILE 8706250115, RECORDS OF CLARK COUNTY WASHINGTON. SAID POINT BEING A 5/8" IRON ROD WITH YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE ALONG THE SOUTHERN LINES OF THAT PROPERTY CONVEYED TO THE PORT OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9206090248 SOUTH 65°59'34" EAST, 861.82 FEET TO A 5/8" IRON ROD W/ YELLOW PLASTIC CAP STAMPED "HILL LS 7591";

THENCE SOUTH 15°54'21" EAST, 2,655.23 FEET TO **TRUE POINT OF BEGINNING** AT THE INTERSECTION OF THE ORDINARY HIGH WATER LINE OF THE COLUMBIA RIVER WITH THE WESTERN LINE OF THAT PROPERTY CONVEYED TO THE PORT OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9105240201 PARCEL 1B;

THENCE ALONG THE ORDINARY HIGH WATER LINE THE FOLLOWING COURSES:

THENCE NORTH 89°29'12" WEST, 9.52 FEET;

THENCE NORTH 77°40'26" WEST, 16.60 FEET;

THENCE SOUTH 86°36'31" WEST, 77.49 FEET;

THENCE NORTH 78°50'38" WEST, 173.64 FEET;

THENCE NORTH 84°19'36" WEST, 254.87 FEET;

THENCE NORTH 76°30'55" WEST, 20.14 FEET;

THENCE NORTH 69°05'45" WEST, 310.36 FEET;

THENCE NORTH 73°25'50" WEST, 31.58 FEET;

THENCE NORTH 78°01'48" WEST, 41.07 FEET;

THENCE NORTH 75°14'34" WEST, 70.64 FEET;

THENCE NORTH 67°13'09" WEST, 106.03 FEET;

THENCE NORTH 85°08'56" WEST, 14.42 FEET;

THENCE NORTH 69°41'50" WEST, 102.24 FEET;

THENCE NORTH 62°47'21" WEST, 22.10 FEET;

THENCE NORTH 85°06'24" WEST, 12.19 FEET;

THENCE NORTH 78°40'23" WEST, 23.96 FEET;

THENCE NORTH 68°36'38" WEST, 11.78 FEET;

THENCE NORTH 54°35'29" WEST, 28.64 FEET;

THENCE NORTH 61°34'46" WEST, 105.07 FEET;

THENCE NORTH 70°03'25" WEST, 111.12 FEET;

THENCE NORTH 61°56'51" WEST, 18.49 FEET;

THENCE NORTH 66°35'10" WEST, 27.88 FEET;

THENCE NORTH 71°57'33" WEST, 28.64 FEET;

THENCE NORTH 61°44'43" WEST, 36.12 FEET;

THENCE NORTH 70°11'57" WEST, 27.01 FEET;

THENCE NORTH 75°26'06" WEST, 88.93 FEET;

THENCE NORTH 69°07'46" WEST, 82.68 FEET;

THENCE NORTH 85°00'29" WEST, 9.41 FEET;

THENCE NORTH 79°39'38" WEST, 24.20 FEET;

THENCE NORTH 71°31'12" WEST, 49.99 FEET;

THENCE NORTH 76°56'35" WEST, 34.63 FEET;

THENCE NORTH 79°53'56" WEST, 6.78 FEET;

THENCE NORTH 74°55'38" WEST, 53.64 FEET;

THENCE NORTH 73°16'30" WEST, 41.35 FEET;

THENCE NORTH 69°24'34" WEST, 52.13 FEET;

THENCE NORTH 62°17'46" WEST, 32.15 FEET;

THENCE NORTH 65°47'53" WEST, 33.52 FEET;

THENCE NORTH 63°32'11" WEST, 25.50 FEET;

THENCE NORTH 55°03'48" WEST, 52.98 FEET;

THENCE NORTH 34°13'21" WEST, 10.50 FEET;

THENCE NORTH 48°48'47" WEST, 8.46 FEET;

THENCE NORTH 67°23'10" WEST, 34.95 FEET;

THENCE NORTH 62°28'18" WEST, 21.35 FEET;

THENCE NORTH 60°53'29" WEST, 42.70 FEET;

THENCE NORTH 62°43'59" WEST, 61.76 FEET;

THENCE NORTH 47°54'15" WEST, 13.10 FEET;

THENCE NORTH 57°42'47" WEST, 34.21 FEET;

THENCE NORTH 45°30'34" WEST, 26.68 FEET;

THENCE NORTH 63°11'33" WEST, 91.74 FEET;

THENCE NORTH 63°52'03" WEST, 43.89 FEET;

THENCE NORTH 68°40'24" WEST, 45.31 FEET;

THENCE NORTH 63°18'56" WEST, 41.82 FEET;

THENCE NORTH 55°08'42" WEST, 40.63 FEET;

THENCE NORTH 65°23'25" WEST, 39.33 FEET;

THENCE NORTH 68°13'41" WEST, 36.75 FEET;

THENCE NORTH 59°46'47" WEST, 20.47 FEET;

THENCE NORTH 56°29'02" WEST, 23.33 FEET;

THENCE NORTH 73°15'43" WEST, 30.91 FEET;

THENCE NORTH 65°05'42" WEST, 34.79 FEET TO THE EASTERN LINE OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC AS DESCRIBED IN AUDITOR'S FILE 8706250115;

THE SOUTHEASTERN SIDE-LINE OF SAID STRIP IS TO BE EXTENDED AND/OR SHORTENED TO MEET AT ANGLE POINTS, TO COMMENCE AT THE SOUTHERLY EXTENSION OF THE WESTERN LINE OF THAT PROPERTY CONVEYED TO THE PORT

OF VANCOUVER AS DESCRIBED IN AUDITOR'S FILE 9105240201 PARCEL 1B AND TO TERMINATE AT THE SOUTHERLY EXTENSION OF THE EASTERN LINE OF THAT PROPERTY CONVEYED TO VANCOUVER SMELTING AND INGOT, INC AS DESCRIBED IN AUDITOR'S FILE 8706250115.

SAID TRACT CONTAINS 588,867 SQUARE FEET / 13.52 ACRES, MORE OR LESS.

BEARINGS BASED ON THE WASHINGTON STATE PLANE COORDINATE SYSTEM OF 1983, SOUTH ZONE AND DISTANCES ARE AT GROUND.

2-7-11 DEED (PARCEL 1A)

REAL PROPERTY SITUATED IN THE CITY OF VANCOUVER, CLARK COUNTY, WASHINGTON, BEING A PORTION OF THE HENRY VAN ALMAN DONATION LAND CLAIM, LYING IN THE NORTH HALF OF SECTION 20, TOWNSHIP 2 NORTH, RANGE 1 EAST OF THE WILLAMETTE MERIDIAN, DESCRIBED AS FOLLOWS:

A PORTION OF LOT 3 AND LOT 4 OF THE PORT OF VANCOUVER BINDING SITE PLAN RECORDED IN BOOK 53 OF SURVEYS, AT PAGE 141, RECORDS OF SAID COUNTY, DESCRIBED AS FOLLOWS:

(THE FOLLOWING DESCRIPTION IS REFERENCED TO THE WASHINGTON COORDINATE SYSTEM OF 1983, SOUTH ZONE. DIVIDE THE FOLLOWING "GRID" DISTANCES BY A COMBINED SCALE FACTOR OF 1.000042242 TO DETERMINE "GROUND" DISTANCES.)

BEGINNING AT THE NORTHEAST CORNER OF SAID LOT 4, SAID CORNER BEING ON THE SOUTH RIGHT OF WAY LINE OF LOWER RIVER ROAD (SR 501) AS SHOWN ON SAID BINDING SITE PLAN; THENCE ALONG THE NORTH LINE OF SAID LOT 4 AND SAID SOUTH RIGHT OF WAY LINE NORTH 64° 04' 04" WEST 572.59 FEET TO THE NORTHWEST CORNER OF SAID LOT 4, SAID CORNER BEING THE MOST NORTHERLY NORTHEAST CORNER OF SAID LOT 3; THENCE ALONG THE NORTH LINE OF SAID LOT 3 AND SAID SOUTH RIGHT OF WAY LINE NORTH 64° 04' 04" WEST 673.53 FEET; THENCE LEAVING SAID NORTH AND SOUTH LINES SOUTH 30° 59' 21" WEST 717.83 FEET; THENCE SOUTH 58° 53' 18" EAST 1305.38 FEET TO AN ANGLE POINT ON THE EAST LINE OF SAID LOT 3; THENCE ALONG SAID EAST LINE NORTH 19° 56' 02" EAST 57.87 FEET; THENCE ALONG SAID EAST LINE AND THE EAST LINE OF SAID LOT 4 NORTH 27° 04' 10" EAST 775.48 FEET TO THE POINT OF BEGINNING.

CONTAINING 984,584 SQUARE FEET OR APPROXIMATELY 22.603 ACRES.

SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.

EXHIBIT "D"

ALTERATIONS TO BE MADE BY LESSOR AND LESSEE

LESSOR'S INFRASTRUCTURE IMPROVEMENTS

- A connection to "The Trench" connecting the BNSF Fall Bridge Subdivision to the Port of Vancouver.
- One common arrival track estimated at 7684 feet between the two (2) innermost switches (identified as Track 4002).
- A connection to the Terminal 5 loop track facility.
- Two dedicated loop tracks for arrivals, each estimated at 7684 feet. These tracks will be identified as Tracks 4106 and 4107.
- A connection with cross-over switches capable of departing on any of two departure tracks listed below.
- Two departure tracks, each estimated at 7684 feet. These tracks are identified as Tracks 4841 and 4842.
- A connection from the departure tracks to the trench for departure.
- Two Bad Order tracks located off the loops tracks designated as Track 4109 and Track 4110. Track 4109 shall be approximately 200 feet and Track 4110 shall be 660 feet. Lessor will make additional space available for Bad Order repairs and processing.

At such time as Lessee has: (i) on a consistent basis, sustained a volume of [redacted] (ii) reasonably demonstrated that additional customer volume is likely to be achieved (e.g., through customer expressions of interest, letters of intent, memoranda of understanding or the like), and (iii) Lessee has requested in writing that Lessor proceed, then Lessor shall, within one hundred twenty (120) days, make the following available to Lessee:

- Two dedicated surge tracks, consisting of one loop track for arrivals and one departure track in the main yard (the permits for which shall be obtained by Lessee) with connection to the trench for departure.

LESSEE'S IMPROVEMENTS

Project Description

The Facility is designed to receive crude oil by rail from various sources in North America and pipe it to storage tanks where it will be held until it is loaded onto ships/vessels for transport to end users, which are expected primarily to be West Coast refineries. The Facility will include:

1. Administrative and Support Buildings. The Facility will include an approximately 3,400 square-foot office building for administrative functions and two additional buildings to house lockers, restrooms, and other employee support facilities, each consisting of approximately 3,400 square feet. These buildings will be located on the north side of the Terminal-5 Loop south of Old Lower River Road.

2. Rail Unloading Facility. The rail unloading facility will be located south of the administrative and support facilities and is designed to handle unit trains consisting of approximately [redacted] each up to 62 feet in length and powered by three locomotives for a total length of approximately [redacted] feet. At full build-out, approximately [redacted] trains, carrying up to a total of approximately [redacted] barrels of crude oil per day, will arrive via Class 1 railroad lines for staging on existing and planned tracks at the Port. Trains will arrive at Terminal 5 and travel in a clockwise direction to the unloading building on the north side of the Terminal 5 rail loop. The design will accommodate complete unit trains, eliminating the need to break trains into smaller segments during the unloading process.
   The rail cars will be unloaded in a building that will be approximately 1,850 feet by 91 feet in size, with a maximum height of approximately 50 feet. The building is designed to accommodate three parallel tracks. Each track will include 30 unloading stations for a total of 90 stations. Each station will accommodate one tank car.

Unloading will be accomplished with a closed-loop system that includes dry fit connectors and emergency-automatic shut-offs. Hoses will be connected to the valves on the cars using dry fit connectors, and the crude oil will gravity-drain from the cars to the collection pipe and then to pump vaults in the building, from which the crude oil will be pumped to the storage tanks.

Approximately thirty of the unloading stations may be equipped with steam fittings to heat heavier oils to facilitate oil transfer from the tank car. Pre-steaming stations may be included in advance of the unloading building to allow heating to occur prior to reaching the unloading stations. Steam will be provided from natural gas boilers.

Pump vaults will house a series of pumps that will push the crude oil to the storage tanks on Parcel 1A.

Pedestrian bridges will be located at select spots throughout the building to allow workers to pass over the unit trains during operations. Additional pedestrian bridges will allow access to the administrative and support buildings over the existing Terminal 5 rail loops and to the interior of the rail loop.

3. Piping. A combination of above-ground and below-ground steel pipes will convey crude oil from the rail unloading facility to the tanks and from the tanks to Berths 13 and 14.

4. Storage Area. The crude oil will be stored in up to six double-bottom, above-ground steel tanks located on Parcel 1A. These tanks will be approximately 48 feet in height and 240 feet in diameter, with a shell capacity of 380,000 barrels each. Each tank will have a fixed roof to keep precipitation from reaching the inside of the tank and an internal floating roof to control tank vapor emissions to the atmosphere. The double-bottomed tanks will include a leak detection system between the tank floors. Two of the proposed tanks may include steam heating coils in their bases to maintain temperatures for heavier crude oil grades. The tanks will be enclosed by a containment berm. The containment area will be designed with a capacity at least equal to 110 percent of the volume of the largest tank plus precipitation from a 24-hour, 100-year storm event. The entire tank containment area will be lined with an impervious membrane to prevent any spills from leaving the containment area via the ground. A sump will collect storm water from the containment area; the sump will be designed to prevent crude oil-contaminated water from being pumped to the storm water disposal system in the event of a spill.

5. Marine Loading. Crude oil will be pumped by pipe to existing port Berths 13 and 14. Piping, jib cranes and related equipment will be installed on the existing dock that serves Berths 13 and 14. The loading system will incorporate automatic shutoff valves with a maximum 30-second shutoff time. A return line will allow oil to return to the storage tanks in case of a shutdown of the ship loading system.

6. Rail. Up to two additional lines will be added to the Terminal 5 loop to accommodate the rail unloading facility. The additional lines will form two complete loops inside of the existing rail loops and will begin and end near the Gateway Avenue grade separation.

Project Schedule

The Facility is subject to the exclusive jurisdiction of the Washington Energy Facility Site Evaluation Council (EFSEC). Per its enabling statute, EFSEC is to make a recommendation to the Governor regarding approval of the proposed project within 12 months of receipt of an application. The Facility may also require permits from the U.S. Army Corps of Engineers. It is anticipated that the Facility will be constructed and fully operational within 9 to 12 months from the receipt of all required permits. A more detailed timeline will be developed as the commencement of construction approaches.

EXHIBIT "E"

GLOSSARY OF TERMS

"Additional Charges" is defined in Paragraph 5.

"Alterations" shall mean all changes, additions, improvements or repairs to, all alterations, reconstructions, renewals, betterments, replacements or removals of and all substitutions or replacements for any of the Premises, both interior and exterior, structural and non-structural, and ordinary and extraordinary. Alterations shall include, but are not limited to, the erection or removal of buildings, facilities or other improvements upon the Premises or the permanent surfacing of any outside areas.

"Baseline Assessment" is defined in Paragraph 2.D. Such site assessment will serve as the baseline environmental study of the environmental condition of the Premises on or about the Conditions Precedent Expiration Date.

"Berth" is defined in Paragraph 9.B.

"Barrels" means a volume equal to 42 U.S. gallons of 231 cubic inches each, at 60 degrees Fahrenheit under one atmosphere of pressure.

"bpd" means Barrels per day, corrected to net standard volume at 60 degrees Fahrenheit as provided for in the API Manual of Petroleum Measurement Standards and ASTM Standard 1250.

"Building Leasehold Award" shall mean that portion of the award in condemnation proceedings that represents the fair market value of Lessee's leasehold interest in the buildings, structures and docks (but not roads, rail lines, utility lines or other infrastructure other than docks) on the Premises for the remaining Term of the Lease. This definition does not include any leasehold advantage award and Lessee may be entitled to such leasehold advantage award if separately awarded.

"CAM" is defined in Paragraph 5.E.

"Common Areas" shall mean those portions of, and facilities within, the Port which are made available by Lessor from time to time for the non-exclusive use of Lessee in common with other tenants and occupants of the Port and their respective customers, agents and employees, including, without limitation, parking areas, driveway, walkways, common loading zones and landscaping.

"**Conditions Precedent**" means those conditions precedent set forth in Paragraph 2.D.

"**Conditions Precedent Expiration Date**" means the earlier of (a) the date on which Lessee provides written notice to Lessor, pursuant to the terms of Paragraph 2.E, that the Conditions Precedent have been satisfied or waived, and (b) the Conditions Precedent Outside Date.

"**Conditions Precedent Outside Date**" means the date that is [redacted] months after the Effective Date.

"**Consent Decree**" means that certain Washington Department of Ecology Consent Decree attached as Exhibit "M".

"**2013 Constant**" means that the Index shall be utilized to gauge the inflationary rate to be applied to determine the sum of money in then-current dollars that is equivalent to the applicable amount of dollars circa 2013.

"Construction Commencement Date" shall mean the date upon which vertical or significant civil construction begins, which shall occur not later than [redacted] months following the Conditions Precedent Expiration Date.

"Construction Period" means the period commencing on the Conditions Precedent Expiration Date and continuing until the Rent Commencement Date.

"Construction Period Fees" means the fees payable pursuant to Paragraph 1.D, to the extent payable during the Construction Period.

"Contingency Period" means the period from the Effective Date until the Conditions Precedent Expiration Date.

"Contingency Period Fees" means the fees payable pursuant to Paragraph 1.D, to the extent payable during the Contingency Period.

"Default" is defined in Paragraph 24.

"**DNR**" means the Washington Department of Natural Resources.

"Environmental Laws" shall mean any federal, state or local environmental health, safety or similar laws, statutes, rules, regulations or ordinances presently in effect or which may be promulgated in the future, as such laws, statutes, rules, regulations and/or ordinances may be supplemented or amended from time to time, including but not limited to laws regarding the proper and lawful use, transportation, storage, treatment, generation, sale and disposal of Hazardous Substances on or in any manner that affects the Premises or the surrounding properties.

"Exclusive Use" is defined in Paragraph 8.E.

"Existing Environmental Conditions" shall mean the presence of Hazardous Substances on, in, at, or under soil, sediment, surface water, groundwater, structures or other materials of the Premises documented in Exhibits "M" and "N" or other documents (including the Baseline Assessment) regarding the Premises on file with the Port or the Washington Department of Ecology prior to Lessee's occupancy.

"**Facility**" shall mean the facility within the Rail/Rack Area, the Support Areas, the Storage Area, and the Marine Terminal Area for the receipt, handling, storage, loading, unloading, blending, and transfer of Petroleum Products.

"Final Premises" is defined in Paragraph 1.B.

"**Force Majeure**" means an event or circumstance, (i) which event or circumstance is not within the reasonable control of, and not the result of the fault or negligence or imprudent practice of, Lessee, and (ii) which event or circumstance the Lessee, by the exercise of reasonable diligence, is unable to overcome, avoid or cause to be avoided, including, without limitation, acts of God; strike or lockout; sabotage; storm; freeze; snow; wind; flood; war, riot or insurrection; explosion; accident; embargo; blockage; inability to secure governmental authorization or permit; forced outages; and any restraint or restriction imposed by applicable law or any directive from a governmental authority. "Force Majeure" shall not include the Lessee's inability to make payments when due under this Lease.

"Hazardous Substances" shall mean any hazardous, toxic, dangerous or extremely hazardous substance, material or waste, including marine pollutants, marine toxics, petroleum, and air toxics, which is or becomes regulated by the United State Government, the State of Washington, or any local governmental authority. The term includes, without limitation, any substance containing contaminants regulated as specified above, but does not include Petroleum Products.

"**Index**" means the Consumer Price Index All Urban Consumers U.S. City Average (1982-84=100) published by the United States Department of Labor, Bureau of Labor Statistics; provided, however, that if such index is discontinued, the Parties shall follow any official consumer price index, whether so named or designated or not, issued by an authorized agency of the United States which supplants such index; otherwise, the Parties shall use any comparable general wholesale or retail price index for the United States reasonably selected by Lessor.

"Interest Rate" shall mean that rate of interest that is the lesser of (i) the maximum interest rate permitted under applicable usury laws; or (ii) twelve percent (12%) per annum.

"**Land Award**" means that portion of the award in condemnation proceedings that represents the fair market value of the Premises, excluding buildings and Lessee's trade fixtures and equipment, but including docks, roads, rail lines, utility lines and other infrastructure.

"Lease" shall mean this Lease Agreement, as amended and supplemented from time to time as permitted hereby.

"Leasehold Tax" shall mean any tax on the leasehold interest created by this Lease or on the Base Monthly Rent reserved under this Lease, including without limitation any leasehold excise taxes due and owing on taxable rent under RCW Chapter 82.29A, and any subsequent revision and amendments thereto. "Taxable rent" is defined by statute, and shall include contract rent which is the amount of consideration due as payment for a leasehold interest, including the total of cash payments made to Lessor, or to any other party for the benefit of Lessor according to the requirements of this Lease or agreement, including but not limited to any payments paid by a sublessee; expenditures for the protection of Lessor's interest when required by the terms of this Lease or agreement; and expenditures for improvements to the property to the extent that such improvements become the property of Lessor. Taxable rent may also be established by the DOR pursuant to RCW 82.29A.020.

"**Leasehold Tax Rate**" means the applicable rate of Leasehold Tax, currently the rate set forth in Paragraph 1.E.

"Lessee" is defined in the preamble of this Lease.

"Lessor" is defined in the preamble of this Lease.

"Lien" shall mean: (i) any interest in property, whether real, personal or mixed and whether tangible or intangible) securing an obligation owed to, or a claim by, a person other than the owner of such property, whether such interest is based on the common law, statute or contract, including any such interest arising from a mortgage, charge, pledge, security agreement, conditional sale, title retention agreement, trust receipt or deposit in trust, consignment or bailment given for security purposes, (ii) any encumbrance upon such property which does not secure such an obligation, or (iii) any other exception to or defect in the title to such property, including but not limited to encroachments, easements, restrictions, rights of entry, licenses and *profits a prendre*.

"Loaded Rail Car" shall mean a rail car that comes in or goes out of the Port with cargo/material.

"**MGA Agreement**" means the Cargo Commodity Payments Agreement and Minimum Annual Guaranty dated as of even date herewith by and between the Parties, the form of which is attached hereto as Exhibit "O".

"**Marine Terminal Area**" is defined in Paragraph 2.B.

"**MGA**" is defined in the MGA Agreement.

"**MGA Term**" is defined in the MGA Agreement.

"Nuisance" is defined as provided in RCW 7.48.120, or successor legislation. Presently, nuisance is defined as "unlawfully doing an act, or omitting to perform a duty, which act or omission either annoys, injures or endangers the comfort, repose, health or safety of others, offends decency, or unlawfully interferes with, obstructs or tends to obstruct, or render dangerous for passage, any lake or navigable river, bay, stream, canal or basin, or any public park, square, street or highway; or in any way renders other persons insecure in life, or in the use of property."

"**Operating Term**" is defined in Paragraph 1.C.

"**Parties**" shall mean, collectively, Lessor and Lessee.

"**Permitted Hazardous Substances**" shall mean Petroleum Products, and Hazardous Substances expressly permitted to be used, stored, or transported on the Premises in accordance with Paragraph 8.A of this Lease, but shall not include any such Petroleum Products or Hazardous Substance to the extent Released: (a) at the Premises or Pipeline Agreement areas, or (b) in conjunction with the Permitted Use.

"**Person**" shall mean any individual (natural person), partnership, corporation, trust, unincorporated association, syndicate, joint venture or other organization or any government or any department or agency thereof or any other entity.

"**Petroleum Products**" shall mean any mixture of hydrocarbons that exist in the liquid phase at atmospheric pressure, including any crude oils, diluents, topped crude oils, partially or incompletely refined crude oils, distillates, biofuels, condensates, intermediates, derivatives, blends, intermixes and finished products (including motor fuels, but excluding any chlorinated hydrocarbons or solvents). Non-exclusive examples of various petroleum products are attached hereto as Exhibit "H." This definition of Petroleum Products shall not be used to designate the Exclusive Use provided in Paragraph 8.E.

"**Pipeline Agreement**" is defined in Paragraph 2.A.

"**Port**" shall mean the Port of Vancouver, a municipal corporation organized and existing under the laws of the State of Washington.

"**Port Commission**" shall mean Commission of the Port of Vancouver.

"**Port Management Agreement**" means the Management Agreement No. 20-080008 dated as of October 1, 1984, between Lessor and the State of Washington, as amended by amendments dated February 24, 1989; on or about May 11, 1993, and most recently amended by Amendment to Port Management Agreement No. 20-080008 dated April 2, 2009, a copy of which is attached hereto as Exhibit P.

"**Port's Rail System**" is defined in Exhibit "J".

"**Preliminary Premises**" is defined in Paragraph 1.B.

"**Premises**" shall mean the Preliminary Premises until such time as replacement Exhibits "A", "B-1", "B-2" and "B-3" have been attached to this Lease and incorporated herein by a lease amendment executed by the Parties, as contemplated by Paragraph 2.D; upon such attachment and incorporation, the term "Premises" shall mean the Final Premises.

"**Rail Facility for Unit Trains**" shall mean a facility on Port property capable of unloading more than [redacted] bpd of crude oil from trains.

"**Rail/Rack Area**" is defined in Paragraph 1.B.

"**Related Parties**" shall mean, with respect to Lessor, its commissioners, officers, agents, representatives and employees and, with respect to Lessee, its officers, directors, employees, shareholders, agents and representatives.

"**Release**" shall be defined as provided in 42 U.S.C. § 9601 and RCW 70.105D.020, or successor legislation. In the event a conflict exists between the two definitions, the broader definition shall apply. For purposes of this Lease, the term Release shall also include an anticipated Release.

"**Rent**" is defined in Paragraph 4.C.

"**Rent Commencement Date**" shall mean the date on which the construction of the Facility has been completed, fully tested and commissioned, and is ready to receive product, which shall be not later than [redacted] months following the Conditions Precedent Expiration Date.

"Restrictive Covenants" means the Washington Department of Ecology mandated Restrictive Covenants attached as Exhibit "N".

"Storage Area" is defined in Paragraph 1.B.

"Term" shall mean the Term of this Lease, as described in Paragraph 1.C, including any extension thereof, unless sooner terminated pursuant to the terms and provisions of this Lease.

"Wharfage, Service and Facilities Fees" means, collectively, the amounts paid for wharfage, service and facilities pursuant to the MGA Agreement.

EXHIBIT "F"

RULES AND REGULATIONS

The following are initial rules and regulations applicable to Lessee's use of the Premises, which rules and regulations are subject to revision by Lessor from time to time as provided in the Lease.

1. All signage within Port of Vancouver shall be in compliance with the local sign ordinances and pre-approved by Lessor. All costs associated with any tenant signage, as well as directory advertisement, will be the responsibility of Lessee.

2. At occupancy date, Lessor shall provide Lessee with a key for the Premises. In the event at any time during the Lease term Lessee changes the locks on the entrance doors to the Premises and/or to any other doors within the Premises, if applicable, without Lessor's prior written approval, Lessee shall immediately provide Lessor with copies of all new keys and shall be responsible for any costs incurred by Lessor for rekeying the Premises on termination, if desired by Lessor.

3. Lessee understands and agrees that no right to store equipment, materials or inventory outside the Premises is being granted as part of this Lease. All equipment, materials and inventory, including, but not limited to, metal, pallets, boxes and items related to Lessee's business, are to be stored inside the Premises.

4. No overnight sleeping in vehicles parked inside or outside the Premises or anywhere within the Port is permitted.

5. Lessee understands and agrees that all shelving, materials, inventory and other product stored in a warehouse area of the Premises must be kept a minimum of three (3) feet away from all sides of the electrical panel installed in the warehouse area.

6. Lessee shall use drip pans, drop cloths, and all other appropriate protective methods and containers under any potential paint, oil, grease, or solvent sources within the Premises, consistent with stringent hazardous waste management practices, so as to minimize the leakage or deposit of such substances, to the maximum extent practicable, will dispose of all such wastes consistent with applicable laws and under permit if appropriate, and will be responsible for returning the Premises back to the same condition and finish existing at the time of first occupancy by Lessee. In particular, all grease/oil and/or any other spills areas must be cleaned thoroughly such that all traces of the waste are removed from the Premises and other contaminated areas are completely remediated.

7. Lessee understands and agrees that washing, steam cleaning or sandblasting of any vehicles, tools, product or equipment is not permitted anywhere within the Premises or Port.

8. Consistent with the Lease, all tenant improvements done within the Premises during the Lease term by Lessee shall first be approved in writing by Lessor prior to the commencement of any construction, and must be done in accordance with all applicable local, state and federal codes, regulations and laws, and must be done by a Washington licensed, bonded and insured contractor and in accordance with the Port's Standard Improvement Specifications. All subcontractors utilized in the Premises for any improvements must first, before commencing work, sign lien releases in favor of Lessor.

9. The Premises will be cleaned thoroughly on a periodic basis and maintained in a clean and presentable condition throughout the Lease term. At the end of the Lease term, a thorough cleaning will be performed and any damage repaired immediately.

10. Lessee is not authorized to do any type of automobile, truck or heavy equipment repair, including oil changes, or dismantling on the Premises or in the Port generally, with the exception of the repair of rail cars incident to the business conducted by Lessee on the Premises.

11. Lessee shall not leave or store disabled vehicles or equipment on the Premises or in the Port, with the exception of those rail cars which are, from time to time, being repaired as part of the business conducted by Lessee on the Premises.

12. Immediately prior to the turnover of the Premises to Lessor on termination of the Lease, Lessee shall walk through the Premises with a representative of Lessor in order to make determinations as to fixtures and any other alterations/additions/installations that have either been done by Lessee and/or for Lessee by Lessor, and that should be removed from the Premises by Lessee, prior to or at the date of Lease termination (except as otherwise expressly provided by the terms of the Lease). Lessee and Lessor shall also agree as to how the Premises must be repaired after such removal; provided, however, that failing agreement, the reasonable determination of Lessor shall be binding on Lessee.

13. No animals are to be kept within the Premises at any time throughout the Lease term, including but not limited to guard dogs.

14. Lessee shall maintain in compliance with all applicable local, state, and federal regulations including, but not limited to, building and fire codes with regard to all activities to be performed within the Premises and in the Port.

Section 2.3 – Construction on Site

WAC 463-60-145
Proposal – Construction on site.

The applicant shall describe the characteristics of the construction to occur at the proposed site including the type, size, and cost of the facility; description of major components and such information as will acquaint the council with the significant features of the proposed project.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-145, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-145, filed 10/8/81. Formerly WAC 463-42-210.)

Section 2.3 Construction On Site

2.3.1 Project Overview

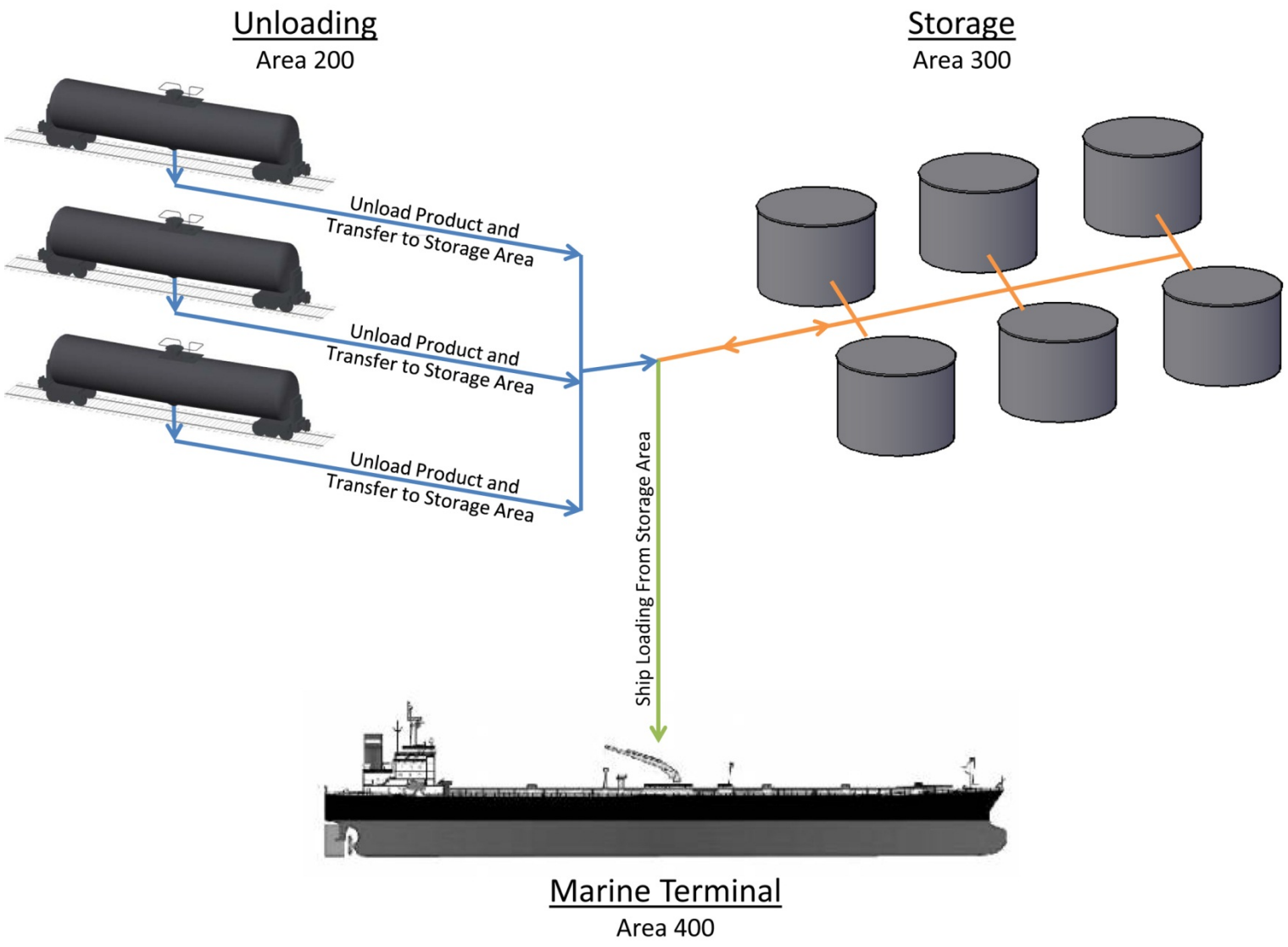
The Applicant is proposing to construct a facility to receive crude oil by rail, store it on site, and load it on marine vessels for shipment to various consumers and end users located primarily on the West Coast. A simplified view of the crude oil flow through the Facility is shown in Figure 2.3-1. Unit trains will arrive at the project site and will be stationed on the Facility rail loops. The trains will be "indexed" through the unloading area (Area 200), where the crude oil will be gravity-drained into the transfer pipeline system (Area 500). The crude oil will be pumped through the transfer pipelines to the crude oil storage tanks (Area 300) where it will be held until the marine vessel loading operation. The storage tanks are also designed to allow blending the various types of crude oil at the Facility to meet customer demands for specific qualities. Marine vessels will arrive and moor at the dock (Area 400) where they will be preboomed. Crude oil will be pumped from the storage tanks to the loading area, and loaded to the marine vessels.

The lease with the Port allows the handling of other petroleum products, including refined products, as well as the ability to unload products at the Marine Terminal. Although allowed by the lease, this request for Site Certification does not include the ability to handle materials other than crude oil or to receive any crude oil or petroleum products at the dock. Should the Applicant decide to undertake these activities, an amendment to the Site Certification Agreement will be pursued with EFSEC.

In addition to the primary components described above, the Facility will include ancillary elements that will support the offloading, storage, and loading operations. The primary and ancillary elements are described in detail below. Table 2.3-1 summarizes the primary and ancillary project elements by Facility area.

Table 2.3-1. Summary of Primary and Ancillary Project Elements

Facility Area	Primary and Ancillary Project Elements
Rail Infrastructure	• Rail facility loops
200 – Unloading and Office	• Rail unloading area • Control rooms\E-houses • Fire Pump and Foam Building • Administrative and Support Buildings
300 – Storage	• Crude Oil Storage Tanks • Secondary Containment Berm • Boiler Building • Pump Basin • Control Room/E-House • Fire Pump and Foam Building
400 – Marine Terminal	• Marine Vessel Loading Hoses and Equipment • Control Room/E-House • Crane Control Room • Dock Safety Unit • MVCU • Vapor Blower Skid • Spill Prevention, Response and Containment Equipment • Dock Improvements
500 – Transfer Pipelines	• Transfer Piping from Area 200 to Area 300 • Transfer Piping to/from Area 300 to Area 400 • Piping from vessel loading to MVCU
600 - West Boiler	• West Boiler Building



BergerABAM	**Figure 2.3-1. Product Flow Diagram**

Primary vehicular access to the proposed project will be to the Administration Building accessible from Old Lower River Road via a private road owned and maintained by the Port. This private road connects with Old Lower River Road approximately 1,000 feet west of the proposed Administration Building. The Storage Area will be accessed from a private drive shared with Farwest Steel from NW Lower River Road. The Storage Area is not anticipated to require full-time staffing and parking will be provided only for routine maintenance. The marine terminal will be accessed by Gateway Avenue and Harborside Drive via a newly constructed driveway. No modifications are proposed to existing public roads accessing this area of the Port. An existing asphalted area at the berths will be used by project personnel during ship loading operations. Although the West Boiler Building at the rail unloading area ordinarily will not be occupied full-time, parking for maintenance vehicles will be provided.

2.3.1.1 Facility Elements Included in the Application for Site Certification

Project Elements Under EFSEC Jurisdiction

The Applicant is seeking site certification for the Facility configuration at full build-out. At full build-out, the Facility will have the capability of loading up to 360,000 barrels/day of crude oil to marine vessels, and will include both the first and second stage facilities as follows:

In a first stage, upon receiving site certification from EFSEC and all federal approvals the Applicant expects to construct the following facilities:

- Two rail loops to receive unit trains
- The unloading building
  - The entire unloading building structure and foundations
  - Two of the unloading tracks, including rail tracks, trenches, pump basins, catwalks/gangways and all piping necessary to support operations
  - One unloading track including only the concrete trench, but no rail or associated piping, gangways or mezzanines
- Administrative and support buildings
  - The administrative building
  - One of the two support buildings
- Storage area including:
  - The entire exterior containment berm sized and designed for 110% of the largest storage tank and the rainfall from a 24-hour, 100-year storm for the entire berm area
  - The four storage tanks designed to handle non-heated pipeline quality crude
  - The intermediate berms necessary to contain the contents of the four tanks installed in the first stage
  - Stormwater facilities to capture stormwater associated with the storage of four of the six tanks.
- Transfer pipelines serving the concurrent unloading of unit trains staged at the 2 unloading tracks described above, and the conveyance to the marine terminal
- Transfer pipelines serving the conveyance of crude oil from the storage area to the marine terminal
- Marine terminal facilities designed to handle the conveyance of crude oil to a marine vessel at full build out.
- All of the berth improvements necessary to support vessel berthing at full build-out

- MVCUs
- Fire-suppression facilities sufficient to meet the suppression needs of the facilities installed

Contingent on evolving market conditions, the Applicant will construct the following additional elements in a subsequent stage:

- In the unloading building
  - The catwalks/gangways and all piping necessary to support operations of the third unloading track which will handle heated non-pipeline quality crude
- Administrative and support buildings
  - The second of the support buildings
- Storage area including:
  - The two tanks that will have the capability to accept heated crude
  - Stormwater facilities to capture stormwater associated with the remaining two of the six tanks.
- Transfer pipelines serving the concurrent unloading of unit trains staged at the 3rd unloading track
- The West Boiler Building (Area 600) and the East Boiler Building, which is part of Area 300
- Fire-suppression facilities sufficient to me the suppression needs of the additional facilities installed

In the future, the facility will incorporate a third rail loop to be constructed by the Port for the facility's exclusive use, serving the third unloading track. This third track will be built by the Port as part of the permitted WVFA project, prior to, concurrently with, or after the construction of the Facility. Until such time that the Facility capacity does not exceed 120,000 barrels per day, this third loop track will be owned and operated by the Port for general use. When the Facility capacity exceeds 120,000 barrels per day, use of the third rail loop will be transferred to the exclusive use of the Facility. The Facility will then also undertake maintenance of this this third loop.

The Applicant expects a 20-year lifetime for the facility. Such timeline may be extended should market conditions warrant. During that lifetime the Applicant requests that site certification be granted for operation and maintenance of all of the above facilities, with the following exception: Maintenance dredging at berths 13 and 14 are part of the Marine Terminal (Area 400). Dredging operations will continue to be conducted by the Port of Vancouver under its existing and future approvals granted by local, state and federal agencies to which such dredging is subject.

2.3.2 Rail Infrastructure

The project site has been selected to take full advantage of dual Class 1 (BNSF and Union Pacific) unit train access at the Port's Terminal 5. The existing rail infrastructure at Terminal 5 is illustrated in Figure 2.3-2.

Up to four unit trains per day on average will be delivered onto the Port's rail network via Class I railroad lines for staging on the rail infrastructure serving the Facility. Trains will arrive at Terminal 5 from the east where they will exit the Class 1 mainlines and enter the Port's industrial rail network and travel to the rail unloading building located on the north side of the Terminal 5 rail loop. The design of the rail infrastructure will accommodate complete unit trains, eliminating the need to break trains into smaller segments requiring multiple switching movements during the unloading process.

To support the staging of unit trains, two new rail lines (track numbers 4106 and 4107), each approximately 7,700 feet in length, will be added to the Terminal 5 rail infrastructure. As shown in Figure 2.3-3, the additional lines will form two complete loops inside the existing rail loops and will begin and end near the Gateway Avenue grade separation. The rail loops will be designed to comply with railroad and federal requirements.

As noted above, at full build-out, to accommodate an average of four unit trains per day and allow simultaneous unloading of up to three unit trains, the Applicant will use the rail loop to be constructed by the Port 5 (Track 4015).

In order to accommodate the two additional rail loops, the configuration of permitted (existing and to be built) WVFA rail facilities and the adjacent loop road will be shifted; the shifting of existing facilities will be performed by others, has been previously permitted, and is not included within this request for Site Certification.

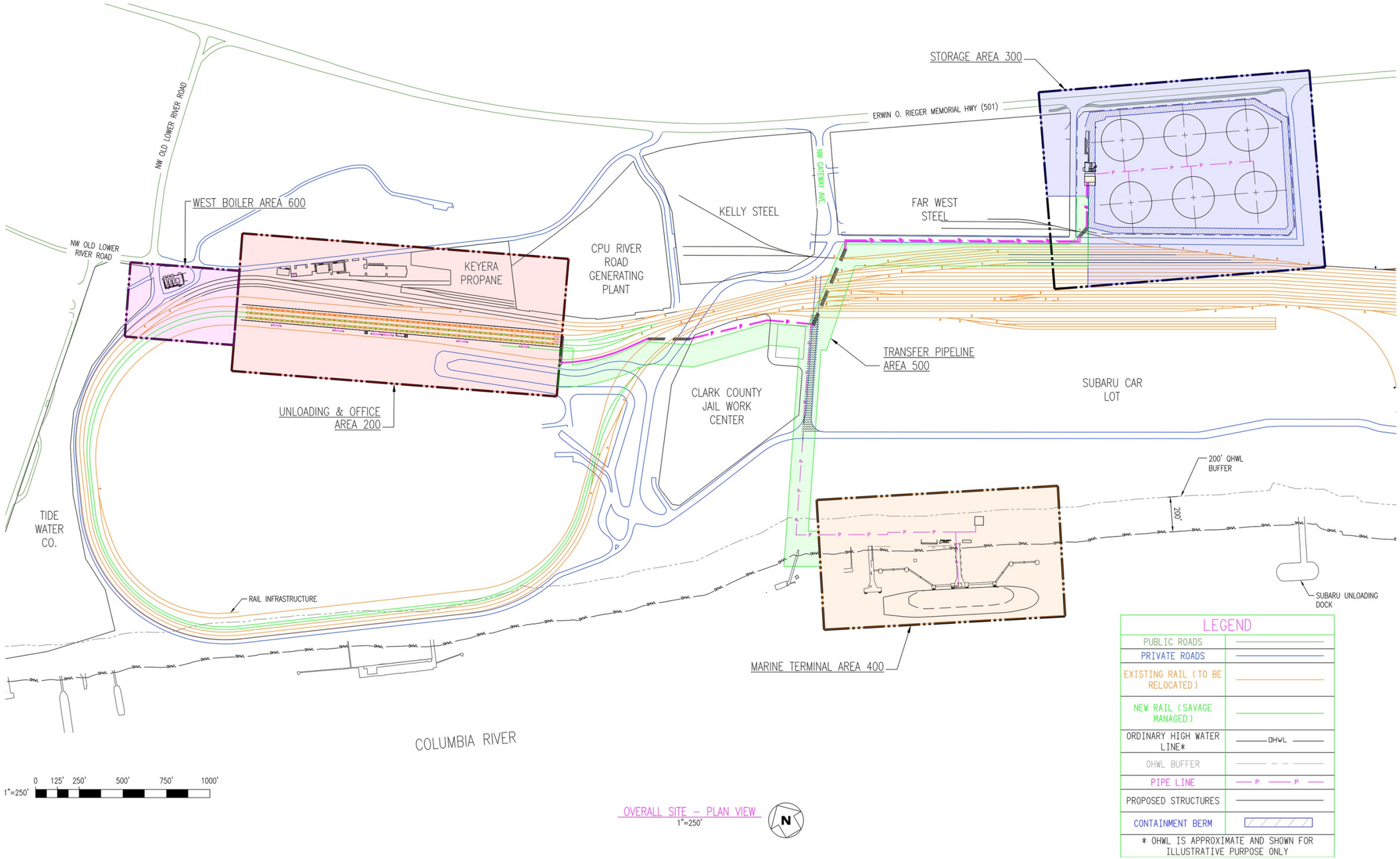


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Figure 2.3-2. Overall Site Plan

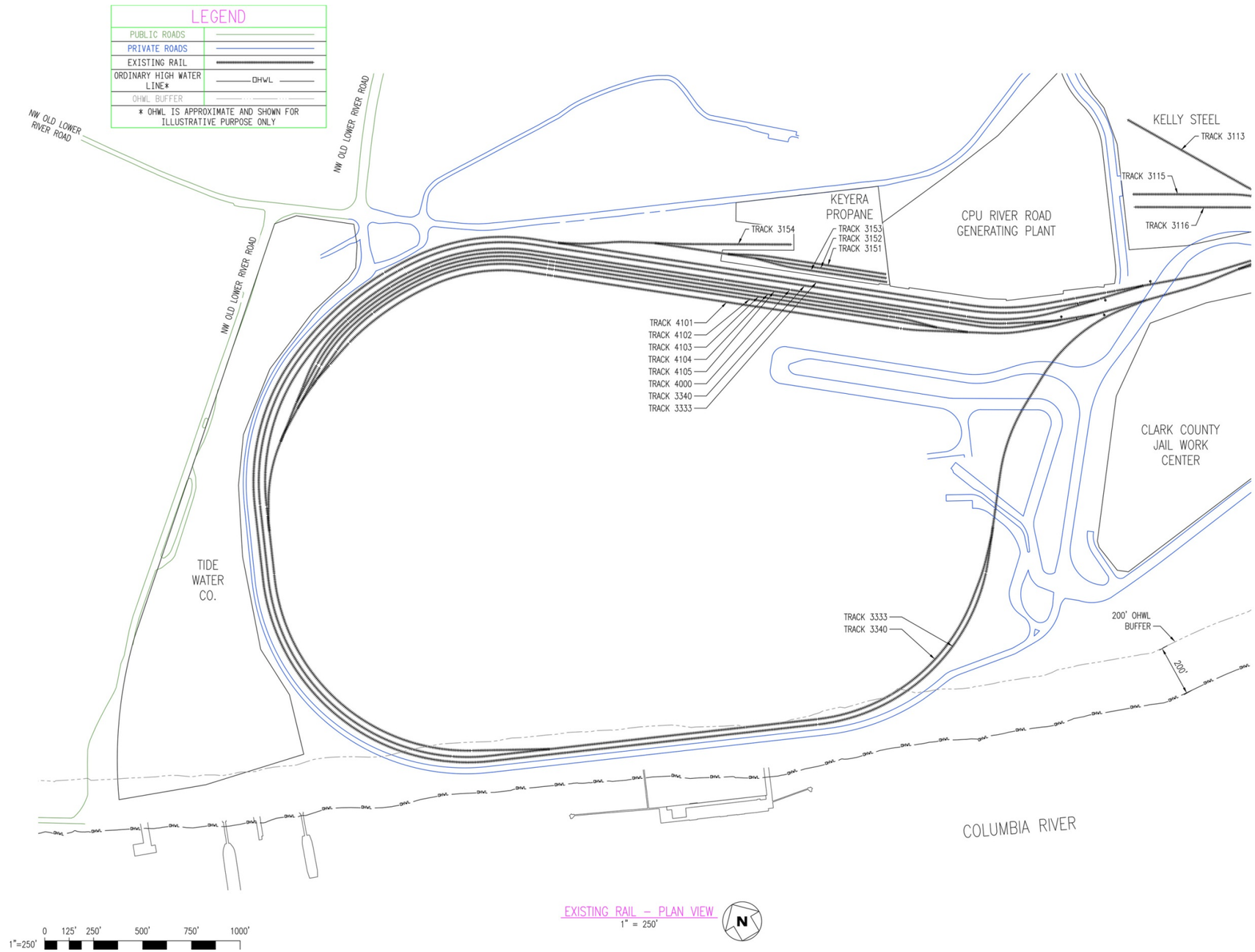

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Figure 2.3-3. Existing Rail Infrastructure

2.3.3 Area 200 – Unloading and Office

2.3.3.1 Rail Car Unloading

General Configuration

The rail unloading elements (Area 200) will be located south of the Administrative and Support Buildings. The rail unloading building will span tracks 4105, 4106, and 4107. Existing rail lines will separate the unloading elements from the Administrative/Support Buildings. These existing rail lines are not part of the Facility. A pedestrian bridge will provide access from the Administrative/Support Buildings to the rail unloading building. Figure 2.3-4 provides a plan view of the arrangement of the rail unloading building with respect to existing rail lines and the Administrative/Support Buildings.

The rail car unloading elements will be designed to receive and unload crude oil unit trains. Two of the unloading tracks will accommodate trains carrying crude oil that can be drained and conveyed without being heated; the third unloading track will accommodate trains carrying crude oil that can be drained and conveyed without being heated as well as crude oil that may need to be heated prior to draining and conveyance to storage.

Each unit train will include approximately 100 to 120 tank cars. Typical unit train length will be approximately 7,800 feet. Tank cars typically hold between 650 and 750 barrels of crude oil.[1] A typical unit train will deliver between 65,000 and 90,000 barrels of crude oil.

The rail car unloading facility is composed of a covered structure through which the trains will be pulled and safely secured where the unloading will occur. The building that houses the rail car unloading functions will be approximately 1,850 feet long by 91 feet wide, with a maximum height of approximately 50 feet. Figure 2.3-7 illustrates cross-sections of the unloading building at the location of the walkway to the Administrative/Support Buildings, and at a typical internal walkway. The structure will consist of a steel frame with sheet metal walls painted a neutral color. The structure will be open on both ends and have sides that stop short of the roofline to allow continuous venting. The structure will have translucent panels for natural lighting as well as interior lighting. The building and its components will be built to applicable building and safety codes as outlined in Section 4.1.

Unloading Piping

The unloading area is designed to accommodate three parallel tracks. Each track will include 30 unloading stations for a total of 90 stations, 30 stations per track. Track 4105 will be able to heat the rail cars by steam, as described in more detail below.

The 30 unloading stations for each track are subdivided into five groups of six unloading stations. Figure 2.3-6 illustrates the typical configuration of rail car unloading. Each unloading station will accommodate one rail car. Each unloading station will include:

- Hoses equipped with dry fit connectors used to gravity drain the crude oil from the tank car to a collection header pipe

[1] A barrel of crude oil contains 42 gallons.

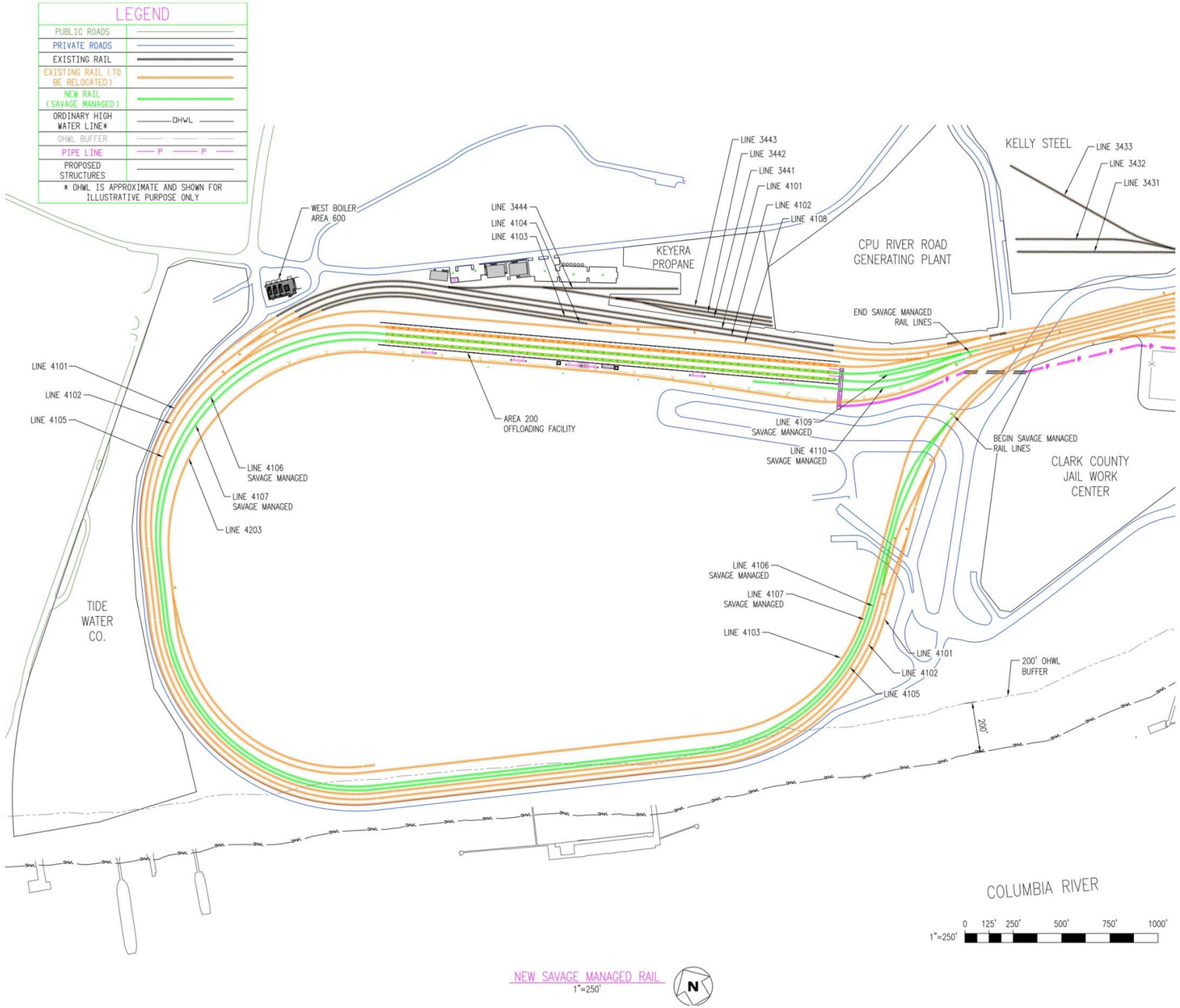

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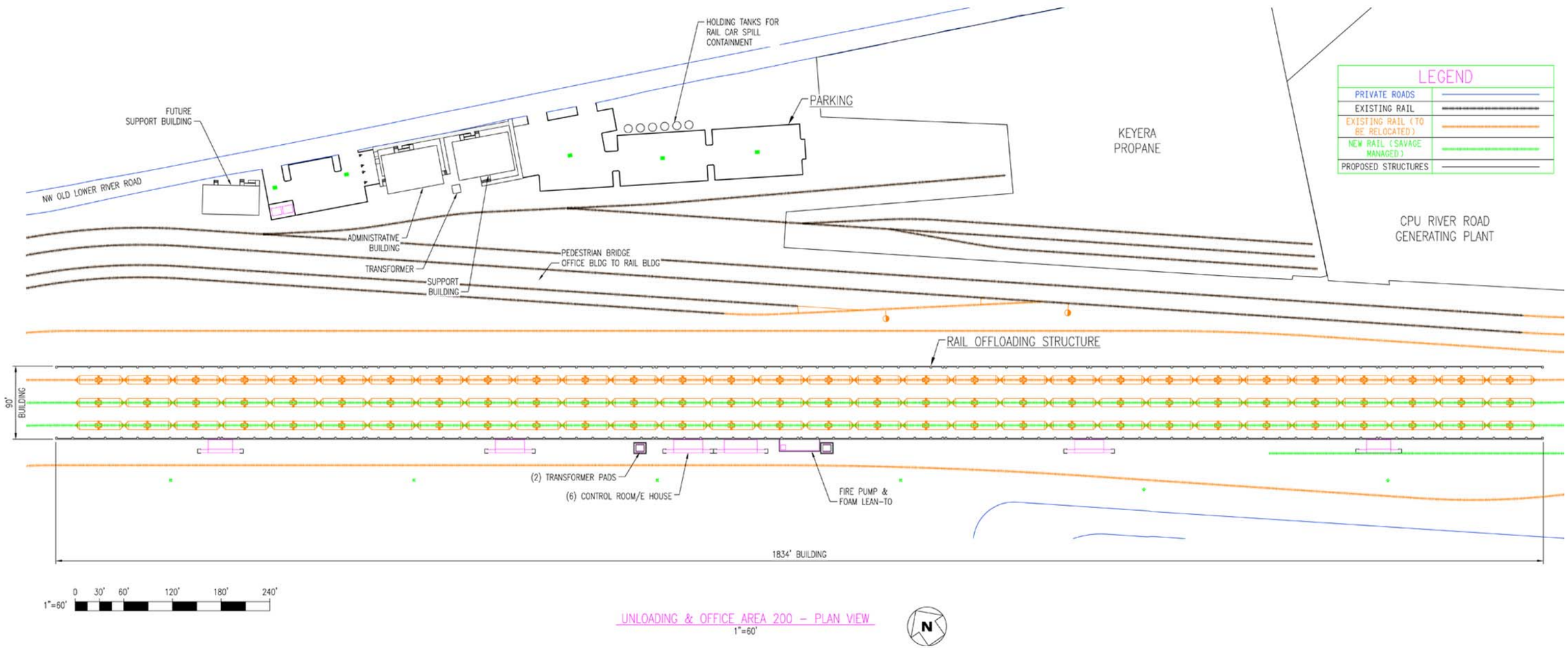
Figure 2.3-4. Rail Improvements



BergerABAM	**Figure 2.3-5. Rail Car Unloading Facility**

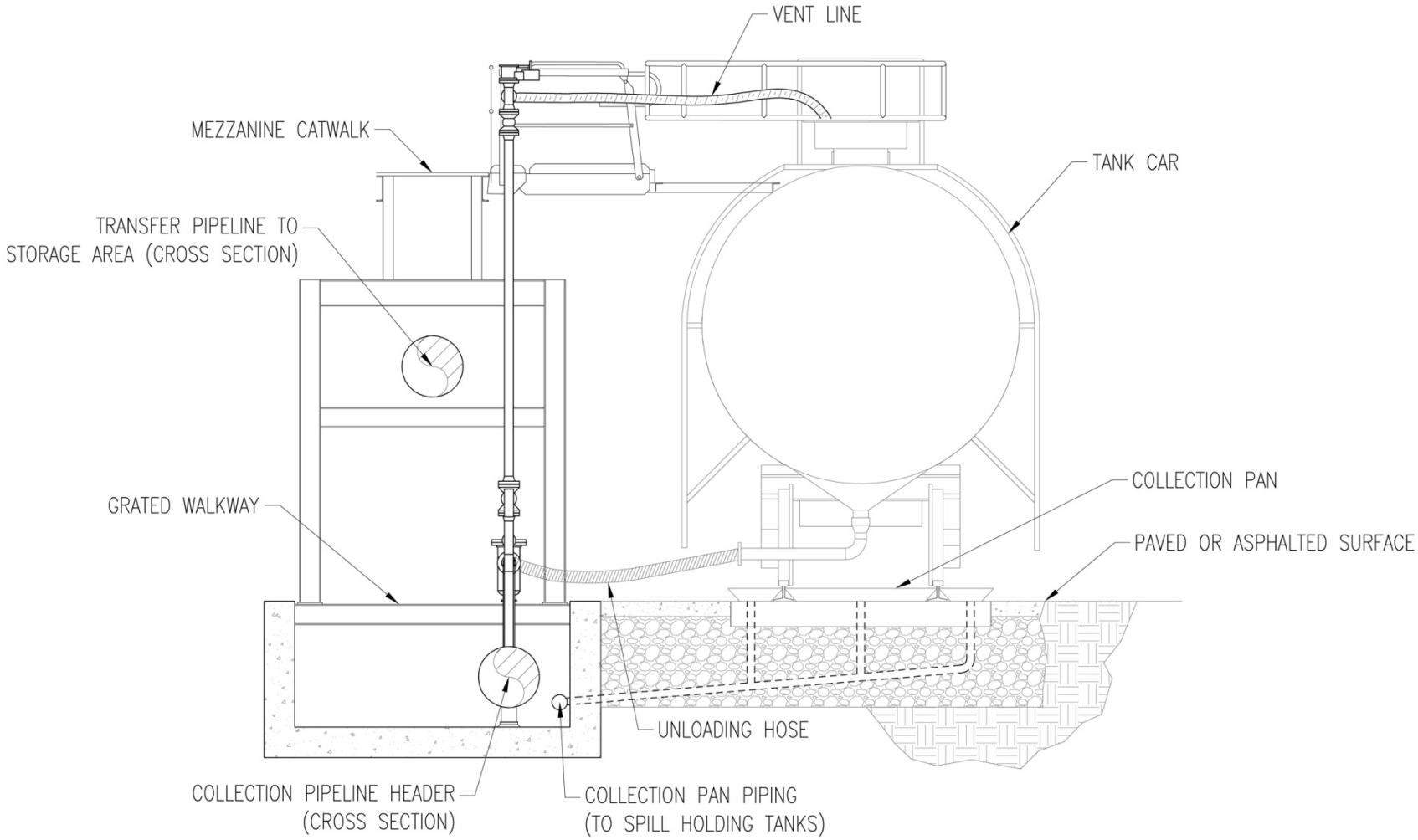


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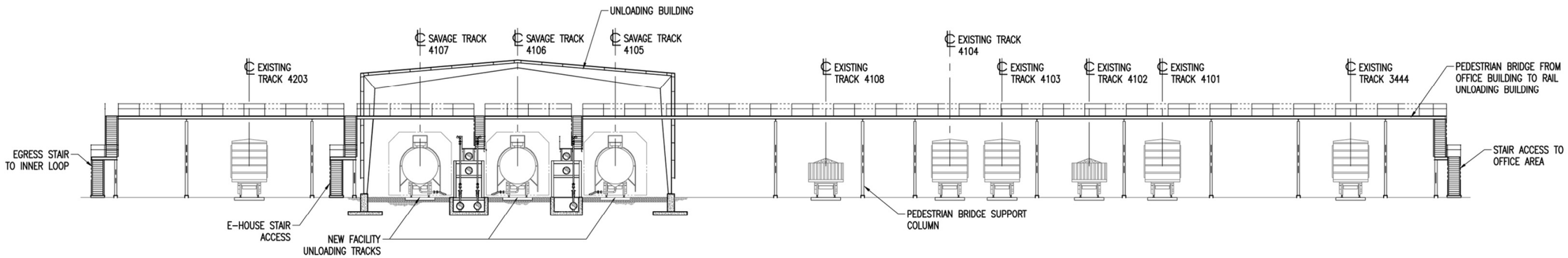
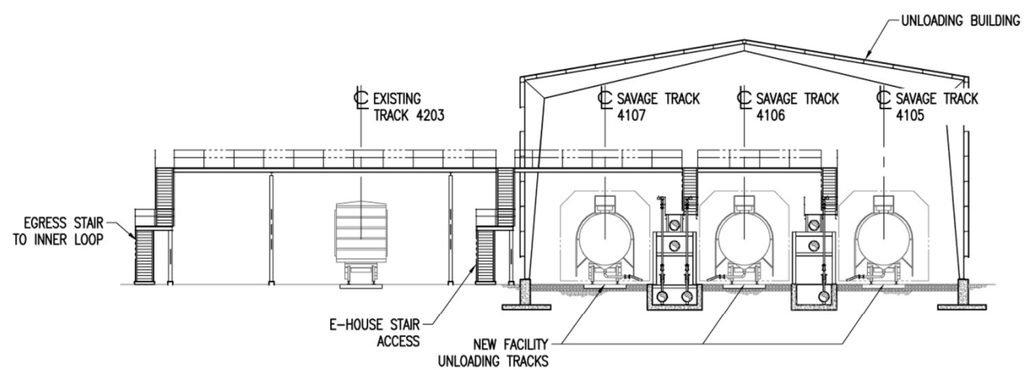
Figure 2.3-6. Rail Car Unloading Facility Cross Section



CROSS SECTION AT PEDESTRIAN BRIDGE



CROSS SECTION AT PEDESTRIAN BRIDGE TO INNER LOOP

BergerABAM	**Figure 2.3-7. Building Cross Section**

- Walkway (gangway) grating to serve as the unloading work platform
- Mezzanine catwalks to access the top of the tank cars
- Collection pans between rails that are piped to a separate line that conveys inadvertent releases to the rail unloading facility containment tanks;
- Paved or asphalted ground surfaces between the unloading rail tracks
- A vent line that allows the tank car to maintain atmospheric pressure as its contents drain

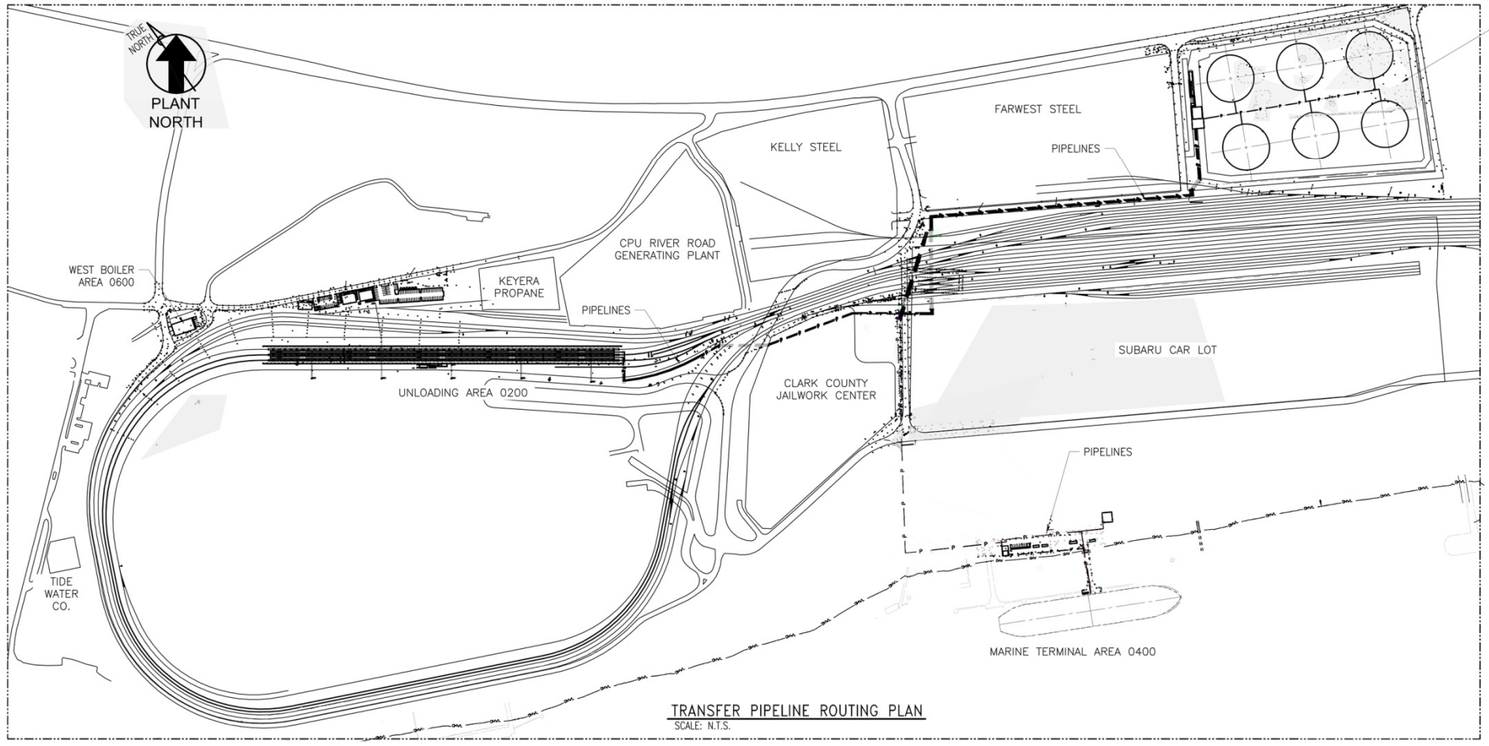
The 30 unloading stations with the ability to heat crude oil unit trains also will be equipped with steam connections to heat the crude oil to decrease its viscosity and allow it to flow more easily. Steam will be produced in the Area 600 Boiler Building (described in section 2.3.6 below) and piped to the unloading facility. Tank cars that receive steam will be fitted with permanent internal steam manifolds at the bottom of the car. Inlet steam hoses will be connected to each car to allow steam to circulate in the manifold, thereby warming the contents of the tank car. Steam condensate exiting the manifolds will be collected via condensate hoses, and piped back to the steam boilers in a closed loop system.

Unloading will be accomplished with a closed-loop system, i.e., the crude oil will be contained in an enclosed system at all times from when it leaves the rail car to when it enters the storage tanks. During the entire unloading process, neither the crude oil nor crude oil vapors will be directly exposed to the atmosphere.

Flexible vent hoses will be manually connected to a valve at the top of the car accessed by a movable gangway. The vent hoses will connect to the collection header. Vapors leaving the collection header as oil flows into the header will travel through the vent hose to the car as the crude oil drains from the car. This prevents vapors from being vented to the atmosphere.

Unloading hoses will be manually connected to the valves on the cars using dry fit connectors, one hose per tank car. Dry fit connectors are designed so that the crude oil in the hose cannot come into contact with the atmosphere. The connector is designed such that crude oil will not flow without a secure connection. Each hose will be equipped with an automatic shutoff valve. Once the dry fit connector has been secured, the crude oil will gravity-drain from the cars to a collection header. The hoses will also have an emergency shutdown (ESD) valve before the collection header. The valve will automatically close during a fire or if an ESD button is depressed in the building. Buttons are located at the bottom of all the stair landings and in between stations on the upper mezzanine.

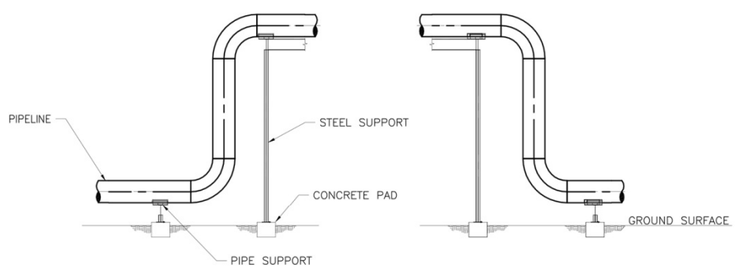
The collection header collects the flow from a grouping of six cars. The collection headers will be housed in below-grade trenches running parallel to the rail tracks. A single 9-foot-wide by 5-foot-deep trench will serve tracks 4106 and 4107; a 9-foot-wide by 5-foot-deep trench will serve track 4105. Although the primary purpose of the trench is to house the product collection header, spill collection line and electrical and data lines, the trench will also act as secondary containment.



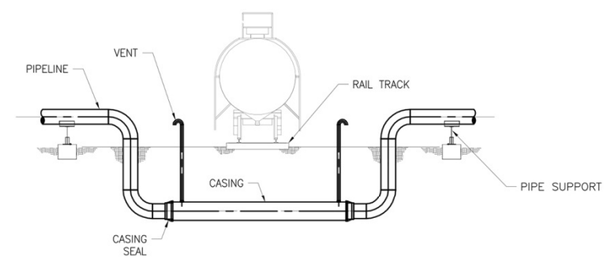
TRANSFER PIPELINE ROUTING PLAN
SCALE: N.T.S.

LEGEND	
PUBLIC ROADS	
PRIVATE ROADS	
EXISTING RAIL	
NEW RAIL	
NEW RAIL (SAVAGE MANAGED)	
OHWL	
PIPE LINE	
STRUCTURES	

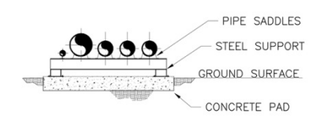
NOTE: OHWL IS APPROXIMATE AND IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.



TYPICAL PIPELINE TRACK/ROAD OVERPASS



TYPICAL PIPELINE TRACK/ROAD BELOW GRADE CROSSING



TYPICAL PIPE SUPPORT

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Figure 2.3-8. Transfer Pipeline

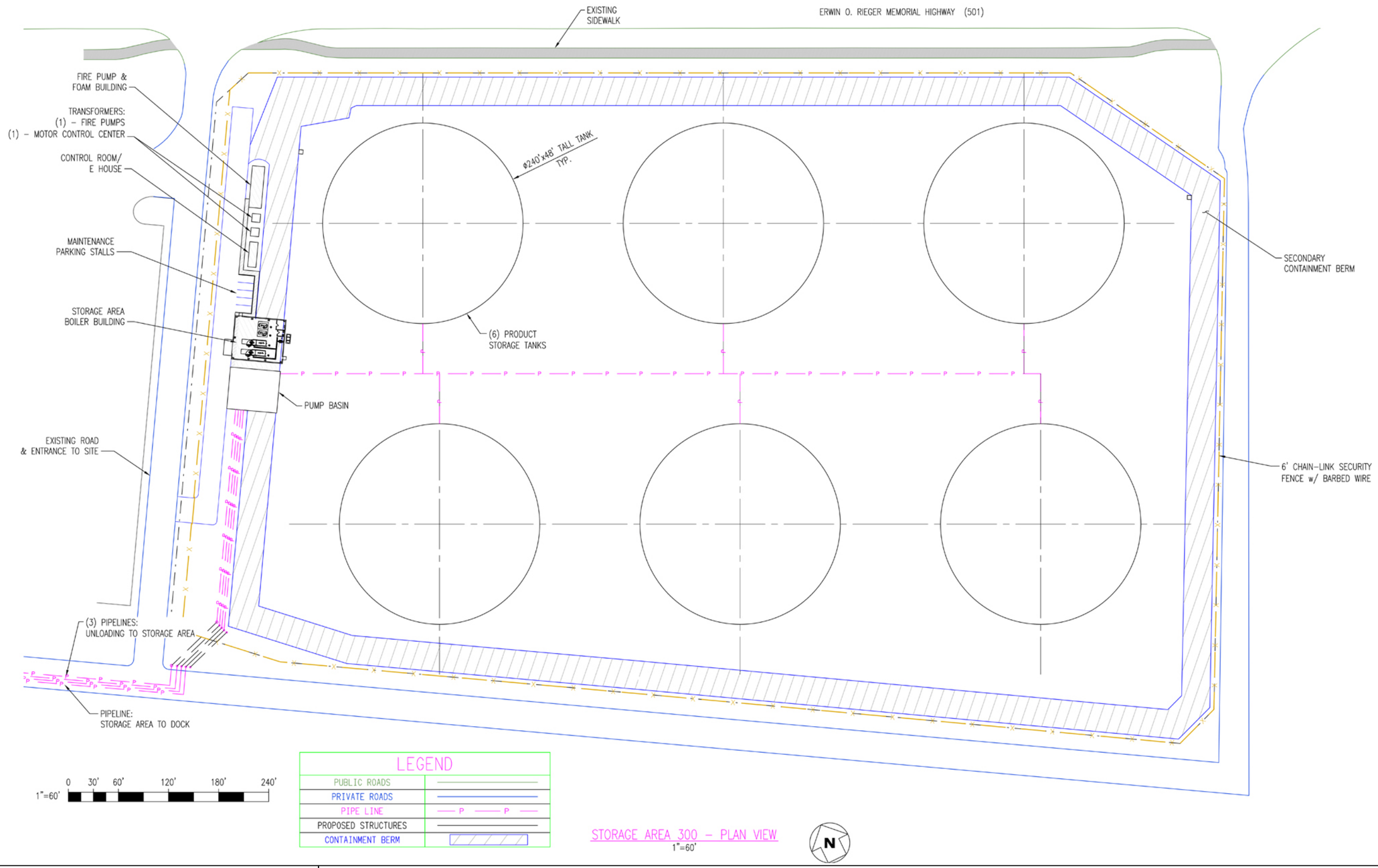

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Figure 2.3-9. Storage Tanks

Each collection header is directly connected to a dedicated pumping station which transfers the crude oil into a 24-inch-diameter transfer pipeline (one per track), which will collect the flow from all five pump basins on that track. As the crude oil flows from the collection header to the pumping stations, it will pass through a basket strainer to remove solids that may be present. The pumping stations monitor volumetric flow rate, crude oil density, and contaminants (sediment and water), and collect regular samples of the crude oil for analysis. The pumps are housed in pump basins beneath the rail unloading building. Each of the five pump basins serving Tracks 4106 and 4107 will measure approximately 15 feet wide by 34 feet long and 15 feet deep. The five pump basins serving track 4105 will measure 10 feet wide by 34 feet long and 15 feet deep. Two pumps will serve each offloading header, with one acting as a primary and the second as an on-line spare on standby. During pumping, the crude oil will not come into contact with the vaults; however, the pump basins will serve as secondary containment. The trenches and pump basins will be constructed of concrete, coated with sealant and include chemical resistant joint sealant.

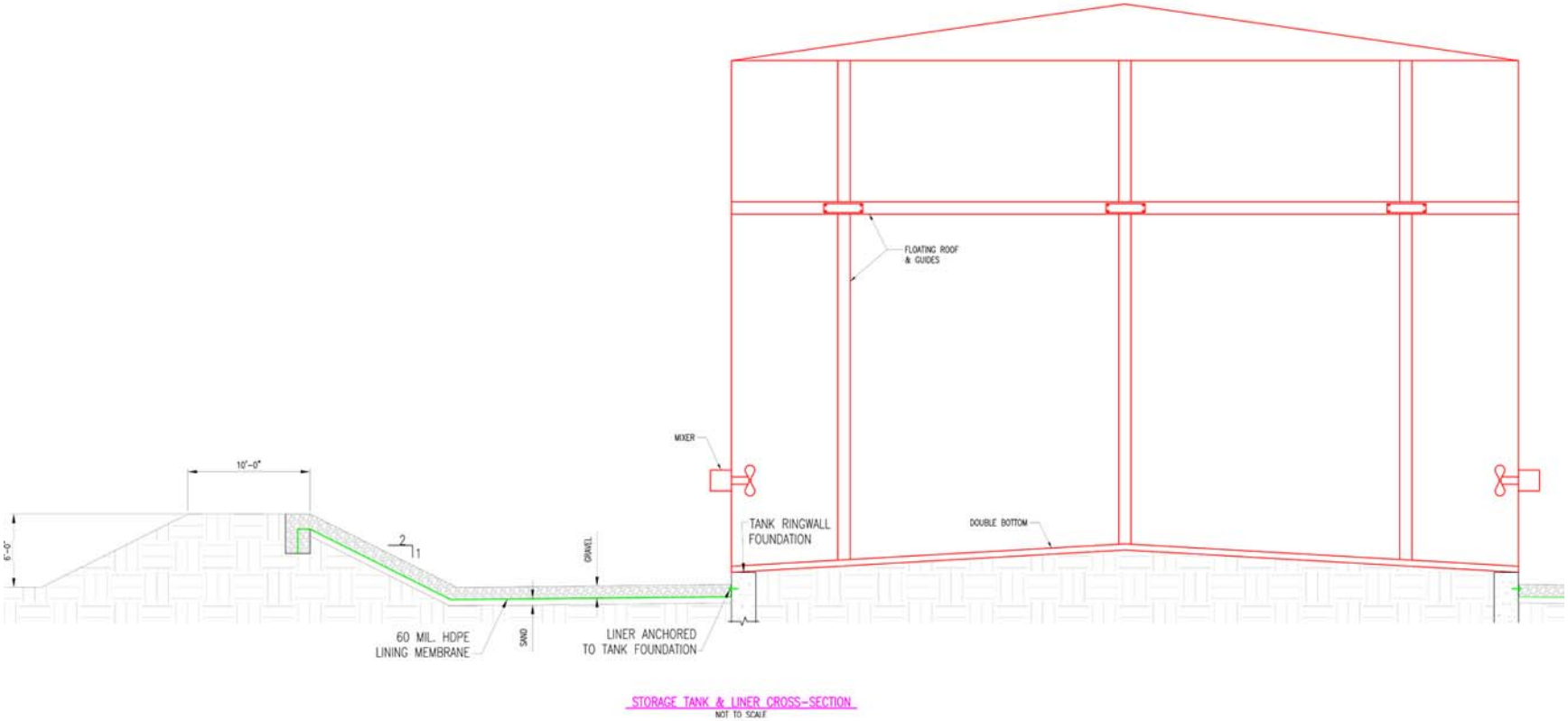
The discharge of all five unloading pumping stations will be combined into one 24-inch-diameter transfer pipeline per track, which will convey the crude oil to the storage tanks in Area 400. This transfer pipeline is part of Area 500 and is described in detail below. There will be a total of two non-heated 24-inch transfer pipelines from the non-heated unloading stations to the storage area inlet manifold. The discharge from the pumping stations with the potential for heating will be combined into a separate heat-traced and insulated, 24-inch transfer pipe to the storage area heated inlet manifold.

Unloading Facility Pedestrian Access

One pedestrian bridge will provide access for workers from the Administrative/Support Buildings, over the existing Terminal 5 rail loops, and to the interior of the rail loop. An additional four pedestrian bridges will allow workers to pass over the unit trains once they are inside the rail car unloading facility. The pedestrian bridges will be grated and a minimum of 3 feet wide to facilitate emergency access.

Rail Car Unloading Facility Spill Holding Tanks

Approximately five holding tanks, with a total capacity of approximately 1,000 barrels, will be constructed adjacent to the administrative/support area. These tanks will be connected, and will provide secondary containment, to a piping system that will receive inadvertent releases captured in the collection pans. The combined volume of the tanks is sized to contain the entire contents of a single tank car. Crude oil captured in a collection pan will flow by gravity into a dedicated line, and will be conveyed from the unloading facility to the containment tanks. The tanks will be covered, constructed of steel, and anchored in accordance with applicable seismic design requirements. The tank contents will be disposed of or recycled at an offsite facility with the ability to handle the waste.



BergerABAM	**Figure 2.3-10. Containment Berm Cross Section**

E-Houses, Transformer, Air Compressor, and Fire Pump and Foam Building

The following elements will be located in Area 200 (see Figure 2.3-2), and will support the unloading operations,

The unloading process will be controlled from six control rooms/E-houses. The integration of the control functions of these E-houses is described in detail in section 2.3.6.1 below. Each of these E-houses will be approximately 825 square feet with a maximum height of 15 feet.

Two transformers will regulate electrical output to the unloading facility. Both will be pad-mounted on 225-square foot pads.

A fire pump and foam building will house an emergency fire pump and fire protection systems associated with the unloading facility. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The single-story building will have an approximate footprint of 750 square feet. Fire suppression systems associated with the unloading building are described in detail in section 4.1.3.4.

2.3.4 Administrative and Support Buildings

The proposed project will require three approximately 3,400-square-foot office buildings for administrative functions, lockers, restrooms, and other employee support facilities. These elements will be located on the north side of the Terminal 5 loop south of the existing private road. Parking and landscaping will be provided per City standards.

2.3.5 Area 500 – Transfer Pipelines

A combination of above- and belowground steel transfer pipelines will convey crude oil from the rail unloading building in Area 200 to the storage tanks in Area 300 and from the storage tanks to the marine vessel loading system in Area 400. Figure 2.3-9 illustrates the transfer pipeline alignment. At full buildout, the system will include the following:

- Up to three 24-inch-diameter, approximately 1,800-foot-long pipes will collect the crude oil unloaded at the rail unloading stations; one of these pipelines will be electrically heat-traced to ensure that the viscosity of the non-pipeline crude oil will be maintained as it is conveyed out of the unloading building.
- Three 24-inch-diameter, approximately 5,500-foot-long pipelines will connect the rail car unloading facility to the storage tanks in Area 300; one of these pipes will be electrically heat-traced to ensure that the viscosity of the crude oil requiring heating will be maintained from the unloading facility to the storage area.
- Two 24- to 30 inch-diameter, approximately 5,300-foot-long pipelines will connect the storage tanks with the vessel loading system in Area 400.
- One 6-inch-diameter, approximately 5,300-foot-long pipeline will return crude oil from the vessel loading system back to the storage tanks; this pipeline is provided to handle loading process shutdowns and provide pressure relief and prevent pipe hammer in the pipe conveyance system.[2]

[2] Pipe hammer or transient pressure wave is the momentary increase in pressure which occurs in a liquid pipe system when there is a sudden change of direction or velocity of the liquid. When a rapidly closed valve suddenly stops flow in a pipeline, pressure energy is transferred to the valves and piping.

- One 16- to 22-inch-diameter, approximately 600-foot-long pipe will deliver hydrocarbon vapor generated during loading of vessels to the MVCU (described in section 2.3.7).

Piping will be constructed of American Standards Testing and Materials (ASTM) A36 pipe. Aboveground runs of piping will be supported so that the bottom of the piping is approximately 2 feet off the ground on vertical supports located every 20 to 25 feet. The vertical supports will be fixed on small concrete foundations (see Detail B Figure 2.3-15). Where multiple pipes are placed within the routing pipelines may be either laid side-to-side, or stacked. Figure 2.3-8, includes a detail of the typical arrangement of an overhead crossing. Expansion loops will be constructed throughout the transfer pipeline runs to accommodate for thermal expansion of the pipelines during operation. The typical configuration of a pipeline expansion loop is shown in Figure 2.3-8. Where road or rail crossings occur and in other limited areas, the piping will be housed in underground steel casings or raised above ground for standard American Railway Engineering and Maintenance-of-Way Association (AREMA) clearances. If installed underground, the piping will be placed in casings with incorporated leak detection (as shown in Figure 2.3-8). Runs of aboveground pipeline will be standard-walled, to ensure ease of inspection and maintenance, and in accordance with the applicable requirements of WAC 173-180-340 and 49 Code of Federal Regulations (CFR) 195.246 through 49 CFR 195.254. Cathodic protection will be provided for piping to prevent corrosion and piping will be wrapped and coated.

The piping system and associated supports and foundations will be designed to applicable seismic protection standards (as detailed in Section 2.18.2), and will be electrically grounded to protect against the buildup of static electricity during crude oil conveyance. Manual isolation valves will be located on the piping system at the exit of the rail car unloading facility and at the entrance to the storage tank area. Annual hydrostatic testing on over-water portions regulated by U.S. Coast Guard (USCG), API, or other standard per SPCC rule and future SPCC Plan. The pipeline system will be inspected on a routine basis.

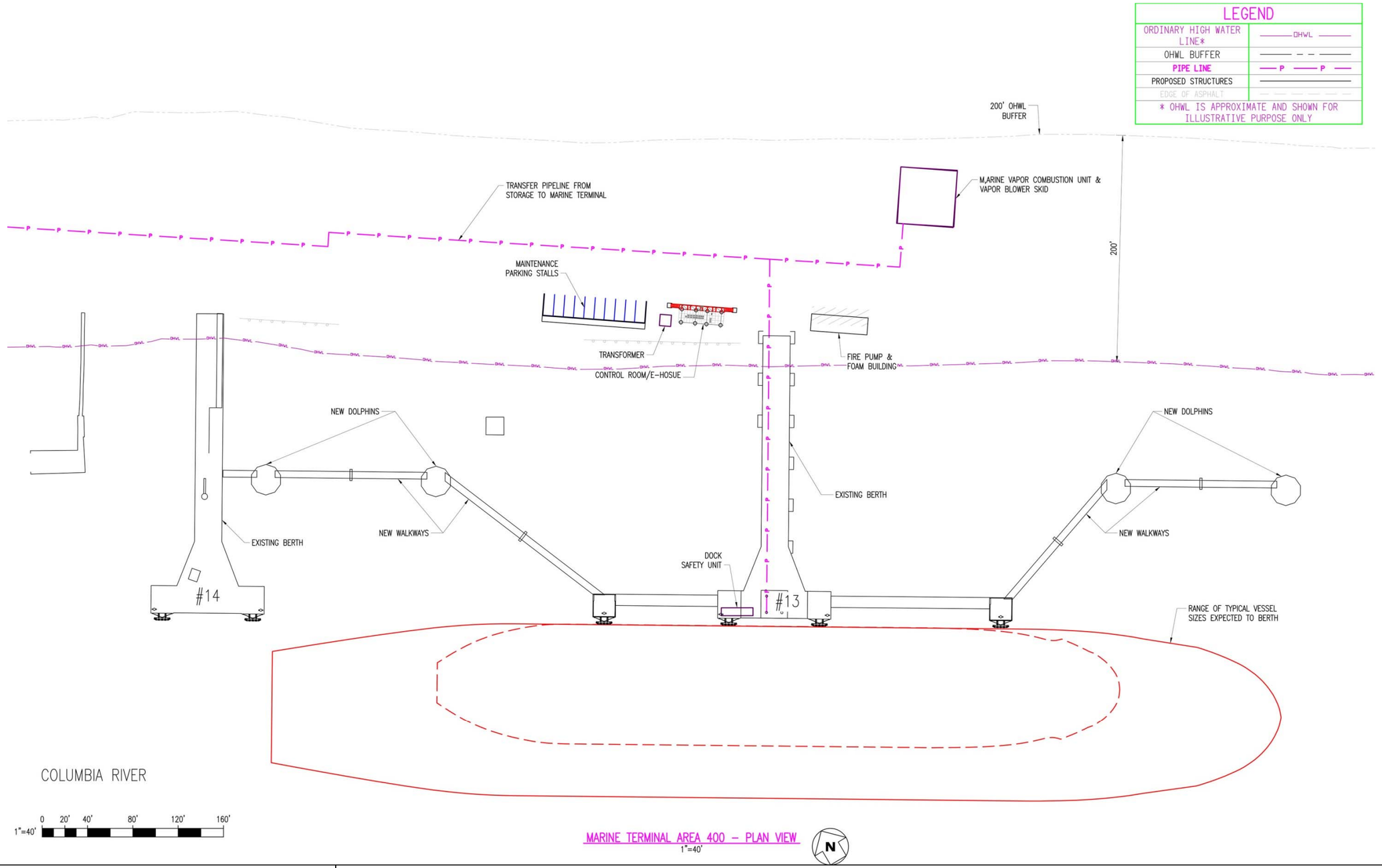


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Figure 2.3-11. Marine Terminal

2.3.6 Area 300 – Storage

Storage Tanks

The crude oil will be stored in up to six double-bottom, internal floating-roof aboveground storage tanks (ASTs) located in Area 300 (see 2.3-9). These tanks will be approximately 48 feet in height and 240 feet in diameter, with a shell capacity of approximately 380,000 barrels each. The maximum amount of product stored in each tank will be approximately 360,000 barrels, to take into account the presence of the internal floating roof and the additional headspace required to allow product movement in the event of seismic conditions. The working capacity of the tanks will be approximately 340,000 bbl[3]. The tanks will be painted white. A typical cross-section of a storage tank is included in Figure 2.3-10.

The ASTs will be erected in the field and constructed per API Standard 650. AST features include a uniformly supported flat bottom, welded carbon steel construction, and control of crude oil temperature and internal tank pressure to API specifications, and will use appropriate live load characteristics for roof design. Two of the tanks may be equipped with steam manifolds constructed into the bottom of the tanks so that the contents of the tanks can be heated to control viscosity during loading and unloading viscosity of oils that may require heating. All of the tanks will be equipped with mixers to prevent crude oil from stratifying during storage.

Each tank will have a fixed roof to keep precipitation from reaching the inside of the tank and an internal floating roof with dual seals to control vapor emissions to the atmosphere. The floating roof will be designed to avoid tipping during operations.

The double-bottomed tanks will include a leak detection system between the tank floors, and will be cathodically protected to prevent corrosion.

Containment Berm

The tanks will be enclosed by a containment berm approximately 6 feet in height. The containment area will be designed with a capacity at least equal to 110 percent of the volume of the largest tank plus precipitation from a 24-hour, 100-year storm event. This capacity reflects the most stringent of Washington spill prevention and control and National Fire Protection Association (NFPA) requirements and exceeds the requirements for secondary containment under 40 CFR 112.7. The 18-inch-high intermediate berms will be installed within the larger area to separate each tank area from the larger containment area.

The entire tank containment area will be lined with an impervious membrane to prevent any spills from leaving the containment area via the ground. Figure 2.3-11 illustrates a typical cross-section of the berm wall and liner system. Stormwater collected in the bottom of the berm will gravity-drain to the berm area sump. The sump will house three pumps to convey the stormwater through a treatment system before it discharges to the existing Port stormwater system. Treatment will consist of a hydrodynamic separator, an oil-water separator, and finally a water quality vault. Prior to pumping water out of the sump to the treatment and stormwater system, a visual inspection will be conducted to detect the presence of an oil sheen. If no oil sheen is detected, the sump pumps will be started manually; the pumps will shut off automatically when

[3] Although the tanks could hold approximately 360,000 bbl, in actual operation internal floating roof tanks are never completely full. The working capacity of the tanks is slightly lower than the total capacity to reflect the maximum volume that each tank will actually hold during operation.

the low level is reached. If oil products are identified through visual inspection, the sump will be emptied to vacuum trucks, and the oily water disposed of or recycled off site at a permitted location. The stormwater collection and treatment system is described in additional detail in section 5.2.

Tank to Dock Product Conveyance Pumps

Crude oil stored in the tanks will be pumped to the dock for transfer to a ship or barge. Four variable speed pumps will pump the crude, with three pumps in operation and one on standby. The pumps will be housed in the tank storage pump basin located on the west side of the storage tank area; the basin will measure approximately 58 by 58 feet square and 12 feet deep. It will be equipped with two sump pumps to evacuate any stormwater that collects in it. Stormwater evacuated from the pit will be routed through the treatment and discharge system associated with the containment berm sump described above.

E-Houses, Transformer, Air Compressor, and Fire Pump and Foam Building

The following elements will be located along the west side of the Storage Area (see Figure 2.3-10), and will provide support to storage operations.

The storage and pumping of crude oil to vessel loading in Area 400 operations will be controlled from a control room/E-house. The integration of the control functions of this E-house is described in detail in section 2.3.6.1 below. This E-house will have a footprint of approximately 1,250 square feet and will be single story.

Two transformers will regulate electrical output to the storage area. Both will be pad-mounted on approximately 210-square-foot concrete pads.

A fire foam skid and fire water pump house will contain an emergency fire pump and fire protection systems associated with the storage operations. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The fire foam skid will have a footprint of approximately 180 square feet; the fire water pump house will have a footprint of approximately 325 square feet and will be single-story. Fire suppression systems associated with the unloading building are described in detail in section 4.1.3.4.

A building will house a primary and a standby natural gas fired boilers, each with a capacity of 13.2 million British thermal units per hour (MMBTU/hr) to provide steam (one boiler operating) for the heating of two storage tanks. Boilers will be field-erected with a watertube design, where water circulates through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and radiant heat transfer. Natural gas will be supplied to the boiler buildings from the existing pipeline serving the area. Steam from the boilers will be delivered to the point of use via insulated pipelines. The gas-fired boiler may also provide steam to pipes and ancillary equipment and potential space heating.

The following elements will also be located in Area 400 (see Figure 2.3-11), and will support the marine vessel loading operations. The loading process will be controlled from a control room/E-house. The integration of the control functions of these E-houses is described in detail in section 2.3.7 below. The E-house will be approximately 825 square feet with a maximum height of 15 feet. One transformer will regulate electrical output to the unloading facility. It will be pad-mounted on a 225-square-foot pad. A fire pump and foam building will house an emergency fire pump and fire protection systems associated with the marine terminal. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The single-story building will have an approximate footprint of 750 square feet.

2.3.7 Marine Terminal

Dock Improvements

Crude oil will be transferred to vessels at berths 13 and 14 (Figure 2.3-12). The berths are existing steel pile-supported docks consisting of two concrete decked access trestles and T-docks, four breasting dolphins connected to the trestles by catwalks, and three mooring dolphins. To obtain an optimal mooring configuration and to meet current seismic standards, a number of modifications will be required at the existing dock to accommodate the Facility.

These modifications include in- and overwater construction as follows.

- Remove two mooring dolphins and two breasting dolphins, including forty-seven 18-inch steel pipe piles, eight 12-3/4-inch steel fender piles, and approximately 1,330 square feet of existing concrete pile cap.
- Remove approximately 3,250 square feet of grated walkway associated with the existing breasting dolphins to be removed. One existing 18-inch steel pipe pile supporting the walkways will also be removed.
- Install four new 27-foot-diameter mooring dolphins (approximately 2,140 square feet combined new, solid overwater coverage), including 40, 36-inch steel pipe piles.
- Add four to eight 24–inch steel pipe piles to the Berth 13 dock platform.
- Add sixteen 24-inch steel pipe piles (all below the ordinary high water mark [OHWM]) to existing bents at Berth 13 access trestle.
- Add six to twelve 36-inch steel pipe piles at the existing trestle abutment at Berth 13, all above the OHWM, including pile cap modifications resulting in an additional 192 square feet of overwater coverage.
- Install structural connection framing consisting of two 24-inch-diameter steel pipes between the Berth 13 platform and the adjacent upstream and downstream breasting dolphins, totaling 920 square feet. Install grated walkways on top of one of the steel pipes adding approximately 690 square feet of new grated walkways (beyond the pile footprint). Install two 24-inch steel pipe piles to support the structural framing system.
- Add approximately 4,035 square feet new grated walkways between mooring and breasting dolphins with four 24-inch steel piles to support the walkways. The existing grated walkways may be reused.

Mooring and Breasting Dolphins and Walkways

The project will remove two existing mooring dolphins and install four new mooring dolphins. The existing mooring dolphins are supported by a combined total of 23, 18-inch-diameter steel pipe piles. One of the existing mooring dolphins that will be removed is located in relatively shallow water, at an elevation of approximately +3 feet CRD. The new mooring dolphins will be located in water depths ranging from approximately -4 feet to -17 feet CRD. Each new mooring dolphin will consist of up to ten 36-inch-diameter steel piles supporting a 27-foot-diameter, cast-in-place concrete pile cap and mooring equipment. The mooring system will incorporate a load monitoring system for the physical tensioning of the mooring lines so that they operate within optimum design considerations and do not stress or break while a vessel is berthed. The new mooring dolphins will be connected to the main structure of the dock by approximately 5-foot-wide grated walkways to allow safe access during vessel mooring; each walkway will be supported by a single 24-inch-diameter steel pipe pile.

Two existing breasting dolphins at Berth 14 will be removed, along with approximately 650 linear feet of existing 5-foot-wide steel grated walkways. The grated walkways that are

removed will mostly be reused and reinstalled if they are determined to be structurally appropriate. The existing breasting dolphins are supported by a combined total of twenty-four 18-inch-diameter steel pipe piles. One section of the walkway is also supported by a single 18-inch-diameter steel pipe pile, which will also be removed.

The existing grated walkways that connect the breasting dolphins east and west of the Berth 13 dock will be replaced with structural framing to physically connect the structures. This framing will be an open design element (not solid) consisting of two interconnected 24-inch pipes. This framing will result in an additional 920 square feet of overwater shading. A length of 5-foot-wide grated walkway will be aligned over one of the pipes. The east span framing will be supported on two 24-inch-diameter steel pipe piles.

Dock design has also taken into consideration worker safety during loading operations by ensuring that access to and from the shore was provided in two separate locations. The dock will include two egress points (one at each of berths 13 and 14) so that all mooring points are accessible by catwalk. Catwalks will be designed to a minimum of four feet wide to assist with emergency evacuations.

Berth 13 Access Trestle

The bents supporting the Berth 13 access trestle will be supplemented with piles for structural support to meet seismic provisions of current building code. The abutment (above the OHWM of the Columbia River) will be supplemented with six to twelve 36-inch-diameter steel pipe piles, while the waterward bents will be supplemented with two or four 24-inch-diameter steel pipe piles at each bent, depending on location. A total of 22 to 28 new piles will be installed to reinforce the trestle, with 16 of these new piles located below the OHWM. To incorporate the new pipe piles at each bent, an additional 192 square feet of shading will result from new concrete pile cap. Additionally, the central platform at the end of the Berth 13 trestle will be supplemented with four to eight 24-inch-diameter steel pipe piles.

In order to drive piles within the footprint of the existing platform, the concrete topping and precast concrete deck panels will be removed to provide sufficient clearance to drive the piles, then reconstructed with cast-in-place concrete.

Dock-Side Loading Equipment

Piping, jib cranes, a moveable gangway, an observation and control platform, dock safety unit, pipe trays, skiff, containment, boom reel, and lighting will be installed on the existing dock that serves berths 13 and 14.

The two 24 to 36-inch pipelines and return line from the Storage Area will be located on the trestle where they will connect with a manifold on the dock. High velocity hoses supported by cranes or a pulley system will be connected to the manifold and used to transfer the crude oil from the piping system to the vessel being loaded. The high velocity hoses will be connected to the grounding grid to protect against the buildup of static electricity. The loading system will incorporate automatic shutoff valves with a maximum 30-second shutoff time. The pipelines serving the dock will undergo annual hydrostatic testing as required by federal standards. A catchment and sump will be constructed at or below the deck level for the containment of inadvertent releases in addition to stormwater that may fall in the catchment area. The containment will be discharged within 1 hour of completion of any transfer by pumping into the return line.

A fence boom will be placed between the vessel location and the shoreline. Floating booms will be deployed after a vessel is at the berth and will connect with the fence boom on the downstream and will be open on the upstream end due to currents.

Marine Vapor Combustion Unit

Marine vessels will generally arrive at the berth empty with inert (nonexplosive) gases occupying the tank. When the vessel tanks are filled with crude oil, the vapors from previous cargo, vapors from the crude being added to the tank, and the inert gases will be forced from the tank. These vapors will be sent to the MVCU system, which will combust the hydrocarbons in the vapors. Piping from the dock will convey the vapors to the MVCUs located north of the access trestle and roadway. Up to eight units will be installed on a 100- by 50-foot concrete slab housing equipment including eight 8-foot-diameter steel stacks approximately 25 feet in height. The MVCU is described in more detail in section 2.12 and 5.1.

2.3.8 Area 600 – West Boiler

The Area 600 West Boiler Building will be located west of the Administration and Support Buildings. This building will have a footprint of approximately 6,000 square feet, and will be approximately 45 feet high. The building will house two primary and one standby natural gas-fired boilers, each with a capacity of 62 MMBTU/hr, to provide up to steam (two boilers operating) for the heating of tank cars during unloading. Boilers will be field-erected with a watertube design, where water circulates through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and radiant heat transfer. Natural gas will be supplied to the building from the existing pipeline serving the area. Steam from the boilers will be delivered to the point of use via insulated pipelines. The gas-fired boiler may also provide steam to pipes and ancillary equipment and potential space heating.

Boiler System Water Treatment

Potable water from the City will be treated with a standard commercial water softener arrangement. The softened water will then be treated, as needed, with a scale inhibitor similar to Nalco NexGuard 22310, a corrosion inhibitor similar to Nalco Tri-Act 1820, and an oxygen scavenger similar to Nalco 1720. The pH will be adjusted, as needed, using a product similar to Nalco 8735.

Boiler Blowdown Pretreatment

Boiler blowdown will not be treated other than to reduce its temperature below 140ºF prior to discharge into the sanitary sewer system.

2.3.8.1 Control Systems

The primary and secondary control systems of the Facility will manage the flow of product from the unloading facility to the storage tanks and finally to the marine loading facility and control the facility fire protection systems. The primary control system will be located in the E-houses constructed adjacent to the rail car unloading elements. The primary control system will monitor and control the tank car unloading operations and transfer of the product to the storage tanks. The secondary control system will be located adjacent to the dock. This system will control the flow of product from the storage tanks to the marine loading system. The primary control system will be able to override the secondary system. An additional E-house will control the operations of the Area 300 Boiler Building and the adjacent facilities supporting storage operations. Separate fire suppression control and gas detection systems will be provided at areas 200, 300, and 400.

2.3.9 Decommissioning

The project is designed for an anticipated lifetime of 20 years. At the end of the term of the lease, the Port will own the improvements on the lease areas. The Port has the option to request the removal of all or none of the improvements unless mutually agreed to at the time. Based on the nature and extent of removal or retention, the Applicant may pursue an amendment to the Site Certification or if the site no longer operates in such a manner to trigger the need to terminate the agreement as authorized by WAC 463-66-20.

In accordance with WAC 463-72 040, at least ninety days prior to the beginning of site preparation, the Applicant will provide an initial site restoration plan to EFSEC which addresses site restoration occurring at the conclusion of the plant's operating life, or in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will parallel a decommissioning plan, if such a plan is prepared for the project. The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated. It will describe the process used to evaluate the options and select measures that will be taken to restore or preserve the site or otherwise protect all segments of the public against risks or danger resulting from the site. The plan will include a discussion of economic factors regarding the costs and benefits of various restoration options versus the relative public risk and will address provisions for funding or bonding arrangements to meet the site restoration or management costs. The provision of financial assurances will include evidence of pollution liability insurance coverage in an amount justified for the project, and a site closure bond, sinking fund, or other financial instrument or security in an amount justified in the plan.

Should the Applicant seek a termination of the Site Certification Agreement at the end of the facility lifetime, in accordance with WAC 463-72-050 the Applicant will submit a detailed site restoration plan within ninety days from the time EFSEC is notified of the termination. The detailed site restoration plan will address the elements required to be addressed in WAC 463-72-040, in detail commensurate with the time until site restoration is to begin.

2.3.10 Capital and Construction Costs

The total estimated capital cost of the Facility will be approximately $110 million, which includes both capital and construction costs.

Section 2.4 – Energy Transmission Systems

WAC 463-60-155
Proposal – Energy transmission systems.

The application shall identify the federal, state, and industry criteria used in the conceptual design, route selection, and construction for all facilities identified in RCW 80.50.020 (6) and (7), and shall indicate how such criteria are met.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-155, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 83-01-128 (Order 82-6), § 463-42-155, filed 12/22/82. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-155, filed 10/8/81. Formerly WAC 463-42-240.)

Section 2.4 Energy Transmission Systems

As noted in WAC 463-60-155, the definitions from RCW 80.50.020(6) and (7) are for "Certification" and "Construction" but neither applies directly to this WAC. Prior to the reorganization of the definitions to alphabetical order, RCW 80.50.020(6) defined "Associated Facilities" and RCW 80.50.020(7) defined "Transmission facility."

Associated Facilities is now defined by RCW 80.50.020(4) as:

> *'Associated facilities' means storage, transmission, handling, or other related and supporting facilities connecting an energy plant with the existing energy supply, processing, or distribution system, including, but not limited to, communications, controls, mobilizing or maintenance equipment, instrumentation, and other types of ancillary transmission equipment, off-line storage or venting required for efficient operation or safety of the transmission system and overhead, and surface or subsurface lines of physical access for the inspection, maintenance, and safe operations of the transmission facility and new transmission lines constructed to operate at nominal voltages of at least 115,000 volts to connect a thermal power plant or alternative energy facilities to the northwest power grid. However, common carrier railroads or motor vehicles shall not be included.*

"Transmission Facility" is now defined by RCW 80.50.020(21) as:

> *'Transmission facility' means any of the following together with their associated facilities:*
>
> *(a) Crude or refined petroleum or liquid petroleum product transmission pipeline of the following dimensions: A pipeline larger than six inches minimum inside diameter between valves for the transmission of these products with a total length of at least fifteen miles;*
>
> *(b) Natural gas, synthetic fuel gas, or liquefied petroleum gas transmission pipeline of the following dimensions: A pipeline larger than fourteen inches minimum inside diameter between valves, for the transmission of these products, with a total length of at least fifteen miles for the purpose of delivering gas to a distribution facility, except an interstate natural gas pipeline regulated by the United States federal power commission*

The Facility does not involve the construction of facilities that connect the Facility with an existing energy supply nor does it involve the construction of pipelines with a length of more than 15 miles for product transmission. Pursuant to WAC 463-60-115, the Applicant requests a waiver of the application requirements of WAC 463-60-155.

Section 2.5 – Electrical Transmission Facilities

WAC 463-60-160
Proposal – Electrical transmission facilities.

(1) Prior to submitting an application for site certification for an electric transmission facility under RCW 80.50.060(3) an applicant shall follow the procedure as set in Chapter 463-61 WAC.

(2) An application for an electric transmission facility shall include the information required by this chapter unless the requirement may not be applicable to such a facility.

(3) An application for an electrical transmission facility shall include the results of any preapplication negotiations including any agreements between the applicant and cities, towns, or counties where the electrical transmission facility is proposed to be located.

(Statutory Authority: Chapter 80.50 RCW and RCW 80.50.040. 09-05-067, § 463-60-160, filed 2/13/09, effective 3/16/09.)

Section 2.5 Electrical Transmission Facilities

RCW 80.50.060(3) reads as follows:

> *(3)(a) The provisions of this chapter apply to the construction, reconstruction, or modification of electrical transmission facilities when:*
>
> *(i) The facilities are located in a national interest electric transmission corridor as specified in RCW 80.50.045;*
>
> *(ii) An applicant chooses to receive certification under this chapter, and the facilities are: (A) Of a nominal voltage of at least one hundred fifteen thousand volts and are located in a completely new corridor, except for the terminus of the new facility or interconnection of the new facility with the existing grid, and the corridor is not otherwise used for electrical transmission facilities; and (B) located in more than one jurisdiction that has promulgated land use plans or zoning ordinances; or*
>
> *(iii) An applicant chooses to receive certification under this chapter, and the facilities are: (A) Of a nominal voltage in excess of one hundred fifteen thousand volts; and (B) located outside an electrical transmission corridor identified in (a)(i) and (ii) of this subsection (3).*
>
> *(b) For the purposes of this subsection, "modify" means a significant change to an electrical transmission facility and does not include the following: (i) Minor improvements such as the replacement of existing transmission line facilities or supporting structures with equivalent facilities or structures; (ii) the relocation of existing electrical transmission line facilities; (iii) the conversion of existing overhead lines to underground; or (iv) the placing of new or additional conductors, supporting structures, insulators, or their accessories on or replacement of supporting structures already built.*

The Facility will not generate or transmit electricity, pursuant to WAC 463-60-115, nor will it construct transmission facilities as defined under RCW 80.50.060(3). The Applicant requests a waiver of the application requirements of WAC 463-60-160.

Section 2.6 – Water Supply System

WAC 463-60-165
Proposal – Water supply.

1) Water intake and conveyance facilities. The application shall describe the location and type of water intakes, water lines, pipelines and water conveyance systems, and other associated facilities required for providing water to the energy facility for which certification is being requested.

(2) Water supply and usage alternatives. (a) The applicant shall consider water supply alternatives, including use of reclaimed water, water reuse projects, and conservation methods. The application shall describe all supply alternatives considered, including the associated cost of implementing such alternatives, and the resulting benefits and penalties that would be incurred. (b) The application shall include detailed information regarding using air cooling as an alternative to consumptive water use, including associated costs. (c) The application shall describe water conservation methods that will be used during construction and operation of the facility.

(3) Water rights and authorizations. An applicant proposing to use surface or groundwater for the facility shall describe the source and the amount of water required during construction and operation of the energy facility and shall do one or more of the following: (a) Submit a water use authorization or a contractual right to use water supplied by a municipal corporation or other water purveyor; or (b) Submit a water right permit or water right certificate issued by the department of ecology for the proposed facility in an amount sufficient to meet the need of the facility. If the permit and/or certificate has been issued five years prior to the submittal date, the applicant shall provide evidence that the water right permit is in good standing, or that the certificate has not relinquished through nonuse; or (c) For applications for new surface or groundwater withdrawals, or applications for water right changes or transfers of existing rights or certificates for withdrawal, the applicant shall submit appropriate application(s) for such rights, certificates or changes in rights and certificates, to the department of ecology prior to submittal of the application for site certification to the council. The application for site certification shall include report(s) of examination, identifying the water rights, or water right changes, submitted to and under review by the department of ecology, the quantities of water in gallons per minute and acre feet per year that are eligible for change, together with any limitations on use, including time of year. The report(s) of examination shall also include comments by the Washington state department of fish and wildlife with respect to the proposed water right applications under review by the department of ecology. (d) Mitigation. The application shall contain a description of mitigation proposed for water

supply, and shall include any and all mitigation required by the department of ecology pursuant to the review of water rights or certificates, or changes to water rights or certificates required in (c) of this subsection.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-165, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-165, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-165, filed 10/8/81. Formerly WAC 463-42-400.)

Section 2.6 Water Supply System

The Facility will require potable water for domestic purposes, process water, and emergency fire suppression water. All water required for the Facility is proposed to be obtained from the City's water utility. The Facility will connect to the City's existing water distribution network and construct necessary water service connections.

2.6.1 Water Intake and Conveyance Facilities

The City's existing water distribution facilities are adjacent to or located on the site. The Facility's water service will be connected to the City's existing distribution network in accordance with the City's water design and construction requirements. Necessary water metering and cross-connection control will be installed at each of the connection locations between the on-site water facilities and the public water distribution system. Multiple water service connections will be constructed because of the multiple discontinuous areas that are part of the project.

The project will not require the development of new water sources. The City currently has water rights for 108 million gallons per day (mgd) and has developed supply capacity (without storage) of 80.6 MGD. The City's water supply is obtained entirely from groundwater sources using 40 existing wells spread across 72 square miles. Online system storage includes approximately 24.5 million gallons which equates to roughly 11 hours of maximum day demand. Current peak demand is approximately 55 mgd (Tyler Clary, City of Vancouver, Personal Communications, August 12). The City has provided a letter confirming that its supply and distribution system has sufficient capacity to accommodate the project. The letter is included in Appendix E.

2.6.2 Water Supply and Usage Alternatives

A brief review of available water supplies compared the City's and the Port's water systems. Both provide potable-quality water. Both obtain water from local aquifers, provide water treatment, and have storage facilities. However, the Applicant selected the City as the water supplier for the project. The City's system provides source supply, storage, and distribution system redundancy. A portion of the City's water system is shown in Figure 2.6-1.

Water reuse is included with the water treatment system and package boiler units described in section 2.6.4. The boiler plants proposed consist of a closed loop system in which a maximum 10 percent of the total boiler water is blowdown or lost to the atmosphere during condensation; the remaining 90 percent is reused in each steam cycle. The possibility of reusing treated wastewater from the City's Westside Wastewater Treatment Plant (WWTP) located approximately 1 mile east of Area 300 for the required process water was investigated. But because of the need for significant off-site pipeline improvements and additional water treatment to provide suitable process water, this possibility was determined to be infeasible.

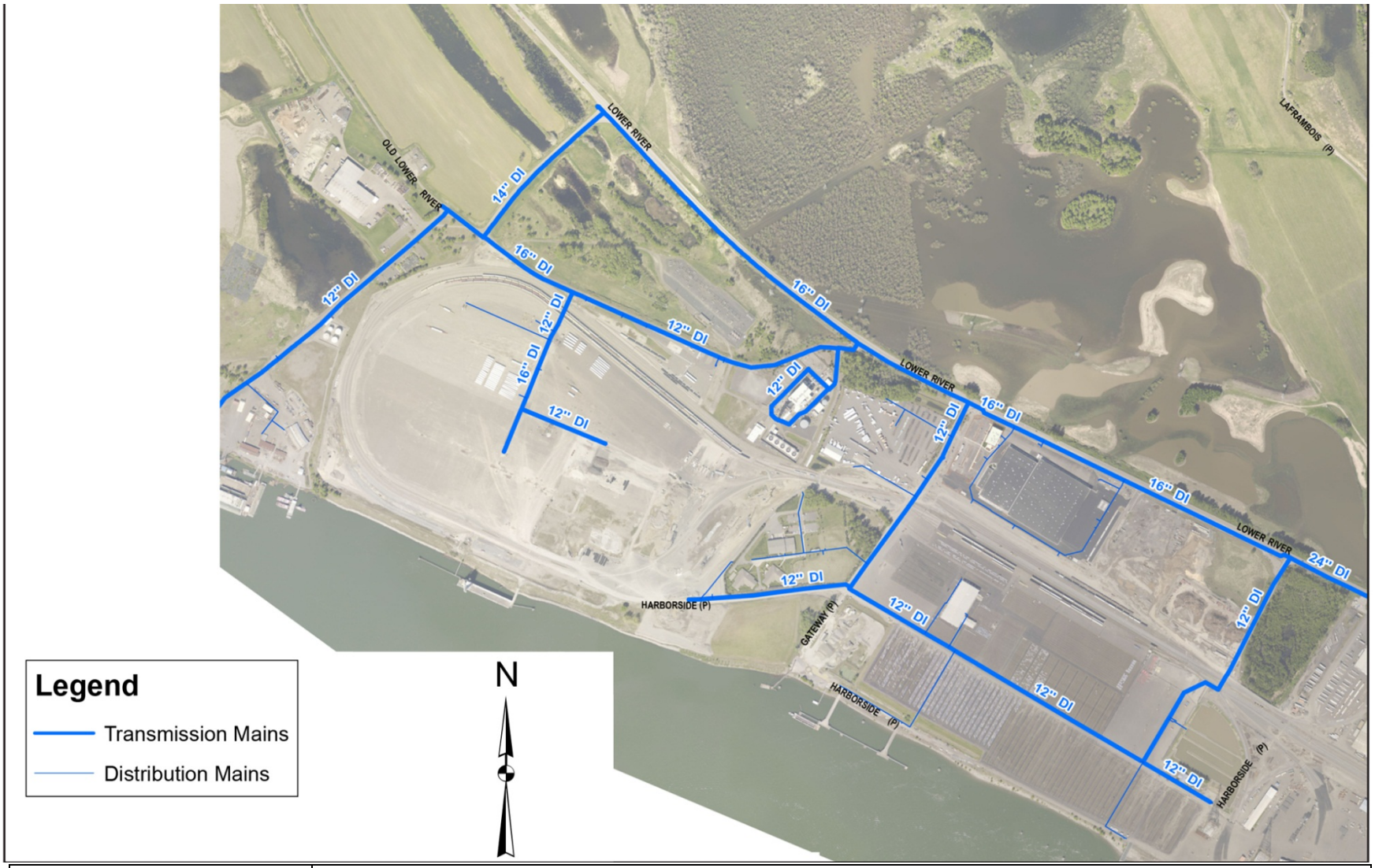

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Figure 2.6-1. Water Transmission Mains

2.6.3 Water Rights and Authorizations

The Facility is not requesting new water rights or authorizations. All water will be acquired from the City water utility. Anticipated annual water use is estimated to be 22 million gallons with a maximum daily water use of 87,400 gallons per day (gpd). A request for utility services was submitted to the City for the Facility. The City indicated in a response letter attached in Appendix E that the City has sufficient supply and distribution system capacity for the proposal.

Construction of the Facility is expected to utilize two 10,000-gallon water trucks per day for a total of 20,000 gallons each day. Testing and commissioning the pipelines, tanks, and water lines will require additional water for pipeline flushing and hydrostatic testing. Testing and commissioning the transfer pipelines and storage tanks will be sequenced to reuse as much testing water as possible on site. Assuming no water reuse, testing and commissioning will require a total of 98.4 million gallons of water. With reuse, a total of 20 million gallons of water is expected to be required for testing and commissioning.

2.6.4 Process Water

Process Industrial processes at the Facility are limited to the transfer and storage of crude oil. Process water for the Facility is limited to the boiler plants, miscellaneous part and equipment wash, and cooling water for the fire suppression pumps.

Two boiler plants, one each in Area 300 and Area 600, will provide steam to heat crude oil within the rail cars and storage tanks. The majority of the process water will be maintained in a closed loop system. However, some process water for the boilers will be necessary for makeup water to replenish the equivalent of steam lost in the system, blowdown water, cooling water, and water treatment. Some steam is lost during the condensate process as the water is returned to the boiler. Blowdown water is used for flushing particulates from the boiler system. Cooling water is used at the outlet of the boiler for temperature pre-treatment. Cleaning water softener used to polish the boiler feed water requires occasional batches of backwash. The total of all process water for the boilers, including all sources of process water, is summarized in Table 2.6-1.

Inside the rail unloading area (Area 200), there is a process water line for the occasional use of a single pressure washer to clean miscellaneous piping fittings, work surfaces, and equipment. At a maximum, the pressure washer will be rated for 5 gallons per minute (gpm). Conservative water use estimates for the miscellaneous part/equipment wash is included in Table 2.6-1.

The Rail Unloading Area, Storage Tanks, and Marine Terminal Areas are protected with emergency fire pumps. The fire pumps selected for this project require a heat exchanger and cooling water supply to maintain operational engine temperatures. A maximum 35 gpm of cooling water supply is required each week for the required 30-minute maintenance cycling. Once a year fire pump flow testing is additionally required. Fire pump cooling water for the maintenance cycling is included in Table 2.6-1.

Table 2.6-1. Process Water Uses and Rates

Industrial Process	Average Water Use (gpd)	Maximum Water Use (gpd)
Area 200		
– Miscellaneous Part/ Equipment Wash	2,400	5,000
– Fire Pump	100	200
Area 300		
– Boiler Building	3,000	3,700
– Fire Pump	100	200
Area 400 – Fire Pump	100	200
Area 600 – Boiler Building	48,400	69,600
Total Process Water	**54,100**	**78,900**

The anticipated maximum day process water demand is approximately 54.8 gpm. Process water will be isolated from the potable water using approved reduced pressure cross-connection control devices. The annual water usage will vary based on the density and viscosity of the raw crude oil, the volume of crude requiring heat and the ambient air temperatures, with lower ambient temperatures requiring higher water usage.

2.6.5 Potable Water

Potable water for the Facility is limited to the amount needed to serve the Administrative and Support Buildings (Area 200), a single restroom inside the Boiler Building (Area 300), and landscape irrigation and will be used predominantly for general kitchen and restroom facilities. A water use consumption rate of 50 gallons per person per day was used for the average, with a 15 percent added for maximum flow. The water use rate of 50 gpd was determined following a review of the Ecology Criteria for Sewage Works Design (sewer design manual) and additional engineering judgment. The sewer design manual lists a maximum of 35 gpd for industrial factory sewer rates in Table G2-2 Design Basis for New Sewage Works. An additional 15 gpd were added because a larger proportion of employees will probably use washbasins and shower facilities.

A total worker population of 110 employees is assumed, with four using the restroom facility at Area 300. The remaining 106 employees are assumed to use the facilities located at the Administrative and Support Building portion of Area 200. Workers will be assigned to Area 400, the Marine Terminal area. Bottled water will be provided for those employees; only irrigation water is included as part of Area 400. Table 2.6-2 shows a breakdown of the potable water uses and rates.

Table 2.6-2. Potable Water Uses and Rates

Potable Water Uses	Average Water Use (gpd)	Maximum Water Use (gpd)
Area 200 – Administrative and Support Buildings	5,300	6,100
Area 300 – Storage Boiler Building Restroom	200	200
Landscaping Irrigation	1,500	2,200
Total Potable Water	7,000	8,500

The maximum daily potable water demand is equivalent to the need for 6 gpm. Potable water use will be isolated from non-potable process water using approved double check cross-connection control devices. The annual water usage will vary based on ambient air temperatures and rainfall, with lower ambient temperatures and higher rainfall requiring less irrigation water usage.

2.6.6 Mitigation Measures

Mitigation measures for the water supply consist of the monetary contribution required by the City for water connections and new services. Service connection fees, system development charges, and industrial water use billing will be paid to the City. Connection fees and system development charges paid at the time of building permit application and application for water service is compensatory mitigation paid to the City for the long-term impacts to water rights, source development, system storage, and distribution piping.

The connection to the City water supply system will be made consistent with standard specifications adopted by the City. Backflow devices will be tested yearly per State requirements.

Section 2.7 – System of Heat Dissipation

WAC 463-60-175
Proposal – System of heat dissipation.

The application shall describe both the proposed and alternative systems for heat dissipation from the proposed facilities.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-175, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-175, filed 10/8/81. Formerly WAC 463-42-430.)

Section 2.7 System of Heat Dissipation

The Facility is not an electrical generating facility, and therefore does not require or incorporate the large heat dissipation systems (i.e., cooling towers or ponds) that are associated with using water or air to cool combustion equipment.

As noted in section 2.3.6, the Facility will be equipped with boilers fueled with natural gas to provide steam used to heat the crude oil in order to facilitate its conveyance during the rail car unloading, storage, and vessel loading operations. The Facility will include two boiler systems: the Area 600 system will include three boilers, each with a rated capacity of 62 MMBTU/hr and the Area 300 system that will include two boilers, each with a rated capacity of 13.2 MMBTU/hr.

Both systems will be field-erected with a watertube design, where water circulates through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot boiler combustion gases and radiant heat transfer. The steam produced through this heating process is circulated in a closed system to the location where the heat carried by the steam is needed, where the steam is released in closed-system manifolds in the heated tank cars and the bottoms of two of the storage tanks. As the steam releases its heat content, the steam condenses, and the water is piped back to the boiler. Excess heat is dissipated with the exhaust gases that exit the boiler building through the vent to the environment; therefore, a heat dissipation system is not required. Small amounts of steam will also be released periodically from the boiler systems. The steam that will be lost to atmosphere from the storage area boiler system will be low pressure steam, and in such quantities that no visual sign of steam loss will be noticeable. The steam that will be lost to atmosphere at the rail unloading area boiler system will be discharged to atmosphere within the rail unloading area and will not result in a visual plume.

To maintain the quality of water used in the closed system, a small amount of water from the closed steam system will be purged from the system and replaced with fresh water treated to the appropriate quality (see section 2.3.6). In order to meet the temperature discharge limits, the blowdown will be cooled by the addition of wastewater generated at the Facility or potable water that is cooler than the discharge.

Section 2.8 – Characteristics of Aquatic Discharge Systems

WAC 463-60-185
Proposal – Characteristics of aquatic discharge systems.

(1) Where discharges into a watercourse are involved, the applicant shall identify outfall configurations including: (a) Location(s) of water discharge pipeline or conveyance system, the outfall, and any associated dilution systems; (b) Average and maximum discharge rate; (c) Extent of the dilution zone if necessary; (d) Width of the receiving water body at the outfall location; (e) Dimension(s), and rated and maximum carrying capacity of the water discharge pipeline or conveyance system, the outfall structure and any associated dilution systems; (f) Depth and width of the receiving water body at the discharge point; (g) Average, minimum and maximum water velocity of the receiving water body at the discharge point, and the times when the maximum and minimum flows occur.

(2) Where discharges are into a water-course via an existing discharge system for which certification is not being sought, the applicant shall also provide the following information: (a) Ownership of the discharge conveyance system; (b) A description of, and the terms and duration contained in, the use agreement that allows the applicant to use the discharge conveyance system; (c) Identification of the party responsible for operation and maintenance of the discharge conveyance system; (d) NPDES or state wastewater discharge permit number for the existing system discharge; (e) Location of connection point into the existing discharge system; (f) Diameter and rated and maximum volume capacity of the wastewater line or conveyance system into which discharge is being proposed; (g) Existing, rated and maximum flow levels in the wastewater line or conveyance system into which the discharge is being proposed; (h) Where a discharge is proposed to a publicly owned treatment works, in addition to the items provided in subsections (1) and (2) of this section, the applicant shall provide an engineering analysis showing that the proposed discharge will not cause the waste treatment facility to exceed capacities or to violate its authorized discharge limits, including both the quality of the discharge and the volume of the discharge, or to violate the permits governing its operation.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-185, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-185, filed 10/8/81. Formerly WAC 463-42-440.)

Section 2.8 Characteristics of Aquatic Discharge Systems

Discharges from the Facility contribute indirectly to downstream aquatic outfalls. All onsite sources of aquatic discharges, including stormwater and wastewater sources, discharge to existing conveyance and treatment systems prior to the eventual release of water to the Columbia River. All of the downstream outfalls are permitted and regulated by Ecology.

2.8.1 Description of Discharge Systems

There are four separate conveyance systems in which discharges are released from the Facility to eventual aquatic discharges. The multiple discharges are directly related to the spread-out nature of the Facility and the boundaries of the existing drainage basins at the Port. The conveyance systems are listed below.

- Terminal 5 stormwater system
- Terminal 4 stormwater system
- Combined Marine Terminal and Subaru lot treatment swales
- Wastewater discharge to City sanitary sewer

A portion of the Facility lease boundary is located within areas determined by the Port to be within its general use area, which the Port defines as areas in which it is not feasible that individual tenants collect and treat their own stormwater discharges. Areas in this Facility that fall under that designation are limited to rail improvements located within the master plan rail corridor, transfer pipeline alignment, and non-pollution-generating rail yard area on the north side of the rail unloading building..

2.8.1.1 Terminal 5 Stormwater System

Stormwater discharging to Terminal 5 is generated from the following Facility locations.

- Area 200 unloading and office
- Portion of Area 500 transfer pipelines
- Area 600 West Boiler
- Rail infrastructure

Stormwater is discharged from the Facility to the Terminal 5 stormwater system in a single location just south of the rail unloading building. Stormwater from the Facility is treated to basic treatment standards prior to its discharge in accordance with the Terminal 5 Western Washington Phase II Municipal Stormwater Permit WAR045201. The Port owns the stormwater conveyance systems and downstream treatment ponds. Stormwater from this connection point flows through a series of minimum 24-inch-diameter manmade conveyance pipelines to a pump station and is pumped to two water quality treatment ponds located west of Terminal 5. The project site discharges approximately 1.09 cubic feet per second (cfs) during a water quality event and approximately 11.39 cfs during a 100-year storm. An outfall is located immediately south of the treatment ponds at latitude 45° 38’ 60” and longitude -122° 44’ 45”.

A master stormwater system plan was prepared for the entire Terminal 5 expansion area by HDR Engineering Inc. and dated May 3, 2012; it is attached to the stormwater report in Appendix F. The conveyance system was sized assuming the entire 91-acre drainage basin is fully impervious at buildout. The report concluded that the conveyance system functions as intended to accommodate the 25- and 100-year storm events.

Stormwater generated on Terminal 5 is currently collected and treated in accordance with the current stormwater regulations and permitted under permit WAR045201. Construction of the additional rail lines will not affect collection or treatment of the stormwater adversely as the facilities in place were previously designed for the entire 91-acre basin. The conveyance pipeline and non-pollution-generating yard area is considered non-pollution-generating. As part of this project, stormwater inlets receiving stormwater from the general use areas in which the Facility is making improvements will be confirmed to have, or will be retrofitted, with spill containment devices.

2.8.1.2 Terminal 4 Stormwater System

Stormwater discharging to Terminal 4 is generated from the following Facility locations.

- Areas 300 storage
- Portion of Area 500 transfer pipelines

Stormwater is discharged from the Facility to the Terminal 4 stormwater system in a single location just south of the Storage Area. In accordance with the Port's Terminal 4 Industrial Stormwater General Permit WAR000424, stormwater from the Facility is treated to enhanced treatment standards prior to its discharge. The Port owns the stormwater conveyance systems and outfall. Stormwater from this connection point flows through a series of 36-inch minimum manmade conveyance pipelines prior to the Columbia River outfall. The project site discharges approximately 3.48 cfs during a water quality event and 20.60 cfs during a 100-year storm. The outfall is located upriver of the Storage Area at latitude 45° 38' 15" and longitude -122° 42' 45".

BergerABAM reviewed the drainage options for Parcel 1A (Storage Area) for the Port in June 2010; a copy of the review is included in the stormwater report (Appendix F). The conveyance system was sized assuming the Parcel 1A and adjacent tenant parcel totaling 44 acres would be fully impervious at buildout. The report concluded that the conveyance system, if designed and installed according to the recommendations of the memo, will function as designed to accommodate the 25- and 100-year storm events.

Stormwater from the general use area of Terminal 4 is currently collected and treated in accordance with the current stormwater regulations and permitted under permit WAR000424. Construction of the conveyance pipeline along the general use area will not impact collection or treatment of the stormwater adversely as the facilities in place were designed for stormwater runoff along the rail corridor. As part of this project, stormwater inlets receiving stormwater from the general use areas in which the Facility is making improvements will be confirmed to have, or will be retrofitted with, spill containment devices. The typical containment device is the installation of a T or 90 degree elbow on the outlet pipe to prevent crude oil from entering the outlet. Final design and maintenance requirements will be completed in consultation with the Port.

2.8.1.3 Combined Marine Terminal & Subaru Treatment & Infiltration Swales

Stormwater discharging to the combined Marine Terminal and Subaru treatment and infiltration swales is generated from the following Facility locations.

- Area 400 Marine Terminal
- Portion of Area 500 transfer pipelines

Stormwater discharged from the Facility to the Combined Marine Terminal & Subaru Treatment & Infiltration Swales will sheet flow across a proposed filter strip abutting the south side of the southernmost swale. The existing treatment and infiltration swales were designed by David Evans and Associates as part of the Port of Vancouver Columbia Gateway – Phase 1 project. The swales current collect and treat the entire 25-acre basin through the pair of northernmost swales which eventually overflow after required treatment into the southernmost swales for infiltration. The project will not add any additional pollution generating surfaces or additional contributing land coverage to the treatment and infiltration swale system. The project site discharges approximately 0.15 cfs during a water quality event and 0.87 cfs during a 100-year storm. There is no outfall for this existing stormwater system.

2.8.1.4 Wastewater Discharge to City Sanitary Sewer

Wastewater discharging to the City sanitary sewer is generated from the following Facility locations and is described in further detail in section 2.9.

- Process water from West Boiler effluent
- Process water from Storage Boiler Building effluent
- Process water from Storage Pump Basin sump pump
- Process water from Storage Fire Pump cooling water
- Domestic sewage from Administrative and Support Buildings
- Domestic sewage from Storage Boiler Building restroom

Wastewater is discharged to the City's sanitary sewer at two locations, one just north of the Administrative and Support Buildings into an existing 18-inch diameter gravity sewer, and a second just south of the Storage Area into an existing 18-inch diameter gravity sewer.

Wastewater is conveyed through the City's conveyance system to the WWTP located approximately 1 mile east of the Storage Area at 2323 West Mill Plain Boulevard. The City owns the conveyance pipeline system, treatment plant, and associated outfall. The treatment plant and outfall are regulated under the Municipal NPDES Individual Permit WA0024350.

The WWTP discharges to the Columbia River, which is designated a Class A receiving water in the vicinity of RM 105. The Columbia River has a special temperature standard of 20 degrees C. Nearby outfalls include Northwest Packing Company (RM 105.1), Great Western Malting (RM 106), Vancouver Marine Park Treatment Plant (RM 110), Vancouver Trout Hatchery (RM 113.5), City of Gresham STP (RM 117.5), and Camas STP (RM 121.2). Ecology approved the most recent mixing zone report in January 1996. A detailed discussion and engineering analysis relating to water body depth, width, maximum and minimum velocities, and a complete mixing zone engineering analysis for surface water quality-based discharge limitations and conformance are included in the previously approved mixing zone study.

A letter confirming conveyance system and treatment capacity from the City has been requested and the City's Industrial Information Form, along with a completed Wastewater Discharge to POTW permit application, have been submitted for City review. Preliminarily, the City reviewed the contents of the pre-application narrative and did not identify capacity restrictions or required offsite improvements for a wastewater flow of approximately 30 gpm (see Appendix I.1). The maximum day wastewater generated from the Facility is approximately 26 gpm. The Applicant has demonstrated that the proposed discharge will not cause the waste treatment facility to exceed capacities or to violate its authorized discharge limits, including both the quality of the discharge and the volume of the discharge, or to violate the permits governing its operation.

Section 2.9 – Wastewater Treatment

WAC 463-60-195
Proposal – Wastewater treatment.

(1) The application shall describe each wastewater source associated with the facility and for each source, the applicability of all known, available, and reasonable methods of wastewater control and treatment to ensure it meets current waste discharge and water quality regulations.

(2) Where wastewater control involves collection and retention for recycling and/or resource recovery, the applicant shall show in detail the methods selected, including at least the following information: (a) Waste source(s); (b) Average and maximum daily amounts and composition of wastes; (c) The type of storage vessel and the storage capacity and duration; and (d) Any bypass or overflow facilities to the wastewater treatment system(s) or the receiving waters.

(3) Where wastewaters are discharged into receiving waters, the applicant shall provide a detailed description of the proposed treatment system(s), including: (a) Appropriate flow diagrams and tables showing the sources of all tributary waste streams; (b) Their average and maximum daily amounts and composition; (c) Individual treatment units and their design criteria; (d) Major piping (including all bypasses); and (e) Average and maximum daily amounts and composition of effluent(s).

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-195, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-195, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-195, filed 10/8/81. Formerly WAC 463-42-470.)

Section 2.9 Wastewater Treatment

Sources of wastewater from the Facility boiler plant effluent (including blowdown, cooling water, and treatment backwash from the two boiler plants), miscellaneous part and equipment wash, fire pump cooling water, and domestic sewage from the Administrative and Support Buildings and the restroom inside the Storage Area boiler building. Most wastewater sources will be connected to the City public sanitary sewer system. Sanitary sewage collected from within the Port area is conveyed to the City's WWTP where it is treated and discharged to the Columbia River under City's NPDES Permit No. WA0024350. All process wastewater discharged from the Facility to the City's sanitary sewer system will undergo pretreatment to ensure compliance with the City's pretreatment program. A copy of the Application for a State Waste Discharge Permit to Discharge Industrial Wastewater to a POTW is included in section 5.2.

2.9.1 Process Wastewater Sources

Sources of process wastewater include the following:

- Feed water treatment effluent from the West Boiler Building and Storage Area boiler
- Blowdown from the West Boiler Building and Storage Area boiler plants
- Blowdown cooling water
- Storage area pump basin sump discharge
- Miscellaneous part and equipment wash water in the rail unloading area
- Fire pump cooling water from the Rail Unloading and Office Area, Storage Area, and Marine Terminal

The boiler plants are expected to produce continuous blowdown, with discharge flow rates fluctuating depending on steam demand. Blowdown temperature at both boiler plants will be lowered to permit allowable levels with a cooling system that utilizes potable water as the coolant. Coolant water will be mixed along with the boiler blowdown. Average and maximum process wastewater steady state flow rates are summarized in Table 2.9-1.

Storage Area pump basin includes a sump pump used to dewater the concrete basin. The basin includes pumps, piping, valving, and appurtenances necessary to transfer crude oil from the product storage tanks to the Marine Terminal and vessel loading area. Waste flows from this basin are calculated assuming (at this time) that the basin is not covered. Average day flows were calculated distributing the annual rainfall total of 38.9 inches per year to determine gpd. Maximum rainfall was calculated using the 100-year storm rainfall event of 4.5 inches per day.

Miscellaneous part and equipment washing will be completed in a designated area located within the Rail Unloading and Office Area. Wash water will be generated from a single 5-gpm pressure washer and will be collected and conveyed to the Unloading Facility Containment Tanks.

The fire pumps must be put through a 30-minute maintenance cycle once a week. Cooling water from the fire pumps will be discharged for the Rail Unloading, Storage, and Marine Terminal Areas to the containment tanks, sanitary sewer, and stormwater system respectively.

Venting from the crude oil drain line will be piped in a continuous loop back through the top of the rail car, capturing all venting condensate within the rail car and/or crude pipelines.

Table 2.9-1. Process Wastewater Sources

Wastewater Stream	Average Daily Flows (gpd)	Maximum Daily Flows (gpd)
Area 200		
– Miscellaneous Part/Equipment Wash	2,400*	5,000*
– Fire Pump Cooling Water	100*	200*
Area 300		
– Boiler Building Effluent	1,600	1,700
– Pump Basin Sump Effluent & Condensate Discharge	600	7,600
– Fire Pump Cooling Water	100	200
Area 400 – Fire Pump Cooling Water	100*	200*
Area 600 – Boiler Building Effluent	16,200	19,900
Sanitary Wastewater Total Process Wastewater	**21,100**	**34,800**
Total Process Wastewater to Sanitary Sewer	**18,500**	**29,400**

* Process water discharged to stormwater system for treatment, or stored on-site and hauled off.

The approximate constituent concentrations in the process wastewater are shown in Table 2.9-2. Boiler blowdown and softener backwash concentrations are based on raw water quality from the City's potable water system and an approximation of the constituent chemical composition of the wastewater based on a preliminary analysis of required pretreatment water polishing and effluent discharge pretreatment. Wastewater discharge concentration standards are based on VMC Chapter 14.10, Pretreatment Ordinance.

Table 2.9-2. Estimated Chemical Makeup of Process Water Discharge

Constituent	Quantity Boiler Blowdown	Softener Backwash	Unit
pH	10.2	8	
Conductivity	1,200	1,000	mmhos
Alkalinity	336	120	mg/L
Hardness	14	500	Mg/L as CaCO3
Polyacrylate	250	0	mg/L
Aluminum	<0.1	<0.1	mg/L
Barium	<0.4	<0.4	mg/L
Boron	<0.1	<0.1	mg/L
Bromide	<0.2	<0.2	mg/L
Cadmium	<0.04	<0.04	mg/L
Calcium	0.5	125	mg/L
Chloride	9.3	6,000	mg/L
Chromium	<0.01	<0.01	mg/L
Copper	4	0.2	mg/L
Iron	2	0.1	mg/L
Lead	<0.2	<0.2	mg/L
Lithium	<0.01	<0.01	mg/L
Magnesium	3	50	mg/L

Constituent	Quantity Boiler Blowdown	Softener Backwash	Unit
Manganese	<0.01	<0.01	mg/L
Molybdenum	<0.1	<0.1	mg/L
Nickel	<1	<1	mg/L
Nitrate	0.8	0.32	mg/L
Nitrite	<0.2	<0.2	mg/L
Phosphorus	1	1	mg/L
Potassium	59	59	mg/L
Silica	150	54	mg/L
Sodium	5,880	6,000	mg/L
Strontium	0.1	0.1	mg/L
Sulfate	15	0.72	mg/L

Additional non-process wastewater may be generated intermittently from the unloading area. Non-process wastewater originating from within the unloading area may include rainwater that enters the building from rail cars and is blown in at the entry and exits, oil and other contaminates dripping off rail cars, and fire retardant foam released by the fire suppression system during routine maintenance. Containment drip pans and secondary containment trenches will be installed between and adjacent to the tracks of the rail car unloading building to capture any spilled oil, rainwater, and fire retardant and direct it to sump pumps installed at low points within each containment trench. The sump pumping system will transfer any collected non-process wastewater to a series of aboveground holding tanks where it will be removed by a vacuum truck or pumped out of the tanks and hauled off site to a licensed and approved disposal Facility.

2.9.2 Domestic Strength Wastewater Sources

Sources of domestic strength wastewater include the following:

- Domestic strength sanitary discharge from the administrative and support buildings
- Domestic strength sanitary discharge from the Storage Area Boiler Building restroom
- Domestic strength sanitary discharge from the Marine Terminal

Domestic strength sanitary wastewater from the Administrative and Support Buildings and Boiler Building restroom will consist primarily of domestic waste from kitchen/break room, restroom facilities, and shower areas. No pretreatment is proposed at these locations. Discharges from both the Administrative and Support Buildings and Boiler Building restroom will be discharged directly to the sanitary sewer. Marine Terminal (Area 400) employees will use portable toilets located at the Marine Terminal. The waste from the Marine Terminal will be hauled off site (see Table 2.9-3).

Table 2.9-3. Domestic Wastewater Sources

Wastewater Stream	Average Daily Flows (gallons per day)	Maximum Daily Flows (gallons per day)
Area 200 – Administrative and Support Buildings	5,300	6,100
Area 300 – Boiler Building (restroom)	200	200
Area 400 – Portable toilets	100*	100*
Total Domestic Wastewater	**5,600**	**6,400**
Domestic Wastewater to Sanitary Sewer	**5,500**	**6,300**

* Domestic wastewater stored on-site and hauled off.

2.9.3 Process Wastewater Treatment Alternatives

Final treatment of all wastewater discharged from the Facility to the public sanitary sewer will be done at the City's existing WWTP. No treatment process modifications at the WWTP will be necessary to accommodate this project. Pretreatment will be conducted on site per the requirements of the City's industrial wastewater pretreatment permit. Process wastewater streams requiring pretreatment include blowdown and condensate discharges from the boiler plants. Pretreatment processes for these waste streams will be designed and furnished by the boiler manufacturer in accordance with industry practices.

2.9.4 Selection of Wastewater Treatment Alternatives

The total discharge amount of the Facility's wastewater flows is not significant when compared to the overall treatment plant flows or capacity. The boiler units and effluent pretreatment systems are standard and therefore a formal alternatives analysis was not necessary for this project. The location of the project within the City's service area and sanitary sewer service basin of the City WWTP eliminates further alternatives analysis. Discharges will be within the City discharge requirements.

2.9.5 Waste Discharge/Water Quality Standards

Maximum wastewater discharges to the City's sanitary sewer system by the Facility will account for less than 0.1 percent of the total treatment capacity of the City's WWTP. The WWTP uses an activated sludge process, UV disinfection, and sludge incineration for treatment, and is rated for a maximum wet weather treatment capacity of 28.26 MGD. Current treatment plant maximum demands listed in the most recent Ecology facility fact sheet dated 2003 is 17.4 MGD. The WWTP is permitted through Ecology and its municipal NPDES Individual Permit WA0024350.

New wastewater sources will be connected to the existing public sanitary sewer via a combination of new gravity and pressure sewer lines. A small sanitary sewer pump station is necessary to convey wastewater from the Area 600 West Boiler Building to the discharge location near the Administrative and Support Buildings. The public sanitary basin to which the Facility discharges contains a single pump station at the southeast corner of the Storage Area.

The City reviewed a pre-application narrative which listed wastewater discharges of 30 gpm and indicated that the City has sufficient wastewater treatment and conveyance capacity to serve the project (Aaron Odegard, City of Vancouver, Personal Communications, July 2013). An Industrial Information Form and copy of the Wastewater Discharge to POTW permit application have been submitted to the City.

Discharges to the City's sanitary sewer system will comply with VMC Title 14.010 Pretreatment Ordinance. The following discharge limits are specified in VMC 14.010.

Table 2.9-4. Required Wastewater Discharge Constituent Limits

Constituent	Daily Maximum Concentration Limit	Instantaneous Concentration Limit	Unit
pH (minimum)	5.5	N/A	-
pH (maximum)	10.0	N/A	-
Arsenic	0.22	0.44	mg/L
Biological oxygen demand	500	-	ppd
Cadmium	0.14	0.28	mg/L
Chromium	7.22	14.44	mg/L
Chromium (hexavalent)	4.28	8.56	mg/L
Copper	3.67	7.34	mg/L
Cyanide	0.47	0.94	mg/L
Hydrocarbon based Oil & Grease	50.0	-	mg/L
Lead	0.44	0.88	mg/L
Mercury	0.008	0.016	mg/L
Molybdenum	0.42	0.84	mg/L
Nickel	0.90	1.80	mg/L
Selenium	0.31	0.62	mg/L
Silver	1.13	2.26	mg/L
Temperature*	104		mg/L
Thallium	0.53	1.06	mg/L
Zinc	1.64	3.28	mg/L

* Temperature of the total influent measured at the treatment plant.

Discharges additionally will comply with VMC 14.010.050 Prohibited Discharge Standards, VMC 14.010.060 National Categorical Pretreatment Standards, and VMC 14.010.070 State Pretreatment Standards.

Section 2.10 – Spill Prevention and Control

WAC 463-60-205
Proposal – Spillage prevention and control.

The application shall describe all spillage prevention and control measures to be employed regarding accidental and/or unauthorized discharges or emissions, relating such information to specific facilities, including but not limited to locations, amounts, storage duration, mode of handling, and transport. The application shall describe in general detail the content of a Construction Phase and an Operational Phase Spill Prevention, Control and Countermeasure Plan (Chapter 40 CFR Part 112 and Hazardous Waste Management Plan) that will be required prior to commencement of construction.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-205, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-205, filed 10/8/81. Formerly WAC 463-42-420.)

Section 2.10 Spill Prevention and Control

This section describes the spill prevention and control measures to be employed at the Facility regarding accidental and/or unauthorized discharges or emissions, especially as they relates to specific proposed Facility components, storage (locations, amounts duration), and modes of product handling from the time the crude oil enters the Facility to the time it is loaded to marine vessels.

The nature of the proposed Facility (offloading from rail, storage, and loading to marine vessels) and the nature of the product handled (crude oil) engender a comprehensive and rigorous regulatory environment for facility design, construction, operation, and spill response contingency planning. Local state and federal programs all regulate spill prevention of the proposed facility and offer significant redundancy in safety protocols for the proposed facility. The cooperation of local, state, and federal agencies, and industry spill response cooperatives has made Washington State a national leader in spill contingency planning and response.

The Applicant will comply with the comprehensive regulatory context regarding Facility design, construction, operation, and contingency planning requirements and its actions will be fully coordinated to meet all applicable local, state, and federal requirements. The Applicant will also implement inspection and training processes to ensure long-term compliance with these requirements. Inspections and training relating to spill prevention and controls will be integrated into the overall day-to-day management of the Facility.

Stormwater protection will also require spill pollution controls – these are addressed separately in Sections 2.11 and 5.3 of this Application.

2.10.1 Regulatory Overview and Applicability

2.10.1.1 Federal Requirements

The federal regulatory structure for spill prevention, control, and contingency planning related to the storage and loading of crude oil to marine vessels has developed over time through the interaction of multiple federal law-making processes. Lawmaking has primarily involved the following three components to address these requirements: the establishment of the National Contingency Plan (NCP), the Clean Water Act (CWA), as amended, and the Oil Pollution Act of 1990 (OPA 90). Appendix B.1 provides a summary of how these three statutes have interacted since their inception to include requirements applicable to oil storage facilities and to oil transfer operations over marine waters, as well as the broader regional contingency planning effort.

Spill Prevention and Control

Section 311(j) of the CWA establishes the spill prevention and control requirements for three categories of facilities: related to transportation, not related to transportation, and complexes. What constitutes transportation-related versus non-transportation-related facilities has been established through a series of executive orders (EOs) and memoranda of understanding (MOUs) (EPA, 2005). Onshore and certain offshore non-transportation-related facilities (and portions of a complex) are subject to the SPCC regulation, provided they meet the other applicability criteria set forth in Section 112.1 of the law. A facility with both transportation-related and non-transportation-related activities is a “complex” and is subject to the dual jurisdiction of EPA, and

USDOT further delegated authority over vessels and transportation-related onshore and offshore facilities to the USCG Commandant.

Per 33 CFR 154.1020, the facility that is the subject of this application is considered a complex subject to both USCG and EPA jurisdiction. The USCG regulates the pier structures, transfer hoses and piping, hose-piping connection, containment, and controls associated with the transfer of oil between a vessel and an onshore facility. EPA regulates the tanks, internal piping, loading racks, and vehicle/rail operations that are completely within the non-transportation portion of the facility. EPA jurisdiction begins at the first valve inside secondary containment.

Transportation-related activities, i.e., transportation of the crude oil by rail to the Facility, and transportation of the crude oil away from the Facility by vessel, are also regulated. USDOT regulates railroad cars from the time the oil is offered for transportation to a carrier until the time that it reaches its destination and is accepted by the consignee. USDOT, through delegation to the USCG, also regulates spill prevention and control related to vessels once they have been loaded and have left the berthing dock. These activities are not part of the Facility and are, therefore, not further addressed in this application.

The following are the federal regulations that address spill prevention and control provisions applicable to the Facility:

40 CFR 110 – Discharge of Oil ("Sheen Rule"), addresses the reporting of spills to the National Response Center.

40 CFR 112 – Oil Pollution Prevention, Subpart A and Subsection 112.8 of Subpart B, address the requirements for an SPCC plan for a non-transportation facility. These subparts apply to the facilities and operations related to offloading crude oil from the rail cars (Area 200); conveying oil to and storing it in the storage tanks (Area 300); and conveying it to the marine vessel loading area (Area 400).

33 CFR 154, Facilities Transferring Oil or Other Hazardous Materials in Bulk, applies to facilities capable of transferring oil to or from a vessel with a capacity of 250 barrels or more. Subparts A through D apply to the design and operation of the vessel loading equipment associated with Area 400.

33 CFR 156, Oil and Hazardous Material Transfer Operations, applies to the transfer of oil or hazardous material on the navigable waters or contiguous zone of the United States to, from, or within each vessel with a capacity of 250 barrels or more.

Spill Contingency Planning

The requirements for spill contingency planning at marine transportation-related (MTR) complexes are divided along similar lines as those described for spill prevention and control above.

40 CFR 112, Subpart D – Response Requirements, addresses contingency planning for non-transportation related facility response plans and associated training and drills; this subpart applies to the equipment and operations related to the unloading of crude oil from the rail cars (Area 200), and its conveyance to, and storage in, the storage tanks (Area 300).

33 CFR 154, Subpart F – Response Plans for Oil Facilities, addresses oil spill response contingency planning for fixed MTR facilities that could reasonably be expected to cause substantial harm or significant and substantial harm to the environment by discharging oil into or

on the navigable waters, adjoining shorelines, or exclusive economic zone (EEZ). In accordance with 33 CFR 154.1015, because the Facility is onshore and has the capacity to transfer oil to a vessel with a capacity of 250 barrels or more, it is considered to be an MTR that, because of its location, could cause substantial harm.

USCG Safety Regulations

33 CFR 154, Subpart E addresses the design, installation, and operation of vapor control systems associated with marine vessel loading operations. These requirements are aimed at ensuring the *safety* of the operations and are, therefore, addressed in section 4.1.4 of this ASC.

2.10.1.2 State Requirements

Both RCW 88.46 Vessel Oil Spill Prevention and Response, and RCW 90.56 Oil and Hazardous Substance Spill Prevention and Response, provide the statutory authority for regulating spill prevention and control, and contingency planning in Washington. These authorities are implemented though the WAC as follows:

WAC 173-180 establishes minimum standards for safe oil transfer operations to meet a zero spill goal established by the legislature. WAC 173-180 applies to all classes of oil handling facilities, including transfer operations involving any size nonrecreational vessel. The facility, meets the definition of a "Class 1 facility" in RCW 90.56.010 and WAC 173-180-025.8 as "Any structure, group of structures, equipment, pipeline, or device, other than a vessel, located on or near the navigable waters of the state that transfers oil in bulk to or from a tank vessel or pipeline, that is used for producing, storing, handling, transferring, processing, or transporting oil in bulk."

WAC 173-182 establishes the requirements for spill contingency planning. The Applicant will be required to prepare and implement a contingency plan because the project meets the definition of a "Class 1 facility." The Facility proposes to only handle Group 2, 3, and 4 persistent oils as defined in WAC 173-182-030 (24) with a specific gravity less than 1 (meaning they will float on water), and an API gravity ranging from 10 to 45. The Facility will not receive, store, or load Group 5 persistent oils, those with a Specific gravity greater than 1.0000 and an API gravity equal to or less than 10.0, which are heavier than water.

Finally, WAC 173-183, authorized by RCW 90.48.366, 90.48.367, and 90.48.368, establishes procedures for convening a resource damage assessment (RDA) committee, preassessment screening of resource damages resulting from oil spills to determine which damage assessment methods to use, and determining damages in cases where the compensation schedule is selected as the damage assessment methodology to apply. This WAC does not directly apply to spill prevention, control, and contingency planning; however, its activities are conducted in coordination with the "potentially liable party," i.e., the person or persons who may be liable for damages resulting from an oil spill.

Table 2.10-1 summarizes the regulations promulgated under these statutes that apply to this Facility.

Table 2.10-1. Summary of Washington State Spill Prevention and Control and Contingency Planning Regulations Applicable to the Facility

WAC, Regulatory Authority, and Federal Regulations Incorporated by Reference	Applicable WAC Requirements	Identification of Primary Compliance Methods
WAC 173-180 **Facility Oil Handling Standards** Regulatory Authority: (1) RCW 88.46.160 and 88.46.165 provide statutory authority for regulating the transfer of oil on or over waters of the state. (2) RCW 90.56.220 provides statutory authority for developing operations and design standards and implementing a compliance program (3) RCW 90.56.230 provides statutory authority for operations manual preparation and review requirements (4) RCW 90.56.220 provides statutory authority for the personnel training and certification requirements (5) RCW 90.56.200, 90.56.300, and 90.56.310 provide statutory authority for the prevention plan preparation and review requirements Federal Regulations Adopted by Reference: 33 CFR 154.300, 33 CFR 154.310, 33 CFR 154.570, 33 CFR 154.710, 33 CFR 154.1050, 33 CFR 154.1055, 33 CFR 155, 33 CFR 156.120, 33 CFR 156.150, 33 CFR 156.170, 40 CFR 109. 40 CFR 112 Subpart F, 49 CFR 195	**Part A – General Requirements** WAC 173-180-010 Applicability WAC 173-180-015 Purpose WAC 173-180-020 Authority WAC 173-180-025 Definitions WAC 173-180-030 Compliance with federal rule or law WAC 173-180-035 Inspections WAC 173-180-040 Recordkeeping WAC 173-180-050 Oil Spills WAC 173-180-055 Work Hours WAC 173-180-060 Personnel Qualifications	• The Facility, meets the definition of a Class 1 facility in RCW 90.56.010 and WAC 173-180-025.8 as "[a]ny structure, group of structures, equipment, pipeline, or device, other than a vessel, located on or near the navigable waters of the state that transfers oil in bulk to or from a tank vessel or pipeline, that is used for producing, storing, handling, transferring, processing, or transporting oil in bulk." • The Applicant will comply with inspection, recordkeeping, oil spill notification, work hour, and personnel qualification requirements.
	Part B – Oil Transfer Requirements WAC 173-180-200 Applicability WAC 173-180-205- Oil Transfer Equipment WAC 173-180-215 Advance Notice of Transfer WAC 173-180-220 Transfer containment and recovery requirements WAC 173-180-221 Rate A Prebooming Requirements WAC 173-180-223 Compliance Schedule for Prebooming and Alternatives for Rate A transfers WAC 173-180-224 Safe and Effective Threshold Determination Reports WAC 173-180-230 Preloading or Cargo Transfer Plan WAC 180-235 Pretransfer Conference WAC 173-180-240 Communications WAC 173-180-245 Oil Transfer Procedures WAC 173-180-250 Emergency shutdown	• The Facility oil transfer equipment will be designed and operated to meet the requirements of equipment protection, operation, and testing. The Applicant will submit an advance notice of transfer (ANT) 24 hours prior to oil transfer operations and will participate in pre-transfer conferences. • The Facility meets the threshold of a "Rate A" transfer operation, with transfer rates exceeding 500 gallons per minute. The Applicant will implement the Rate A pre-booming requirements prior to the beginning of an oil transfer. • The Applicant will prepare a safe and effective threshold determination report for the Facility marine vessel loading area (Area 400) and submit it for review and approval 120 calendar days prior to the first oil transfer operation. • The Applicant will provide safe vessel access. • The Applicant will prepare a transfer plan prior to any oil transfer, and participate in a face-to-face pre-transfer conference with the vessel's person in charge (PIC) • Oil transfers will occur in accordance with the Facility's approved operations manual. • The oil transfer facilities will be equipped with an emergency shutdown that can shut down transfer operations within 30 seconds.
	Part C – Design Standards for Class I Facilities WAC 173-180-300 Applicability WAC 173-180-320 Secondary Containment Requirements WAC 173-180-330 Storage Tank Requirements WAC 173-180-340 Transfer Pipeline Requirements	• The secondary containment berm surrounding the storage area will be designed and constructed in accordance with the requirements of WAC 173-180-320. • The storage tanks will be designed and constructed in accordance with the requirements of WAC 173-180-330, including compliance with NFPA No. 30l, and inspection results will be kept for the service life of the Facility. • Transfer pipelines will be designed, constructed, protected, maintained, and inspected in accordance with WAC 173-180-340.

WAC, Regulatory Authority, and Federal Regulations Incorporated by Reference	Applicable WAC Requirements	Identification of Primary Compliance Methods
	Part D – Operations Manual Requirements for Class I and Class 2 Facilities WAC 173-180-400 Applicability WAC 173-180-405 Class 1 facility- Operations Manual Class 1 facility- Operations Manual Preparation WAC 173-180-430 Class 1 Facility- Operations Manual Review and Approval WAC 173-180-435 Class 1 Facility- Operations Manual Updates WAC 173-180-435 Class 1 Facility- Submitting Operations Manual for re-approval	• The Applicant will prepare, submit for approval, and update/submit for re-approval every 5 years a facility operations manual in compliance with WAC 173-180 400 to -435. • The facility operations manual will be submitted for approval 120 calendar days prior to oil transfer operations.
	Part E – Training and Certification WAC 173-180-500 Applicability WAC 173-180-510 Class 1 Facility Training Requirements WAC 173-180-515- Class 1 Facility Certification Program WAC 173-180-515- Class 1 Facility- Training and Certification Program Approval	• The Applicant will develop and implement oil transfer training for key supervisory, operations, maintenance, management, and indirect operations personnel identified in WAC 173-180-510, and maintain training records for the designated period. • The Applicant will develop and implement a certification program to certify that key supervisory and operations personnel identified pursuant to WAC 173-180-510 have met the Facility's oil transfer training program requirements; the certification program will be submitted for approval 120 calendar days prior to oil transfer operations.
	Part F – Prevention Plans for Class 1 Facilities WAC 173-180-600 Applicability WAC 173-180-610 Plan Preparation WAC 173-180-620 Plan Format Requirements WAC 173-180-630 Plan Content Requirements WAC 173-180-640 Plan Submittal WAC 173-180-650 Plan Review and Approval WAC 173-180-660 Plan Maintenance and Use WAC 173-180-670 Plan Update Timeline	The Applicant will prepare a plan for prevention of oil spills from the Facility into the waters of the state, and for the protection of fisheries and wildlife, other natural resources, and public or private property from oil spills. The Applicant's SPCC plans, operation manuals, and other prevention documents which meet federal requirements under 33 CFR 154, 33 CFR 156, 40 CFR 109, 40 CFR 112, or the federal Oil Pollution Act of 1990 may be submitted to satisfy state contingency plan requirements.
	Part G – Oil Transfer WAC 173-180-700 Applicability WAC 173-180-710 Class 1 Facility Contingency Plans	The Applicant will develop and implement a contingency plan in accordance with WAC 173-182.
WAC 173-182 **Oil Spill Contingency Plan** Regulatory Authority: RCW 88.46.060, 88.46.070, 88.46.080, 88.46.090, 88.46.100,	**Part 1 – Purpose, Authority, Applicability and Definitions** WAC 173-182-010 Purpose WAC 173-182-015 Applicability WAC 173-182-020 Authority WAC 173-182-030 Definitions	The Applicant will develop and implement a contingency plan in accordance with WAC 173-182.

WAC, Regulatory Authority, and Federal Regulations Incorporated by Reference	Applicable WAC Requirements	Identification of Primary Compliance Methods
88.46.120, 88.46.160, 90.48.080, 90.56.050, 90.56.060, 90.56.210, 90.56.240, 90.56.270, 90.56.280, 90.56.310, 90.56.320, 90.56.340, and chapter 316, Laws of 2006, provide statutory authority for the contingency plan preparation and review requirements, drill and response contractor standards established by this chapter for onshore and offshore facilities and covered vessels. Federal Regulations Adopted by Reference: 33 CRF 165 Appendix B; and 33 CFR. 154 Appendix C.	**PART II – Covered Vessel and Facility Oil Spill Contingency Plans** **Section A--General Planning, Information and Timing** WAC 173-182-110 Authority to Submit Contingency Plan WAC 173-182-120 Submitting a contingency plan WAC 173-182-140 Plan Maintenance WAC 173-182-142 Significant changes to approved plans require notification WAC 173-182-145 Plan Implementation Procedures WAC 173-182-150 Post Spill Review and Documentation	The Applicant will submit the contingency plan for review and approval 65 days prior to the planned date for beginning operations. The plan will be resubmitted every 5 years for review and approval.
	PART II – Covered Vessel and Facility Oil Spill Contingency **Section B--Contingency Plan Format and Content** WAC 173-182-210 Contingency Plan Format Requirements WAC 173-182-220 Binding Agreement WAC 173-182-230 Contingency Plan General Content WAC 173-182-240 Field Document WAC 173-182-250 Initial Response Actions WAC 173-182-260 Notification and call-out procedures WAC 173-182-264 Notification requirements for facility spills to ground or containment that threaten waters of the state WAC 173-182-270 Maintain records for response equipment WAC 173-182-280 Spill management teams	The Applicant's contingency plan will be formatted and will contain the content in accordance with the requirements of Section B of WAC 173-182. The plan will be consistent with the Northwest Area Contingency Plan (NWACP).The plan will address initial response actions as well as procedures for advance notice to state emergency management agencies in the event of a discharge or substantial threat of a discharge. The plan will address notification and response actions in response to spills to ground or containment that could threaten the waters of the state. The plan will address the maintenance of response equipment and the availability an organization of spill management teams.
	PART II – Covered Vessel and Facility Oil Spill Contingency **Section C--Planning Standards** WAC 173-182-315 Facility planning standards for non-dedicated work boats and operators WAC 173-182-320 facility planning standards for aerial surveillance WAC 173-182-325 Planning standards for dispersants WAC 173-182-330 Planning standards for in-situ burning WAC 173-182-335 Planning standards for storage WAC 173-182-345 Determining effectiveness of recovery systems WAC 173-182-348 Determining effective daily recovery capacity WAC 173-182-350 Documenting compliance with planning standards WAC 173-182-355 Transfer sites for covered vessels and vessel terminals WAC 173-182-420 Vancouver Planning Standard	The Applicant's contingency plan will address and document planning standards for spill response, including aerial tracking resources, the use of dispersants, in-situ burning, interim storage locations, and the effectiveness and capacity of recovery systems. The Applicant's contingency plan will address specifically how the plan meets the Vancouver planning standard of WAC 173-182-420.

WAC, Regulatory Authority, and Federal Regulations Incorporated by Reference	Applicable WAC Requirements	Identification of Primary Compliance Methods
	PART II – Covered Vessel and Facility Oil Spill Contingency **Section D--Response and Protection Strategies for Sensitive Areas** WAC 173-182-510 Requirements for response and protection strategies WAC 173-182-520 Facility Planning Standards for Shoreline Cleanup WAC 173-182-530 Planning standards for groundwater spills WAC 173-182-540 Planning standards for wildlife rescue and rehabilitation	The Applicant's contingency plan will address how sensitive and public resources will be protected in the event of a spill, and will identify the availability of resources for shoreline cleanup. The plan will address methods to assess and respond to spills affecting groundwater. The plan will identify applicable federal, state, and NWACP requirements for wildlife rescue and rehabilitation.
	PART II – Covered Vessel and Facility Oil Spill Contingency **Section E--Plan Evaluation** WAC 173-182-610 through 640	The Applicant will coordinate with the regulatory agency as needed during the agency's evaluation of the contingency plan.
	PART III – Drill and Equipment Verification Program WAC 173-182-700 Drill participation, scheduling and evaluation WAC 173-182-710 Type and Frequency of Drills WAC 173-182-710 Drill participation, scheduling and evaluation WAC 173-182- 730 Other ways to get drill credit WAC 173-182-740 Drill requirement waivers	The Applicant will conduct drills in the manner and upon the schedule identified in Part III of WAC 173-182.
WAC 173-183 **Oil Spill Natural Resource Damage Assessment** Regulatory Authority: RCW 90.48	WAC 173-183-010 through 920	In the event of a spill, the Applicant will participate in an agency-directed process to assess damages.

2.10.1.3 Local Requirements

Section 14.26 of the VMC protects water resources in the City by establishing development regulations and minimum standards to reduce the risks of contaminants entering water resources. All operations within the City are subject to this ordinance and must meet the minimum design standards of VMC 14.26.120. Table 2.10-2 summarizes the requirements of VMC 14.26, and how the Facility will meet these requirements in the context of the overall spill prevention and control and contingency planning effort required by federal and state requirements.

VMC 14.26.115. B.2. defines special protection areas inside the critical aquifer recharge areas (CARAs) (inside the City boundary) to include property within 1,900 feet of any municipal water supply well. VMC 14.26.135 establishes restrictions in special areas, including the prohibition of new bulk petroleum fuel operations. VMC 14.26.110 defines "Petroleum Fuels" as petroleum-based liquid products that are refined from crude oil specifically for fuel purposes, including but not limited to, all grades of automotive gasoline, aviation gasoline, diesel, heating oils, and kerosene. As part of this application, the Facility does not propose to store "petroleum fuels." In addition, the Facility is not located within 1,900 feet of any municipal water supply well.

Table 2.10-2. Summary of VMC 14.26.120 Minimum Requirements Applicable to the Facility

VMC 14.26.120 Requirement	Method of Compliance
A. Operational best management practices (BMPs): All operations shall adopt the following BMPs to ensure their operations minimize potential risks to water resources.	
1. Precautions: The owner/operator shall take precautions to prevent accidental releases of hazardous materials. Hazardous materials shall be separated and prevented from entering stormwater drainage systems, septic systems, and drywells.	• Facility design • Operations SPCC plan • Spill contingency plan • Individual Industrial Stormwater Permit
2. Hazardous Materials Management: Hazardous materials shall be managed so that they do not threaten human health or the environment or enter water resources.	• Facility design • Operations SPCC plan • Spill contingency plan
3. Hazardous Material Releases: All hazardous materials that have been released shall be contained and abated immediately, and the hazardous materials recycled or disposed of properly. The City shall be notified of any release of hazardous materials that clearly impact water resources, as soon as possible but no later than 24 hours after the release. The [Ecology] Stormwater Manual provides applicable operational BMPs for spills of oils and hazardous substances.	• Operations SPCC plan • Spill contingency plan • Individual Industrial Stormwater Permit
4. Oil/Water Separators: Oil/water separators shall be inspected, cleaned, and maintained as stipulated in the stormwater manual. The City may allow an operation to modify the regularity of cleanouts if the operation can demonstrate to the City's satisfaction that the separator operates effectively at less frequent cleaning intervals.	• Individual Industrial Stormwater Permit

VMC 14.26.120 Requirement	Method of Compliance
5. Pesticide and Fertilizer Management. All pesticides, herbicides, fungicides, and fertilizers shall be applied and managed according to the applicable BMPs for landscaping and lawn/vegetation management in the [Ecology] Stormwater Manual, VMC 20.760 Shoreline Management Area, and VMC 20.740 Critical Areas Protection.	• Individual Industrial Stormwater Permit
6. Stormwater Treatment Systems: Stormwater drainage systems and treatment facilities, including, but not limited to, catch basins, wetponds and vaults, biofilters, settling basins, and infiltration systems, shall be cleaned and maintained by the responsible party designated in VMC 14.25.230 according to the applicable operational BMPs for the maintenance of stormwater, drainage and treatment systems in the [Ecology] Stormwater Manual.	• Individual Industrial Stormwater Permit
8. Operation Closure: At the closure of an operation, all hazardous materials shall be removed from the closing portion of the operation and disposed of in accordance with local, state and federal laws.	• Decommissioning Plan

2.10.2 Facility Design

The Facility will incorporate numerous design elements aimed at preventing the release of product and providing secondary containment of materials that are accidentally discharged so that they do not result in a spill that has the potential to cause harm to the environment or to human health.

Federal and state regulations that apply to handling hazardous materials and crude oil at the Facility, and transferring crude oil over marine waters to a receiving vessel mandate specific requirements for equipment configuration and operation and maintenance. An overview of preventive design elements is provided below.

2.10.2.1 Materials to Be Stored at the Facility

Table 2.10-3 summarizes oils, fuels, and hazardous materials to be stored at the Facility during construction and operation.

Table 2.10-3. Summary of Oils, Fuels, and Hazardous Materials to Be Stored at the Facility

Construction[1]	Operations
• Construction vehicle fuel (e.g., gasoline, diesel, kerosene) • Welding gases • Oil (e.g., transformer, lubricating) • Solvents and thinners • Paints • Antifreeze • Coatings and sealants • Batteries	• Crude oil – 6 tanks (380k barrels (bbl) each) • Mineral spirits – 20 gals • Micro-Blaze (concrete stain remover) – 20 gals • WD-40 – 5 gals • CTI-220 – 110 gals • Simple Green Cleaner – 110 gals • Solvent (parts cleaner) – 20 gals • PB Blaster – 5 gals • Motor oil – 495 gals • Antifreeze – 275 gals • Hydraulic oil – 275 gals • Grease – 520 lbs • Mobile Polyrex EM (grease) – 120 lbs • Ultra-Low Sulfur Diesel – 3 tanks (500 gals each)

Note 1: The list will be finalized when the specific elements of the construction and operations SPCCP are developed.

2.10.2.2 Rail Unloading Facilities

As described in detail in section 2.3 above, crude oil unloading will be accomplished within an entirely enclosed system so that under normal operations, the crude oil never comes into contact with the open atmosphere or unprotected ground surfaces.

Design elements aimed at preventing discharges of oil during unloading will include:

- The use of dry fit connectors on hoses connected to the rail car for unloading. Dry fit connectors require the operator to lock the connector into place to allow product flow to begin. When disconnected, all product on either side of the connector remains within the transfer hose or rail car.
- All conveyance of transferred oil occurs within enclosed piping and pumps.

The unloading area incorporates the following containment systems:

- Containment pans between rails will capture unanticipated leaks from rail cars stationed in the unloading facility and from any unanticipated discharges from the unloading operations.
- Materials captured in the containment pans will drain to a dedicated piping system that will convey the liquids to a series of five secondary containment tanks located in Area 200. The five secondary containment tanks will have a total capacity of 1,000 barrels, enough to contain the 110 percent of the contents of a single rail tank car. Should a discharge to these tanks occur, the contents of the tanks would be transferred to vacuum truck(s) to be disposed of at an approved location off site.
- As noted in section 2.3, piping and pumping systems associated with the unloading area will be contained within concrete trenches and concrete pump basins. These trenches and basins can serve as secondary containment in the event of a release from the piping and pumping equipment. Should a release occur, discharged materials would be removed from the trenches and basins using vacuum truck(s) to be disposed of at an approved location off-site.

- Ground surfaces between rail tracks in the unloading building will be asphalt or concrete to facilitate material recovery in the event of an unanticipated discharge.

2.10.2.3 Aboveground Storage Tanks

Following unloading, crude oil will be conveyed in transfer pipeline to the storage area (Area 300). Design elements aimed at preventing discharges of oil during unloading will include:

- As described in section 2.17, the storage tanks will be designed in conformance with applicable industry standards.
- The storage tanks will be constructed to meet the NFPA 30 requirements of WAC 173-18-330 and associated manufacturing standards, and will include the necessary measures to prevent tank overfill.
- As described in section 2.17, during construction of the tanks industry standard testing techniques will be implemented to ensure the tanks are constructed to the required specifications.
- As described in section 2.3.5, cathodic protection of the tank components will be implemented to prevent corrosion.
- Hydrostatic testing of the tanks will be conducted to ensure they will meet operational stresses and loads prior to their receiving any crude oil.

Design elements related to containing unanticipated discharges will include:

- As described in section 2.3.5, the tanks will be constructed with a double tank bottom, with interstitial monitoring to detect leaks should they occur
- As described in section 2.3.5, constructing the tanks in a fully lined bermed area with the capacity to contain 110 percent of the largest tank and precipitation from a 24-hour, 100-year storm.

2.10.2.4 Transfer Pipelines and Pumping Systems

Crude oil will be conveyed between the unloading area, the storage area, and the vessel marine loading area using a system of transfer pipelines and pumps, as described in section 2.3.4. Design elements aimed at preventing discharges of oil during conveyance will include:

- As described in section 2.17, the transfer pipelines will be designed in conformance with applicable industry standards.
- All conveyance of crude oil will occur in a fully enclosed system.
- Transfer pipelines and the associated pumping systems will be equipped with flow and pressure sensors to identify out of the ordinary operating conditions that could be the result of a pipeline or pump failure and potential risk of crude oil discharge.
- Transfer pipelines will be equipped with valves at the exit of and entry to the unloading area, the storage area, and the marine vessel loading area. These valves will include 30-second shut-offs to stop the flow of product should anomalous flow and pressure conditions related to a product spill occur, or in response to operations personnel triggering the shutoff.
- Transfer piping will be for the most part installed aboveground to facilitate inspections and maintenance. Where road or rail crossings occur, the piping will be housed in underground steel casings or raised aboveground using standard AREMA clearances (see section 2.3.4, Figure 2.3-9 for an illustration of typical road and rail crossings). Pipelines at each railroad,

highway, or road crossing will be designed and installed to adequately withstand the dynamic forces exerted by anticipated traffic or rail loads.

- Transfer pipelines will be coated and cathodically protected to prevent corrosion.
- Sections of transfer pipelines constructed underground will be installed so that they are not in electrical contact with any metallic structures. This requirement will not preclude the use of electrical bonding to facilitate the application of cathodic protection. Tests will be carried out to determine the presence of stray currents and protective measures provided when stray currents are present.
- Transfer pipelines will be equipped with leak detection systems meeting regulatory standards.

Design elements related to containing unanticipated discharges will include:

- Piping systems associated with the unloading of crude oil in Area 200 will be placed in concrete trenches; these trenches can serve as secondary containment in the event of a product discharge. Should a discharge occur in the trench, the materials would be removed by vacuum truck and recycled or disposed off site at an approved location.
- Pumps will be located in concrete basins; the concrete basins can serve as secondary containment in the event of a product discharge. Should a discharge occur in the pump basins, the materials would be removed by vacuum truck and recycled or disposed off site at an approved location.

2.10.2.5 Marine Vessel Loading

As described in section 2.3.5, the trestle at Berth 13 will be equipped with piping and hoses to transfer the crude oil from the transfer pipeline system to the receiving marine vessel. In accordance with 33 C.F.R. § 154.530 a facility transferring oil or hazardous materials to or from a vessel with a capacity equal to or greater than 250 barrels, must have fixed catchments, curbing, or other fixed means for small discharge containment of materials at the hose handling and loading arm area, each hose connection manifold area, and under each hose connection that will be coupled or uncoupled as part of the transfer operation. For this facility, it is anticipated that the hose diameter will be between 6 and 12 inches, requiring that discharge containment capacity must be at least three barrels.

At Berth 13, a catchment and sump will be constructed at or below the deck level of sufficient capacity to hold the small discharge containment in addition to stormwater that may fall in the catchment area. The containment will be discharged within one hour of completion of any transfer by pumping into the return line.

In addition the design elements aimed at preventing discharges of oil during conveyance will include:

- Hoses and their supporting equipment will be designed to meet the applicable hose protection requirements of WAC 173-180 Part B and 40 CFR 156.
- Vessel mooring systems will meet the applicable requirements of 40 CFR 156.

2.10.2.6 Booming

In accordance with the requirements of WAC 173-180, the Applicant will prepare and implement a booming plan. The purpose of the booming plan is deploy booms in advance of each oil transfer to ensure that any materials accidentally discharge to surface water can be contained. A

fence boom will be placed between the vessel location and the shoreline. Floating booms will be deployed after a vessel is at the berth and will connect with the fence boom on the downstream and will be open on the upstream end due to currents.

The Applicant has performed a preliminary review of the booming requirements, and proposes to implement the following state of the art equipment during vessel loading operations:

1. Fence Boom – 1,200-foot total length in 100-foot sections, the fence boom must be 18 inches in height. End connectors will be made of aluminum and be the ASTM Universal Slide connector.
2. Containment Boom – 1,000 feet in length in 100-foot sections, the boom will have 12 inches of freeboard with a 6-inch skirt. The outer fabric will be 26-ounce PVC and the flotation logs will be in 3-foot lengths to accommodate being placed on a reel for deployment and recovery. The end connectors will be made of Aluminum and be the ASTM Universal Slide connecter.
3. Containment Boom – This boom will be 2,000 feet total length in 100-foot sections, the boom will have 12 inches of freeboard with a 6-inch skirt. The outer fabric will be 26-ounce PVC and the flotation logs will be in 6-foot lengths to accommodate being placed in a connex box on shore. The end connectors will be made of aluminum and be the ASTM Universal Slide connecter.
4. Twenty foot Connex – This connex is to store the boom listed in item 3 above and will be placed along the shoreline near the berth for rapid deployment.
5. Aluminum Hydraulic Boom Reel – Reel must be designed large enough to contain 1,000 feet of the contractor boom in item 2. It must be hydraulically controlled for deployment and recovery of the boom. There must be an override on the hydraulic system so boom can be deployed without hydraulic power also.
6. Boat – One boat constructed of aluminum material (minimum of 24 feet in length with at least a 6-foot beam for stability) with 200 horsepower. Tow post must be a minimum of three feet forward of the turning axis to ensure mobility while towing boom. Boat must have center council with a cab to provide weather shelter for crew.
7. Rapid Response Boom – NOFI Current Buster 2 Systems, two each of these systems. Each system will come on a reel in a container on a flatbed trailer towable by three-quarter ton or one-ton pickup truck. Each container will house the reel and the diesel power pack to deploy and retrieve the boom. Each container will house two each portable leaf blowers for inflating the boom as it is deployed. This type of boom is effective in currents up to 5 knots and can contain up to 95 barrels of oil in the separator bag. Figure 2.10-1(a) is an example of a container housing a reel and diesel power pack to deploy and retrieve the boom.
8. Skimmers for Rapid Response Boom – two each 13/30 fuzzy disc skimmers with diesel hydraulic power pack. Skimmer and power pack with the hydraulic hoses and discharge line. Figure 2.10-1(b) is a photograph of this type of skimmer.

BergerABAM	**Figure 2.10-1. Rapid Response Boom Skimmer and Reel**

2.10.3 Spill Prevention, Control, and Contingency Planning

2.10.3.1 Facility Construction

The Applicant will have the overall responsibility for compliance with state and federal environmental regulations during construction. The construction management lead will develop and implement a construction SPCC plan in accordance with 40 CFR 112 for compliance with state and federal environmental regulations. The SPCC plan will be submitted to EFSEC for review and approval prior to beginning construction. The employees of the construction contractor will oversee field activities and coordinate the requirements of the SPCC plan. The contractor will be responsible for inspections, training its employees in spill prevention and control, and, if an incident occurs, for containment and cleanup.

The construction SPCC plan will address responsible personnel, spill reporting, project and site information, pre-existing contamination, potential spill sources, spill prevention and response training, spill report form(s), plan approval, and SPCC plan acknowledgement forms (to be signed by all project personnel).

2.10.3.2 Facility Operations

The Applicant will prepare and implement the following plans to comply with state and federal requirements.

- An operations SPCC plan, prepared under 40 CFR 112 and WAC 173-180, Part F
- A safe and effective threshold determination report, prepared under WAC 173-180-224
- A pre-loading transfer plan according to WAC 173-180-230
- A facility operations manual in compliance with WAC 173-180 400 to -435
- An oil transfer training program in compliance with WAC 173-180, Part E
- A certification program in compliance with WAC 173-180, Part E
- A spill contingency plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F

To comply with this complex regulatory context, the Applicant will prepare coordinated plans to meet all applicable local, state, and federal requirements.

Section 2.11 – Surface Water Runoff

WAC 463-60-215
Proposal – Surface water runoff.

The application shall describe how surface-water runoff and erosion are to be controlled during construction and operation to assure compliance with state water quality standards. The application shall describe in general detail the content of the construction and operational storm water pollution prevention plans that will be prepared prior to commencement of construction and/or operation of the facility.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-215, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-215, filed 10/8/81. Formerly WAC 463-42-330.)

Section 2.11 Surface Water Runoff

2.11.1 Stormwater Erosion Control during Construction

Managing construction stormwater to reduce the discharge of contaminated stormwater runoff requires implementing specific procedures on site before construction activities begin. Additionally, monitoring, maintaining, and overseeing erosion control practices are necessary to ensure strict compliance. Site-specific erosion control plans and a comprehensive stormwater pollution prevention plan (SWPPP) will be submitted to EFSEC before construction.

A preliminary SWPPP is attached as Appendix C. The plan includes a preliminary site-specific erosion and sediment control plan, construction best management practices (BMPs), and construction phase enforcement procedures.

A final SWPPP, which will be submitted to EFSEC prior to construction, will meet the requirements of the NPDES Industrial Permit and State Construction Stormwater General Permit and reflect final construction plans. The final plan also will include provisions for permanent stormwater management as discussed further in section 2.11.2. Once completed and submitted to EFSEC, the implementation of the construction BMPs is the responsibility of the contractor, supervised by the Applicant's resident inspector, and enforced by EFSEC.

Site Construction

Site-specific BMPs for temporary erosion and sediment control are identified in the SWPPP and erosion and sediment control plans. BMPs have been selected from the Stormwater Manual and will comply with the permit issued for the project by EFSEC.

Construction activities will be sequenced and controlled to limit erosion. Clearing, excavation, and grading will be limited to the areas necessary to construct the project. Interim surface protection measures, including dust control, straw matting, and erosion control blankets, will be required to prevent erosion. Final surface restoration will be completed within 14 days of the area's final disturbance.

Sediment control measures used throughout construction will be designed based on a 10-year design storm. Water quality measures (other than sediment removal) will be based on the 6-month, 24-hour design storm. All construction practices will emphasize erosion control over sediment control. Temporary cutoff swales and ditches will be installed to route stormwater to the appropriate sediment trap and discharge location. A summary of construction-related BMPs is provided below.

Table 2.11-1. Construction Source Control BMPs

BMP Devices	Area 200 Unloading & Office	Area 300 Storage	Dock Area 400 Marine Terminal	Pipeline Alignment Area 500 Transfer Pipelines	Area 600 West Boiler	Rail Infrastructure
Silt Fencing	X	X	X	X	X	X
High Visibility Fencing	X	X		X		
Sediment Pond	X	X				

BMP Devices	Area 200 Unloading & Office	Area 300 Storage	Dock Area 400 Marine Terminal	Pipeline Alignment Area 500 Transfer Pipelines	Area 600 West Boiler	Rail Infrastructure
Straw Wattles		X	X	X		
Inlet Protection	X	X	X	X	X	X
Stabilized Construction Entrance	X	X			X	
Temporary Seeding/Mulching		X	X	X	X	
Concrete Washout	X	X				
SWPPP	X	X	X	X	X	X

Water of hydrostatic testing be obtained from the City or Port systems and will be discharged through the onsite stormwater treatment systems for disposal through the existing stormwater systems. Water used for flushing and hydrostatic testing will be tested and treated to removal chlorination of other constituents if necessary prior to its discharge to ensure compliance with discharge limits. Testing water will be released at a controlled rate from onsite storage facilities and monitored to ensure safe conveyance through downstream system.

2.11.2 Permanent Stormwater Management

Existing land cover on the site is primarily gravel or compacted fill material. Vegetation on the site is sparse and is generally limited to short (6 to 8 inches) herbaceous plant material. No wetlands or wetland vegetation are present on the site. The total combined site area comprises approximately 41.5 acres, and the developed impervious area is estimated to be 38.2 acres.

The Port receives approximately 38.9 inches of rain per year measured at the Simmons Rain Gauge located at 16001 N. Simmons Road in Portland, Oregon and maintained by the City of Portland Bureau of Environmental Services as reported by the USGS Oregon Water Science Center. The Ecology stormwater manual requires stormwater to be designed assuming rainfall patterns follow a Type I-A distribution. Permanent stormwater management and compliance with City and Ecology standards require construction of storm drain systems to collect and treat stormwater.

The Facility's new development and redevelopment will comply with VMC Section 14.25 and will be regulated by the City's January 17, 2007 NPDES Western Washington Phase II Municipal Stormwater Permit and the mandatory provisions it incorporates from the 2012 edition of the Ecology stormwater manual. The following table summarizes changes to land coverage resulting from this project.

Table 2.11-2. Drainage Basin Areas

	On-site Drainage Areas				Off-site Drainage Areas	
	Existing Impervious Surface	Replaced or Maintained Impervious Surface	Separated Impervious Roof Runoff	Impervious Surface Converted to Landscaping	Impervious Surface Contributing to Project Drainage System	Replaced Impervious Surface
Area 200 Unloading and Office	8.65 ac	4.07 ac	4.21 ac	0.37 ac	0.06 ac	-
Area 300 Storage	20.85 ac	12.84 ac	6.39 ac	1.62 ac	-	0.17 ac
Area 400 Marine Terminal	1.00 ac	0.90 ac	0.03 ac	0.07 ac	0.08	-
Area 500 Transfer Pipelines	4.47 ac	4.47 ac	-	-	-	-
Area 600 West Boiler	0.46 ac	0.16 ac	0.15 ac	0.15 ac	0.04 ac	-
Rail Infrastructure	4.63 ac	4.63 ac				
Total	**2.21 ac**	**27.07 ac**	**10.78 ac**	**2.21 ac**	**0.18 ac**	**0.17 ac**

The land-disturbing activity that will be carried out by the project will exceed the regulatory threshold of the City's NPDES Phase II permit for application of the standards for water quality treatment. Therefore, minimum requirements 1 through 9 of the Ecology stormwater manual apply to the project. A detailed discussion of compliance with all minimum requirements is attached in the stormwater report in Appendix F.

The project therefore will require compliance with the following standards and regulations.

- Ecology Stormwater Manual
- City of Vancouver Municipal Code (VMC)VMC 14.24, 14.25 and 14.26
- City Surface Water General Requirements (revised September 2009)
- Port Industrial General Stormwater Permit
- Port Municipal Phase II General Stormwater Permit
- 40 CFR 112

The project requires compliance with all nine of the minimum requirements set forth in the Ecology stormwater manual.

2.11.2.1 Source Control BMPs

Operational and structural source control BMPs are designed to exceed the requirements of Chapter 2, Volume IV of the Ecology stormwater manual. Onsite operations, including unloading, pumping, transfer, and storage of crude oil and miscellaneous materials, are conducted in covered facilities designed to keep stormwater from entering the structures and mixing with industrial activities. Transfer of crude oil at the dock is completed with a closed piping system where oil transfer will not be exposed to stormwater. To the maximum extent possible, all industrial activities are protected from stormwater.

Secondary structural containment measures are in place; they consist of rail drip pans along the unloading terminal, double bottom tanks with in situ monitoring for the tank farm, and an impervious lined berm that surrounds the tank farm and is sized to exceed the storage requirements of 110 percent of the largest tank plus a 100-year rainfall event. Secondary containment system at the rail unloading building are conveyed to double-walled storage tanks

located near the office building where the contents will be hauled offsite to permitted disposal or recycling facility. A series of manually controlled pumps that discharge to hydrodynamic separators, oil water separators, and water quality filter vaults evacuate the stormwater contained within the tank farm berm. During storm events, the pumps are manual on, automatic off. Each time, the pumps must be turned on manually, with the manual on switch located where visual inspection for oil sheen is required.

Parking and access areas are designed with a combination of catch basin filters and filter vaults to treat stormwater runoff. Filter vaults are designed to include an oil-water separating baffle for added protection from miscellaneous oil drips.

Maintenance, including equipment and parts wash, will be conducted in a covered portion of the rail unloading building. All wastewater produced will be pumped to the secondary containment tanks.

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. The most likely spill event is small drips resulting from nicks, corrosion pinholes, or gasket seal failures resulting in discharges less than 5 gallons. An example of secondary containment that can address these discharges is to confirm or retrofit all stormwater inlets within the contributory drainage area of the pipeline alignment with spill control devices to contain small oil leaks or spills.

2.11.2.2 Operational Source Control BMPs

In addition, containment drip pans and other containment measures will supplement the structural source control BMPs. A comprehensive site-specific spill prevention control and countermeasures (SPCC) plan will be developed in accordance with 40 CFR 112; a preliminary outline of the SPCC plan is attached as Appendix B.2.

Table 2.11-3. Applicable Structural Source Control & Operational BMPs

Subbasin No.	S411 Landscaping and Lawn/Vegetation Management	S412 – Loading & Unloading Areas	S415 – Maintenance of Public & Private Utility Corridors & Facilities	S417 – Maintenance of Stormwater Drainage & Treatment Systems	S421 – Parking & Storage of Vehicles and Equipment	S422 – Railroad Yards	S425 – Soil Erosion & Sediment Control at Industrial Sites	S426 – Spills of Oil & Hazardous Substances	S427 Storage of Liquids in Permanent Aboveground Tanks	S431 Washing & Steam Cleaning of Vehicles/Equipment/Building Structures
Area 200 Administrative and Support Buildings	X	X	X	X	X			X	X	
Area 200 Rail Offloading Area		X	X	X		X	X	X		X
Area 300 Containment Berm	X			X			X	X	X	
Area 300 & 700 Support Buildings & Parking	X	X	X	X	X		X	X		
Area 400 Marine Terminal	X	X	X	X	X		X	X		

Subbasin No.	S411 Landscaping and Lawn/Vegetation Management	S412 – Loading & Unloading Areas	S415 – Maintenance of Public & Private Utility Corridors & Facilities	S417 – Maintenance of Stormwater Drainage & Treatment Systems	S421 – Parking & Storage of Vehicles and Equipment	S422 – Railroad Yards	S425 – Soil Erosion & Sediment Control at Industrial Sites	S426 – Spills of Oil & Hazardous Substances	S427 Storage of Liquids in Permanent Aboveground Tanks	S431 Washing & Steam Cleaning of Vehicles/Equipment/Building Structures
Area 500 Transfer Pipeline				X				X		
Area 600 West Boiler	X	X		X	X		X			
Rail Improvements				X		X	X	X		

2.11.2.3 Water Quality Treatment Analysis and Design

In accordance with the City's General Requirements, the Western Washington Hydrology Model (WWHM) with a continuous storm event was used to size the stormwater treatment system. Per the General Requirements, the water quality storm is the 6-month, 24-hour event, as estimated using the WWHM. A simplified model for each subbasin was developed in the WWHM 3.0 software. Water quality model results are included in the stormwater report in Appendix F. This estimated peak flow was used to size the stormwater treatment system.

2.11.2.4 Flow Control Analysis and Design

The project discharges to existing Columbia River outfalls through existing manmade conveyance pipelines. This project is categorically exempt from the flow control provisions of the stormwater manual. According to Appendix I-E of the manual, the Columbia River is listed as a flow control-exempt water body.

Conveyance pipelines and structures on site were sized for the 100-year storm to ensure safe conveyance. The pipeline running along the south side of the rail unloading building was additionally analyzed to ensure capacity to convey 1,000 gpm of water entering the system at the extreme west and east ends of the building from the fire suppression systems. Conveyance pipelines were designed using Manning's equation assuming that the pipelines are flowing at 75 percent of capacity. Grade of the proposed pipelines was determined assuming 2.5 feet per second using the 2-year storm event.

2.11.3 Permanent Waterways

All of the permanent surface water runoff will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. All conveyances constructed with this project will be inlets, pipelines, manholes, and vaults. No permanent above-grade surface waterways will be constructed with this project. Surface water runoff from the Storage Area will be treated to enhanced water quality standards and discharged to the existing Terminal 4 stormwater system. The capacity of the Terminal 4 stormwater system was sized to accommodate flows from the Storage Area assuming the entire Parcel 1A was impervious. Discharges will be conveyed through existing pipelines to an existing outfall to the Columbia River.

Discharges from Area 200, Area 600, rail improvements, and portions of Area 500 will be treated to basic levels and discharged to the existing Terminal 5 stormwater system. The Terminal 5 conveyance system flows through manmade conveyance to water quality ponds located west of Terminal 5 for final treatment prior to discharge through an existing outfall to the Columbia River.

Discharges from Area 400 will be treated and conveyed to existing infiltration swales located immediately north of the site. The MVCU, as proposed, may impact approximately 4 percent of the treatment capacity of the bio-swales located immediately south of the Subaru facility. These swales treat water from the 25-acre basin including Subaru, CalPortland, and Marine Terminal Area. To mitigate for loss of treatment capacity of the swale, a new filter strip located along the south side of the southernmost swales will be constructed and will treat stormwater from more than 4 percent of the total basin acreage. No additional stormwater will be infiltrated.

The remaining project, consisting of a portion of Area 500 along the old Gateway Avenue, is considered within the Port's general use area. Stormwater will be collected through existing inlets and a conveyance system and discharged into the Port's stormwater treatment systems at either Terminal 4 or Terminal 5 for treatment prior to discharge through existing outfalls to the Columbia River.

Upland construction activity will not affect any permanent waterways. Existing downstream conveyances, treatment systems and/or infiltration facilities are already receiving stormwater from the Facility areas. See Sections 3.3 and 3.4 for a detailed discussion of design and construction methodologies for dock improvements in relation to protecting and preserving natural waterways.

Section 2.12 – Emission Control

WAC 463-60-225
Proposal – Emission control.

(1) The application shall describe and quantify all construction and operational air emissions subject to regulation by local, state or federal agencies.

(2) The application shall identify all construction and operational air emissions that are exempt from local, state and federal regulation, and the regulatory basis for the exemption.

(3) The applicant shall demonstrate that the highest and best practicable treatment for control of emissions will be utilized in facility construction and operation.

(4) The application shall identify all state and federal air emission permits that would be required after approval of the site certification agreement by the governor, and the timeline for submittal of the appropriate applications for such permits.

(5) In the case of fossil-fuel fired energy plants, the application shall describe and quantify all emissions of greenhouse gases.

(6) In the case of a nuclear-fueled plant, the applicant shall address optional plant designs as these may relate to gaseous emissions.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-225, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-225, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-225, filed 10/8/81. Formerly WAC 463-42-520.)

Section 2.12 Emission Control

The Facility has the potential to emit air pollutants during both construction and operations. During construction, emissions will primarily consist of dust and exhaust from construction vehicles and equipment. During operation, air pollutant emissions will result from the following project components:

- natural-gas fired boilers to provide steam to facilitate transfer of crude oils from rail cars to storage tanks and from storage tanks to vessels;
- MVCU that combust hydrocarbons displaced from vessels as they are filled;
- storage tank evaporative and working losses;
- emergency engines to power firewater pumps; and
- leakage from components.

Air pollutant emissions from these emissions units include "criteria" pollutants designated by the EPA such as nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2), as well as airborne solids and liquids that combine in what is referred to as particulate matter (PM). Volatile organic compounds (VOCs), which are a precursor to the criteria pollutant ozone (O_3), also will be emitted. In addition, emissions will include toxic air pollutants (TAPs), as regulated in Washington under WAC 173-460 and defined in WAC 173-460-150, and hazardous air pollutants (HAPs) as defined and regulated under 40 CFR Part 63. The proposed Facility will utilize a set of best practices and the pollution control equipment to comply with state and federal air quality law.

2.12.1 Regulatory Authority

The authority for air permitting is granted to EFSEC under RCW Chapter 80.50 for crude oil facilities that receive more than an average of 50,000 barrels per day transported over marine waters. This authority is promulgated under WAC Title 463. To address air quality, EFSEC has adopted the provisions of WAC 173-400 (General Regulations for Air Pollution Sources) by reference under WAC 463-78-005.

The federal and Washington clean air acts require new (industrial) stationary sources to obtain the applicable air pollution permits before commencing construction. The permitting process, referred to as new source review (NSR), is used to ensure that the source uses the best available control technology (BACT) to limit emissions and does not cause ambient pollutant concentrations to exceed established standards. Some emission units may have to comply with new source performance standards (NSPS) if they fit the classification for units defined in 40 CFR Part 60.

The air permits required for a source vary depending on its emission potential and location. If the source is located in an area where federal and state ambient air quality standards have not been violated (referred to as an "attainment" area), then the source is subject to the prevention of significant deterioration (PSD) permitting program. If the source is located in a region where concentrations exceed ambient standards, the area is deemed " non-attainment" and the source is permitted under the non-attainment NSR (NNSR) program. The source is considered "major" if the potential-to-emit (PTE) of any one designated pollutant exceeds the PSD threshold for that pollutant. A source can avoid being classified as major by seeking enforceable operations limits in its permit application.

The proposed Facility will be located in a region considered to be in attainment for all criteria pollutants and therefore would be subject to PSD review. However, the region has been in non-attainment in the past and is therefore regulated under regional air quality "maintenance" plans whose purpose is to ensure continued compliance. New stationary sources may therefore be subject to additional requirements set forth in the regional maintenance plans.

Vancouver is designated as a carbon monoxide maintenance area. The region was a carbon monoxide non-attainment region until compliance was demonstrated in 1992; since then, the implementation of a maintenance plan to sustain attainment has been required. The Southwest Clean Air Agency (SWCAA) Section 400-111 rules contain measures for new major stationary sources as part of the maintenance plan. The proposed Facility will not exceed the threshold of 100 tons-per-year of carbon monoxide designated in the plan for major stationary sources and therefore no additional measures are required to comply with the maintenance plan.

Vancouver is also located in an ozone maintenance area and is therefore subject to the Washington state implementation plan (SIP) part of the Portland-Vancouver ozone maintenance plan. The Portland-Vancouver region was declared as "in attainment" for ozone in 2004 and has since required adherence to a maintenance plan. Under the SWCAA Section 400-111 rules, new major stationary sources must offset VOC and nitrogen oxides emissions or may apply to SWCAA for an allocation of the available growth allowance. The proposed Facility will not exceed the threshold of 100 tons per year of VOC or nitrogen oxides designated in the plan for major stationary sources and therefore no additional measures are required to comply with the maintenance plan.

TAP emissions are addressed through NSR as specified in WAC 173-460. All TAPs whose potential emissions exceed the *de minimis* rate must undergo review. If emissions of any TAP exceed the corresponding small quantity emission rate (SQER), dispersion modeling must be conducted to demonstrate that ambient concentrations of that TAP do not exceed a pollutant-specific acceptable source impact level (ASIL). The ASILs, SQERs, and *de minimis* values for each TAP are listed in WAC 173-460-150. Some emission units may need to comply with national emissions standards for hazardous air pollutants (NESHAPs) for unit classes defined under 40 CFR Parts 61 and 63.

Since January 2, 2011, the EPA has regulated the emission of greenhouse gases (GHGs) in the NSR process. GHGs are regulated as a single air pollutant defined as the aggregate of six gases (carbon dioxide [CO_2], nitrous oxide [N_2O], methane [CH_4], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]). Potential emissions are determined by a CO_2 equivalency (CO_2e) that takes into account the potential of each gas to absorb terrestrial radiation through a "global warming potential" weighting factor. Under the PSD tailoring rule for new sources, GHGs require PSD review if 1) the source triggers PSD review for any criteria pollutant and annual GHG emissions exceed 75,000 tons, or 2) the potential annual emissions of GHGs equal or exceed 100,000 tons CO_2e.

Because the Facility would be a new source of air pollutants, under the Clean Air Act (CAA), it must undergo NSR to obtain the applicable air pollution permits before construction begins. The permitting process is used to ensure that the proposed Facility complies with state and federal air quality laws and does not contribute to any future violation of the state and national ambient air quality standards.

Based on the annual emissions identified in section 2.12.2, the proposed Facility is required to apply for and obtain the following permits:

- A notice of construction (NOC) preconstruction permit, as required under WAC 173-400-110, that identifies potential emissions of criteria air pollutants and TAPs; addresses BACT for proposed emission units; and presents an air quality modeling analysis demonstrating compliance with ambient air quality standards and TAP criteria.
- A PSD permit, as required under WAC 173-400-830, addressing BACT for greenhouse gases.
- A Title V air operating permit, as specified under WAC 173-401 and as required for major sources. The application must be submitted within 1 year of commencing operation of the Facility and requires renewal every 5 years.

PSD review is required because the Facility will emit annual amounts of GHGs that are greater than the PSD threshold of 100,000 (CO_2e) and 100,000 tons per year (actual mass). The emissions of all other regulated air pollutants are under the threshold where they must be evaluated under PSD review. The annual emission rate calculations for Facility operations are discussed in detail in section 2.12.2.2.

The Facility includes control equipment to limit emissions of hydrocarbons when the vessels are loaded. The MVCU is composed of components that include a collection system and thermal combustor. The design and operation of such equipment is regulated by the USCG under 33 CFR Part 154. Therefore, approval of the control equipment also must pass review of the appropriate USCG regulatory arm.

2.12.2 Criteria Pollutants

The six common air pollutants, referred to as criteria pollutants, are ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and lead (see section 3.2.1 for an expanded discussion of these pollutants). There is no significant emission source of lead associated with the proposed Facility. Although no significant source of ozone is associated with the Facility, nitrogen oxides and VOCs react in the atmosphere to form ozone and these pollutants will be emitted during Facility operations. The NAAQS address particulate matter in terms of the size fractions PM_{10} and $PM_{2.5}$, which include inhalable particulate matter smaller than 10 microns in diameter and fine particulate matter smaller than 2.5 microns in diameter, respectively. Virtually all the particulate matter generated by the Facility will be PM2.5, and this application refers to all size categories generically as PM. Nitrogen oxide air pollutants include nitrogen dioxide and nitric acid.

2.12.2.1 Construction Emissions

Equipment

Construction equipment includes heavy diesel vehicles, cranes, and generators used for excavation, Facility construction, and paving. Diesel engines emit criteria and TAPs. Diesel engine emissions are regulated under federal standards for mobile sources.

Odor

Intermittent and temporary odors may be discernible off site during construction because of the use of diesel vehicles and because of paving, painting, and other construction activities.

Dust
Fugitive dust emissions generated during construction will be mitigated through compliance with existing nuisance regulations. Common work practices include the application of water to unpaved areas to prevent entrainment of dust. During construction, emissions are also minimized by covering exposed piles, limiting vehicle speed, and other BMPs.

2.12.2.2 Operations Emissions

Boilers
Because some crude oils do not flow easily when cold, the Facility will include natural gas-fired boilers to generate steam for heating rail cars and storage tanks. At the rail car unloading building, three boilers, each with a nameplate heat input capacity of 62 MMBtu/hr, will be installed to facilitate transfer from the rail cars. The unloading boilers are expected to operate throughout the year, but at varying loads dictated by railcar arrival schedules and the viscosity of the crude oil contained in the railcars. Typically, no more than two boilers will operate at any given time, with the third boiler kept as a redundant unit. However, to allow for uninterrupted steam supply, the third boiler may operate for a limited period of time before one of the operating boilers is shut down. The calculation of annual emissions from the unloading boilers was based on the conservative assumption that two of the boilers were assumed to operate at full capacity every hour of the year. This assumption is sufficient to address the occasional startup of the third unit.

Two natural gas-fired boilers, each with a nameplate heat input capacity of 12.5 MMBtu/hr, will be installed to provide steam to heat the crude oil storage tanks. Typically, only one of the storage area boilers will operate at any given time, with the second kept as a redundant unit. However, to allow for uninterrupted steam supply, the second boiler may start up and produce steam for a limited time before the operating boiler is shut down. Annual emission calculations are conservatively based on continuous use of one boiler every hour of the year, but the actual operation will depend on crude oil viscosity and loading schedule. This conservative assumption is sufficient to address the occasional startup of the second unit.

Stationary equipment units associated with the Facility are subject to federal NSPS. Subpart Dc applies to steam-generating units that commence construction, modification, or reconstruction after June 9, 1989, and have a maximum design heat input capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. Subpart Dc will apply to all natural gas-fired boilers at the Facility because each one has a maximum design heat input capacity within the range specified by the standard.

Because these boilers will be fired solely with natural gas, the PM and SO_2 emission standards defined in Subpart Dc do not apply and only the record-keeping and reporting provisions of Subpart Dc apply. These requirements include maintaining records of daily fuel use and occurrence and duration of startup, shutdown, or malfunction; malfunction of control equipment (if any) Boiler emissions will include criteria pollutants and TAPs. The most effective and feasible control equipment options and corresponding emission rates are determined in a BACT analysis for the boilers, attached in Section 5.1, Attachment 1. Boiler emissions are more specifically addressed in Section 5.1.

Crude Oil Storage Tanks

The Facility includes six 360,000-bbl capacity crude oil storage tanks, each with a working capacity of approximately 340,000 bbl These tanks are subject to an NSPS that applies to storage vessels for petroleum liquids (40 CFR Part 60 Subpart Kb). The Facility will comply with Subpart Kb by incorporating the option identified in §60.112b(a)(1): A fixed roof in combination with an internal floating roof that floats on the liquid surface. The tanks will feature an internal floating-roof design with a pontoon-style internal deck. The storage tanks may emit VOCs as fugitive emissions. The most effective and feasible control options for the storage tanks are determined in the BACT analysis, attached in Section 5.1, Attachment 1. Fugitive emissions from the tanks are more specifically addressed in Section 5.1.

Marine Vapor Combustion Unit

Vessels will arrive at the Facility with on-board tanks filled with inert gas with oxygen levels below eight percent. The inert gas consists of cleaned exhaust from dedicated on-board inert gas generators (engines burning ultra-low sulfur distillate). Note that the inert gas is added to the tanks as the cargo is discharged – not at the Facility, which is a loading facility.

When the vessel tanks are filled with crude oil, the vapors from the cargo tanks, made up of hydrocarbon and inert gases, is displaced to a MVCU, which will combust the hydrocarbons in the vapors. In order to ensure adequate destruction of hydrocarbons by the MVCU, the vapor stream must consist of at least approximately 20 percent hydrocarbon. Natural gas will be added if needed to the displaced vapors at the MVCU as an "assist gas" to increase the heating value of the vapors, and ensure adequate destruction.

The MVCU is expected to achieve a least 99.8 percent destruction of the hydrocarbons in the delivered vapors. MVCU emissions are more specifically addressed in Section 5.1.

Emergency Diesel Fire Water Pump Engines

Emergency fire water pumps powered by diesel engines will be used in the event that water is needed to fight a fire within the Facility. Each of the engines will be 225 horsepower (hp) or smaller, and, while specific makes and models have not been selected, emission rates were calculated using emission factors for a 225 hp fire water pump engine that is representative of the units that will be installed. All three engines will be fueled with ultra-low sulfur diesel (ULSD). Planned operation of the units will be limited to half an hour a week for readiness testing and one 8-hour test per year, as specified by the National Fire Protection Association's NFPA 25. Emission rate calculations are detailed in Section 5.1, Attachment 2.

Fugitive Component Leaks

VOC emissions associated with minute vapor leakage from valve seals, pump seals, pressure relief valves, flanges, and similar equipment will occur at the Facility. Emissions from leaks are limited by procedures addressed in the BACT analysis, attached in Section 5.1, Attachment 1. The emission rate calculations for the Facility fugitive component leaks are summarized in Section 5.1, Attachment 2.

Locomotive and Marine Vessel Emissions

Crude oil will be delivered to the Facility by rail for transport by marine vessel. Emissions from locomotives and vessels are not included in the Facility emissions inventory or dispersion

modeling because they are mobile sources powered by off-road engines, and these sources of emissions are specifically exempted from pre-construction permitting.[4]

Odor

Emissions from the boiler units are expected not to cause any significant offensive odors at the Facility or adjacent properties. Odor impacts from natural-gas combustion units are not typically observed, since the methyl mercaptan that gives the gas its odor is destroyed during combustion.

Vessel gases vented to the vapor combustor contain hydrocarbons and reduced sulfur compounds which could contribute to periods of offensive odor if not oxidized in the vapor combustor. The NAAQS for sulfur dioxide (75 ppb) is sufficiently lower than the average detection threshold for sulfur dioxide of 670 – 4,750ppb[5]. Conservative air quality modeling of vapor combustor emissions, included in Section 5.1, demonstrate that the maximum sulfur dioxide concentrations attributable to MVCU emissions do not exceed the odor threshold for sulfur dioxide at any location outside the property boundaries.

Other minor transient odor impacts attributable to diesel-fueled locomotives may occur during operation. These impacts likely will not extend beyond the boundaries of the property and be indiscernible from unrelated industrial and vehicle operations in the vicinity of the Port.

Dust

Fugitive dust emissions during operation are expected to be insignificant because all Facility roads, parking lots, and storage platforms will be paved.

Summary

The projected annual emissions of criteria pollutants from the project units identified in this section are summarized in Table 2.12-1. GHG emissions, discussed in more detail in Section 2.12.4, are included in Table 2.12-1 GHG emissions exceed the PSD threshold of 100,000 tons per year, therefore requiring that the project Facility be designated as a major source for GHGs. Annual emissions of other pollutants relevant to PSD would be emitted at rates below the PSD thresholds, so they are addressed in a minor source permit process.

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[4] See, e.g., WAC 173-400-030(79) ("Secondary emissions do not include any emissions which come directly from a mobile source such as emissions from the tailpipe of a motor vehicle, from a train, or from a vessel."); In re Cardinal FG Company, EPA Environmental Appeals Board PSD Appeal 04-04 (2005) (holding that Ecology correctly concluded that emissions from a captive on-site locomotive are not attributable to the stationary source); Letter from EPA to Ken Waid (Jan. 8, 1990) stating that "to and fro" vessel emissions are not attributable to a stationary source and that when determining PSD applicability you do not consider those emissions "which result from activities which do not directly serve the purposes of the terminal and are not under the control of the terminal owner or operator.")

[5] U.S. EPA Sulfur Dioxide Final Acute Exposure Guideline Levels, May, 2008

Table 2.12-1. Projected Annual Emissions (tons)

	NO_x	CO	SO_2	PM	VOC	CO2e
Storage area boilers	0.60	1.97	0.20	0.41	0.27	6,415
Unloading boilers	5.95	19.47	1.99	4.06	2.70	63,284
MVCU	13.26	5.76	7.02	4.30	8.64	80,191
Components	--	--	--	--	0.82	12
Tanks	--	--	--	--	23.58	261
Firewater pumps	0.01	0.03	0.01	0.00	0.01	14
Total:	19.82	27.24	9.22	8.77	36.02	150,176
PSD threshold[1]	100	100	100	100	100	100,000
PSD SER[2]	40	100	40	10	40	75,000
NOC exemption[4]	2.0	5.0	2.0	0.5	2.0	Does not apply

[1]PSD criteria pollutant threshold of 100 tons for 28 source category exception as defined in 40 CFR 52.21.

[2]PSD Significant emission rates: PSD review required for pollutant emissions from a major source with emissions exceeding the SER

[4]Notice-Of-Construction (NOC) Exemption levels for new or modified stationary sources (WAC 173-400-110 Table 110(5))

2.12.3 Toxic Air Pollutants

The industrial emissions of almost 400 TAPs are regulated under WAC 173-460, and WAC 173-400-110 requires that increases in TAP emissions attributable to the entire project must be reviewed during the preconstruction permitting process. To comply with WAC 173-460, an inventory of TAPs associated with project emission units has been developed. Any TAP expected to have a pre-control emission rate increase as a result of the project that exceeds the *de minimis* level defined for that TAP in WAC 173-460-150 is subject to NSR.

The impact attributable to the emission increase of a given TAP that is subject to the NSR requirements of WAC 173-460 is determined to be insignificant if it can be shown that the total emission rate increase of that TAP, after the application of BACT, is less than the SQER prescribed in WAC 173-460-150. If the expected emission increase of a TAP exceeds the prescribed SQER, a dispersion modeling analysis is required to demonstrate that the ambient impact of the aggregate emission increase of that TAP does not exceed the acceptable source impact level assigned to that TAP in WAC 173-460-150.

In addition to Washington's TAP regulations, under the provisions of Section 112 of the 1990 Clean Air Act Amendments, the EPA is required to regulate emissions of a total of 187 HAPs from stationary sources. EPA does this by specific industry categories to tailor the controls to the major sources of emissions and the HAPs of concern from that industry. The rules promulgated under Section 112 generally specify the maximum achievable control technology (MACT) that must be applied for a given industry category. Consequently, these rules are often called MACT standards.

MACT standards can require facility owners/operators to meet emission limits, install emission control technologies, monitor emissions and/or operating parameters, and use specified work practices. In addition, the standards typically include recordkeeping and reporting provisions. MACT standards are codified in 40 CFR Parts 61 and 63.

There are two types of HAP sources: major and area sources of HAP emissions. Major sources have a potential to emit more than 10 tons of a single HAP, or 25 tons of all HAPs combined. Area sources are facilities that are not a major source.

The Facility's annual potential emissions of all HAPs will not exceed EPA's combined 25 ton per year or single 10 ton per year major source threshold. Therefore, the Facility is categorized as an area source of HAPs, and the MACT standards for area sources of HAP apply to it.

Construction

Temporary emissions of small amounts of TAPs and HAPs are likely from the operation of construction vehicles and equipment during the construction phase. Emissions from mobile sources are regulated under federal standards for mobile sources. Additional site air permits are not required for the temporary deployment of mobile sources on the site, as indicated under WAC 173-400-020.

Operation

The proposed Facility will contain several potential sources of TAPs and HAPs. The rail car unloading area and storage area boilers will combust natural gas to produce steam, and the MVCU will combust both natural gas and the displaced vapors from the vessels. Combustion exhaust contains small quantities of compounds identified in regulations as TAPs and/or HAPs. Similarly, fugitive emissions associated with the transfer and storage of crude oil at the Facility will include TAPs and/or HAPs. The calculated emission rates of TAPs and HAPs are presented in Table 2.12-2. Further details concerning the calculated TAPs emission rates from each unit are available in Section 5.1, Attachment 2.

Table 2.12-2. Facility-wide TAPs/HAPs emissions

Compound	CAS	HAP?[1]	WA TAP Averaging Period	Emission Rate	SQER[2]	Model?[3]
				lb/avg per	lb/avg per	
Acetaldehyde	75-07-0	Yes	Annual	4.23E-02	71	No
Acrolein	107-02-8	Yes	24-Hour	1.50E-04	0.00789	No
Arsenic	7440-38-2	Yes	Annual	4.31E-01	0.0581	Yes
Benzene	71-43-2	Yes	Annual	1.06E+02	6.62	Yes
Benzo(a)anthracene	56-55-3	No	Annual	3.98E-03	1.74	No
Benzo(a)pyrene	50-32-8	No	Annual	2.60E-03	0.174	No
Benzo(b)fluoranthene	205-99-2	No	Annual	3.89E-03	1.74	No
Benzo(k)fluoranthene	207-08-9	No	Annual	3.89E-03	1.74	No
Beryllium	7440-41-7	Yes	Annual	2.59E-02	0.08	No
1,3-Butadiene	106-99-0	Yes	Annual	2.16E-03	1.13	No
Cadmium	7440-43-9	Yes	Annual	2.37E+00	0.0457	Yes
Carbon monoxide	630-08-0	No	1-Hour	9.23E+00	50.4	No
Chromium, (hexavalent)	18540-29-9	No	Annual	1.21E-01	0.00128	Yes
Chrysene	218-01-9	No	Annual	3.90E-03	17.4	No
Cobalt	7440-48-4	Yes	24-Hour	4.96E-04	0.013	No
Copper	7440-50-8	No	1-Hour	2.94E-04	0.219	No
Cyclohexane	110-82-7	No	24-Hour	1.05E-01	789	No
Dibenzo(a,h)anthracene	53-70-3	No	Annual	2.62E-03	0.16	No
Diesel Engine Particulate	DEP	No	Annual	6.41E+00	0.639	Yes

7,12-Dimethylbenz(a)anthracene	57-97-6	No	Annual	3.45E-02	0.00271	Yes
Ethylbenzene	100-41-4	Yes	Annual	4.53E+01	76.8	No
Fluorene	86-73-7	No	24-Hour	4.73E-05	1.71	No
Formaldehyde	50-00-0	Yes	Annual	2.43E+01	32	No
Hexane	110-54-3	Yes	24-Hour	1.10E+01	92	No
Hydrogen Sulfide	7783-06-4	No	24-Hour	9.45E-03	0.263	No
Indeno(1,2,3-cd)pyrene	193-39-5	No	Annual	3.90E-03	1.74	No
Isopropyl benzene	98-82-8	Yes	24-Hour	3.38E-03	52.6	No
Manganese	7439-96-5	Yes	24-Hour	2.25E-03	0.00526	No
Mercury	7439-97-6	Yes	24-Hour	1.54E-03	0.0118	No
3-Methylchloranthrene	56-49-5	No	Annual	3.88E-03	0.0305	No
Naphthalene	91-20-3	Yes	Annual	1.32E+00	5.64	No
Nitrogen dioxide	10102-44-0	No	1-Hour	7.75E+00	1.03	Yes
Propylene	115-07-1	No	24-Hour	4.18E-04	394	No
Selenium	7782-49-2	Yes	24-Hour	1.42E-04	2.63	No
Sulfur dioxide	7446-09-5	No	1-Hour	4.81E+00	1.45	Yes
Toluene	108-88-3	Yes	24-Hour	1.03E-01	657	No
Vanadium	7440-62-2	No	24-Hour	1.36E-02	0.0263	No
Xylene (-m)	108-38-3	Yes	24-Hour	8.85E-02	29	No
Xylene (-o)	95-47-6	Yes	24-Hour	2.27E-02	29	No
Xylene (-p)	106-42-3	Yes	24-Hour	2.53E-02	29	No

Notes:

[1] TAP: Washington toxic air pollutants listed in WAC 173-460-150; HAP: federal hazardous air pollutants listed in Section 112b of the Clean Air Act.

[2,3]Small Quantity Emission Rate as defined in WAC 173-460-150 – emission rates. TAPs with project emission rates greater than the SQER require an air quality modeling analysis to demonstrate compliance with the Washington State ASILs.

As indicated in Table 2.12-2, eight TAPs were identified whose emission rates exceed the SQER. Air quality modeling is required to demonstrate that the ambient concentrations of these TAPs are below the associated ASILs. Section 5.1 includes the local air quality modeling analysis that demonstrates that TAPs concentrations are all below the associated ASIL for each of the eight TAPs.

Also shown in Table 2.12-2, the Facility's annual potential emissions of all HAPs combined does not exceed EPA's 25 ton per year major source threshold and nor does the Facility's annual potential emissions of any individual HAP exceed EPA's 10 ton per year major source threshold. Therefore, the Facility is categorized as an area source of HAPs, and area source MACT standards apply to the proposed emission units as appropriate.

The MACT standards applicable to the project are discussed in detail in Section 5.1.3.1.2.

2.12.4 GHG Emissions

GHGs are those that absorb and emit terrestrial radiation within the thermal infrared range. Although these gases do not pose a direct threat to human health or property by inhalation or contact, the buildup of these gases in the atmosphere may contribute to anthropogenic climate change. On May 13, 2010 the EPA issued a final tailoring rule with the stated intent of establishing a "common sense approach" to addressing GHG emissions from stationary sources,

by "tailoring" the major source applicability thresholds under the prevention of significant deterioration (PSD) and Title V air operating permit programs, and providing a phased implementation for GHG permitting requirements.[6] The tailoring rule defines GHGs as an aggregate of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Under the second phase of the tailoring rule, which began on July 1, 2011, a new source of GHG emissions with the potential to emit 100,000 tpy CO_2e or more is subject to PSD review for GHGs, even if the source will not increase the emissions of any other PSD pollutant significantly. Because there is no ambient standard or increment for GHGs, the only PSD requirement that applies to GHGs is that BACT must be employed to reduce GHG emissions from the proposed project.

The project has the potential to emit only three of the six gases that comprise the Tailoring Rule definition of GHGs: carbon dioxide, methane, and nitrous oxide. The Tailoring Rule further defines CO_2e as the sum of the mass emissions of the constituent GHG, each multiplied by the appropriate global warming potential factor provided in Table A-1 of the federal mandatory GHG reporting rule (MRR, codified in 40 CFR Part 98). Table 2.12-3 summarizes the calculations and shows that the project has the potential to generate a maximum of approximately 150,176 tons of CO_2e per year. An expanded review of these calculations is included in Section 5.1.

Table 2.12-3. GHG (Composite CO_2e) Emission Rates

Emission Unit	Activity	Emission rate (tpy)
Unloading boilers	2 units, 8,760 hours/year	63,284
Storage area boilers	1 unit, 8,760 hours/year	6,415
MVCU	360,000 bbl/day, 365 days/year	80,191
Components	Leaks: methane emissions	12
Tanks	Fugitive emissions of methane	261
Firewater pumps	3 engines, ½ hour per week plus 8 hours per month	14
Total:	--	150,176

[6] EPA GHG permitting guidance and tailoring rules available at: http://www.epa.gov/nsr/ghgpermitting.html

Construction

GHG emission during construction is not subject to PSD review or emission reporting. Emissions will primarily consist of CO_2 release from combustion by diesel- and gasoline-powered vehicles associated with construction. Emissions from vehicle use will be minimized by adherence to a set of best practices including limited idling time.

On-site Operations

The main sources of GHG during operation are the combustion of natural gas at the boiler units and the combustion of natural gas and vessel hydrocarbon vapors in the MVCU. GHG emission calculations for each unit are reviewed in detail in Section 5.1, Attachment 2

Section 2.13 – Carbon Dioxide Mitigation

WAC 463-60-230
Proposal – Carbon dioxide mitigation.

For thermal electric energy facilities, the application shall include a carbon dioxide mitigation plan and information required by Chapter 463-80 WAC.

(Statutory Authority: Chapter 80.50 RCW and RCW 80.50.040. 09-05-067, § 463-60-230, filed 2/13/09, effective 3/16/09.)

Section 2.13 Carbon Dioxide Mitigation

The project is not a thermal electric energy facility as described in RCW 80.70.020. Pursuant to WAC 463-60-115, the Applicant requests a waiver of the carbon dioxide mitigation standards required by WAC 463-80.

Section 2.14 – Greenhouse Gases Emissions Performance Standards

WAC 463-60-232
Proposal – Greenhouse gases emissions performance standards.

For baseload electric generating facilities, the application shall provide information required by, and describe how the requirements of Chapter 463-85 WAC will be met.

(Statutory Authority: Chapter 80.50 RCW and RCW 80.50.040. 09-05-067, § 463-60-232, filed 2/13/09, effective 3/16/09.)

Section 2.14 Greenhouse Gases Emissions Performance Standards

The Facility is not a baseload electric generation facility under RCW 80.80.010(4). Pursuant to WAC 463-60-115, the Applicant requests a waiver of the greenhouse gases emissions performance standards of WAC 463-85.

Note: Greenhouse gas emissions will be addressed as part of the overall assessment of air impacts in section 5 of the site certification application.

Section 2.15 – Construction and Operation Activities

WAC 463-60-235
Proposal – Construction and operation activities.

The application shall: Provide the proposed construction schedule, identify the major milestones, and describe activity levels versus time in terms of craft and noncraft employment; and describe the proposed operational employment levels.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-235, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-235, filed 10/8/81.)

Section 2.15 Construction and Operation Activities

The Applicant will be responsible for the construction of Project. Construction of the project will occur in several general stages including the following main activities:

- Construction of temporary access roads, construction stormwater BMPs and temporary laydown areas.
- Placement of temporary construction offices
- Site grading and installation of subsurface ground improvements
- Installation or movement of underground utilities
- Construction of above ground utilities
- Excavation for, and pouring of unloading track trenches, and other subsurface basins
- Construction of the storage area berm, including placement of the HDPE line
- Installation of rail ballast, rail ties, tracks and other rail infrastructure
- Construction of building, tank and equipment foundations
- Construction of field erected buildings and tanks
- Construction of above and below ground pipelines
- Removal of portions of berths 13 and 14 and construction of new dolphins, catwalks and other dock elements
- Removal of piles at Terminal 2 for compensatory mitigation
- Installation of piping, mechanical, electrical, fire protection and other equipment necessary for the facility
- Testing and commissioning.

2.15.1 Construction Schedule and Milestones

Figure 2.15-1 identifies the major schedule milestones, engineering and procurement, construction and start-up. The construction schedule is based on receipt of a Site Certification Agreement by November 2014 and is subject to change. The construction schedule would be revised to reflect the actual date of approval of the Site Certification Agreement, and provided to EFSEC at least 60 days prior to the beginning of construction.

2.15.2 Construction Workforce

During the construction period approximately 250 construction workers will be employed at the site. Levels will vary over the construction period with a maximum daily workforce of 125 construction workers. Table 2.15-1 summarizes the composition of construction workforce by trade. Most of the construction workforce is anticipated to be hired from the Vancouver/Portland metropolitan area, and its adjoining cities and counties. Workforce may also be sourced from the broader Seattle/Tacoma area. Workers from the Portland/Vancouver area would be expected to commute daily to the construction site; commuters from further afield would be expected to commute on a weekly basis, staying in RV parks and motels near the facility site during the workweek.

Table 2.15-1. Construction Workforce by Trade

Trade	Number of Construction Staff
Carpenters	20
Concrete	15

Trade	Number of Construction Staff
Electrical	35
Iron Workers	32
Laborers	53
Mechanical	50
Operating Engineers	25
Tank Erectors	20
Total for TSPT	250

2.15.3 Operation

When operational, employee levels will vary as a function of project capacity ramping up to satisfy market demand. At full operation there will be up to 110 permanent full time staff. Table 2.15-2 provides a breakdown of staff by trade. The facility will be staffed and operated 24 hours per day, 7 days per week, and 365 days per year. In addition to the staff noted below, two Tesoro Refining & Marketing Company LLC employees will conduct loading operations at the Marine Terminal, and approximately seven to eight longshoremen will be utilized during mooring activities at the dock.

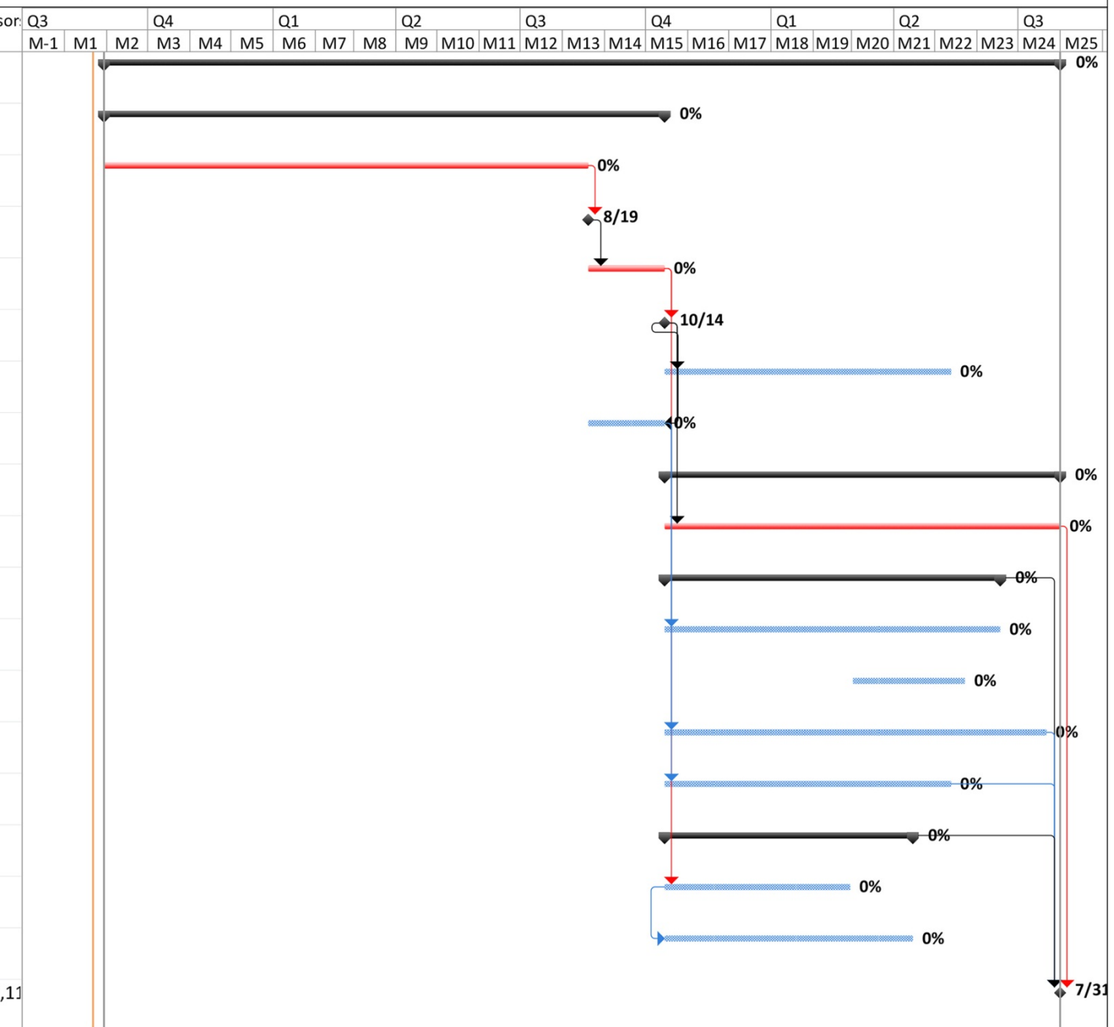
Temporary workforce may be added during major facility maintenance activities. Regular maintenance of major equipment purchased from suppliers (e.g., boiler water treatment systems) may be conducted under contract.

Table 2.15-2. Operations Staff

Trade	Number of Operations Staff
Unloaders	52
Switchman	12
Locomotive Engineers	20
Mechanics	8
Administrative & Logistics	5
Safety	3
Inspectors	8
Supervisory and Management	12
Total for TSVEDT	120

Port Of Vancouver Construction - EFSEC Submittal Rev2

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**TSVEDT**	**501 days**	**Fri 8/30/13**	**Fri 7/31/15**	
2		**Permitting**	**293 days**	**Fri 8/30/13**	**Tue 10/14/14**	
3		EFSEC Review Process	253 days	Fri 8/30/13	Tue 8/19/14	
4		EFSEC Recommendation	0 days	Tue 8/19/14	Tue 8/19/14	3
5		Governor Review	40 days	Wed 8/20/14	Tue 10/14/14	4
6		Decision	0 days	Tue 10/14/14	Tue 10/14/14	5
7		Equipment Procurement/Fabrication	150 days	Wed 10/15/14	Tue 5/12/15	6
8		Bidding	40 days	Wed 8/20/14	Tue 10/14/14	6SF
9		**TSVEDT Construction**	**208 days**	**Wed 10/15/14**	**Fri 7/31/15**	
10		Site Work	208 days	Wed 10/15/14	Fri 7/31/15	6
11		**Unloading/Admin Area Facility**	**176 days**	**Wed 10/15/14**	**Wed 6/17/15**	
12		Unloading Area	176 days	Wed 10/15/14	Wed 6/17/15	8
13		Administrative Area	60 days	Mon 3/2/15	Fri 5/22/15	
14		Tank Farm	200 days	Wed 10/15/14	Tue 7/21/15	8
15		Pipelines	150 days	Wed 10/15/14	Tue 5/12/15	8
16		**Dock Construction Work**	**130 days**	**Wed 10/15/14**	**Tue 4/14/15**	
17		In Water	98 days	Wed 10/15/14	Fri 2/27/15	5
18		Above Water	130 days	Wed 10/15/14	Tue 4/14/15	17SS
19		Project Complete	0 days	Fri 7/31/15	Fri 7/31/15	16,15,14,11



Critical		Split		Finish-only		Baseline Milestone		Manual Summary	Inactive Task
Critical Split		Task Progress		Duration-only		Milestone		Project Summary	Inactive Milestone
Critical Progress		Manual Task		Baseline		Summary Progress		External Tasks	Inactive Summary
Task		Start-only		Baseline Split		Summary		External Milestone	Deadline

Page 1

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Figure 2.15-1. Construction Milestones

Section 2.16 – Construction Management

WAC 463-60-245
Proposal – Construction management.

The application shall describe the organizational structure including the management of project quality and environmental functions.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-245, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-245, filed 10/8/81.)

Section 2.16 Construction Management

2.16.1 Construction Management Organization

The Applicant has hired industry professional contractors to complete the design of the project and will contract with (one or more) engineering, procurement, and construction (EPC) contractors, or construction management firm. Those parties will be responsible for the design, procurement, construction, and startup of the facility. The main EPC contractor or construction manager will be responsible for managing subcontractors.

The EPC contractor will employ a lead project manager, along with a project engineer, a site manager supported by a field engineering team, quality assurance and quality control (QA/QC) specialists, environmental specialists, and a site safety officer. The EPC contractor will be required to implement a safety plan, a QA/QC plan, an environmental protection plan, an SWPP plan, and an SPCC plan.

2.16.2 Safety Program

In addition, before any on-site construction work begins, the EPC contractor will be required to develop a construction safety plan that applies to the employees of the EPC contractor and all subcontractors working at the project site. The construction safety plan will ensure compliance with all applicable laws, ordinances, regulations, and standards concerning health and safety. The EPC contractor's safety manager will have the authority to issue stop work orders when health and safety procedures are violated by the employees of either the EPC contractor or a subcontractor. Upon identification of any health and safety issue, the safety manager will work with the responsible site managers and employees to correct the issue. The construction safety plan will include, but will not be limited to, the following areas:

- Description of the company safety program
- Fire protection and life safety
- Hazard communications
- Hearing conservation
- High temperature work areas
- Job hazard analysis
- Material handling
- Personal protective equipment (PPE) requirements
- Respiratory protection
- Safety administrative controls
- Tools, machinery, and equipment safety
- Compressed gases
- Electrical arc protection work practices
- Confined space entry
- Control of hazardous materials
- Crane/hoist operations and safety
- Electrical appliances
- Electrical safety
- Excavation, trenching, and shoring
- Fall protection

During operations, the Applicant will implement a site- and project-specific operations safety program, addressing all applicable laws, ordinances, regulations, and standards concerning operations health and safety. The program will be documented in the Rail Operating Safety and Maintenance Plan and the Facility Construction and Operations Safety Plan which includes, but is not limited to, the following areas:

- Description of the company safety program
- Fire protection and life safety
- Hazard communications
- Hearing conservation
- High temperature work areas
- Job hazard analysis
- Rail operations
- Material handling
- Personal protective equipment (PPE) requirements
- Respiratory protection
- Safety administrative controls
- Tools, machinery and equipment safety
- Compressed gases
- Electrical arc protection work practices
- Confined space entry
- Control of hazardous materials
- Crane/hoist operations and safety
- Electrical appliances
- Electrical safety
- Excavation, trenching and shoring
- Fall protection

2.16.3 Environmental Protection Program

During construction, the Applicant will require that its EPC contractor and all subcontractors implement an environmental protection program to ensure that construction activities comply with the conditions, limits, and specifications required by the site certification agreement and any other applicable federal permits and regulations. Copies of all applicable permits and approvals will be kept on site. The EPC project manager, and all contractor and subcontractor employees, will be required to read, follow, and be responsible for all required compliance activities and the prompt correction of deficiencies. The environmental protection program will include, but not be limited to, the following:

- Avoidance of sensitive areas by construction activities
- Waste handling and storage
- Stormwater management
- Spill prevention and control
- Any additional requirements of the site certification agreement and other issued permits and approvals and applicable regulations

2.16.4 Training Programs

During construction, the EPC contractor will be required to provide a training program to ensure that any contractor or subcontractor employees entering the construction area are instructed on applicable health and safety requirements and protocols. The training will include, but not be limited to, the following areas:

- Drug and alcohol free workplace policy
- Personal health and safety
- Fall safety
- Confined space
- Excavation
- Crane and rigging
- Equipment and operations safety
- Fire prevention
- Electrical safety
- Emergency response
- Hazards communication
- Stormwater pollution prevention
- Spill prevention, control, and countermeasures

Similarly, extensive training of operations employees will begin prior to their beginning work at the project facilities. All employees will receive training regarding operations-related health and safety, hazards communication, emergency response, stormwater pollution prevention, and spill prevention, control, and countermeasures. Task-specific training will be provided to ensure project facilities are operated and maintained in accordance with industry standards and all applicable permits, approvals, and regulations.

2.16.5 Quality Control Systems and Record Keeping

A QA/QC program will be implemented during all phases of the project to ensure that the engineering, procurement, construction, and startup of the Facility are completed as specified. The elements of the QA/QC program will include:

- A formal QA/QC program that ensures equipment suppliers deliver their components as designed and specified and that the installation of equipment is completed as specified.
- A procedures manual describing activities at the Facility from the initiation of final design through project startup.
- A description by the EPC contractor of the activities and responsibilities within the contractor's organization and the measures taken to assure quality work, including design control, configuration management, and drawing control.
- A review by independent QA/QC personnel of all documentation and their witness of field activities as an organization parallel to the construction organization to assure compliance with the specifications.
- Field inspectors' acceptance for the installation, alignment, and commissioning of all major equipment.

Typical QA/QC checks include:

- Factory QA/QC
  - Inspection of major equipment at manufacturer's facilities
  - Review and inspection of third-party test verification reports
  - Review and inspection of manufacturer's QA/QC procedures
  - Manufacturing drawing review and verification
  - Visual inspection
  - Witness and/or review of testing
  - Verification of welding procedure specifications compliance
  - Inspection of flange interface flatness measurements, finishing, and protection
  - Witness or review of turbine run-in load testing
  - Inspection of paint finishing and protection
  - Shipment packaging and handling, tracking, and identification
  - Pre-commissioning field testing and verification
- Field Inspection QA/QC
  - Reviewing equipment and material delivery acceptance inspection procedures
  - Inspection of all critical interfaces
  - Verification of all mechanical assembly work including erection of major components
  - Verification of field wiring and tagging
  - Pre-commissioning field testing and verification
- Concrete/Structural
  - Inspection of forms, structural steel, and rebar prior to backfilling and prior to casting
  - Field engineer's witness of concrete pouring
  - Inspection of concrete testing during pour (slump) and verification of break test results
  - Inspection of field welds
  - Tank Construction
  - Internal monitoring of tank shape
  - Hydrostatic testing
- Electrical System Installation
  - Inspection of terminations and termination hardware
  - Witness and/or review of polarity, cable marking, and phase rotation tests
  - Witness and/or review of grounding system resistance measurements
  - Inspection of all lock-out/tag-out locations and energizing sequences and plan
  - Inspection of painting/tagging/wiring/preparation for shipment
  - Verification of field wiring and tagging

The Applicant will audit the EPC contractor periodically, including reviews of documentation and surveillances of field activities, to ensure compliance with the specifications and with the requirements of the QA/QC plan. Checks may include:

- Verification of drawings
- Verification of materials
- Verify compliance with engineering specifications
- Verify compliance with environmental permits and regulations
- Verify compliance with health and safety program

Records will be maintained at the on-site administration building in accordance with the Applicant's records management program and any additional record-keeping requirements of project permits and approvals.

Section 2.17 – Construction Methodology

WAC 463-60-255
Proposal – Construction methodology.

The application shall describe in detail the construction procedures, including major equipment, proposed for any construction activity within watercourses, wetlands and other sensitive areas.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-255, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-255, filed 10/8/81.)

Section 2.17 Construction Methodology

2.17.1 Construction Summary

As noted in section 2.3.2 Site Arrangement above, the facility will be constructed primarily on previously developed areas located at the port. The site is relatively flat and without natural vegetation or water features, resulting in limited preconstruction grading activities and modification or removal of vegetation. The only construction element that will include work within a sensitive area is the proposed modifications to berths 13 and 14 and other associated work within the shoreline area for the Marine Terminal (Area 400). For completeness this section addresses all construction elements.

Before any on-site ground disturbance, stormwater pollution prevention measures will be implemented in accordance with the project's SWPPP. Measures will include, but will not be limited to, installing stabilized construction entrances, wheel washes, and temporary stormwater collection and treatment facilities (hay bales, silt fences, other temporary measures), and temporary stormwater ponds.

Construction areas will be secured with temporary or permanent fences to control access to the construction sites. Primary construction access is expected to be established off the existing Gateway overpass; secondary access will be established at the west entrance to Terminal 5 and at Parcel 1A.

Construction on portions of Terminal 5 will involve impacts to areas of known residually impacted soils and protective caps that have been the subject of past remediation and containment activities. Work within these areas will comply with the restrictive covenants and consent decrees in place and the contaminated material management plan that will be developed for the project.

Prior to the construction of foundations and above-ground facilities, existing above-ground and underground utilities will be removed and if necessary reinstalled in a different location. The Applicant will coordinate with the owners and operators of these utilities before they are disconnected or moved. With the exception of rail loop adjustments, dock modifications and utility movements, no existing structures will be moved or removed from the site.

Construction laydown areas will be established for temporary construction trailers, storage of construction equipment and materials, and construction employee parking. The laydown areas will be on are adjacent to the project site. Final configuration will be determined based on construction needs. In addition, areas adjacent to the proposed piping system alignment will be used to stage pipe prior to and during the process of constructing the piping system. Figure 2.17-1 illustrates the anticipated location of temporary construction boundaries and temporary laydown areas with respect to the Facility site boundary.

Conventional construction equipment – including bulldozers, front end loaders, trucks, tractor scrapers and graders – will be used to final grade the site. As described in further detail in the sections that follow, foundations will be constructed, and equipment and project facilities will be installed. Field toilets and temporary holding tanks will be installed for construction personnel. During construction, potable water will be provided in containers until permanent potable water service is established.

Cleanup of debris, final site stabilization and landscaping will complete construction activities.

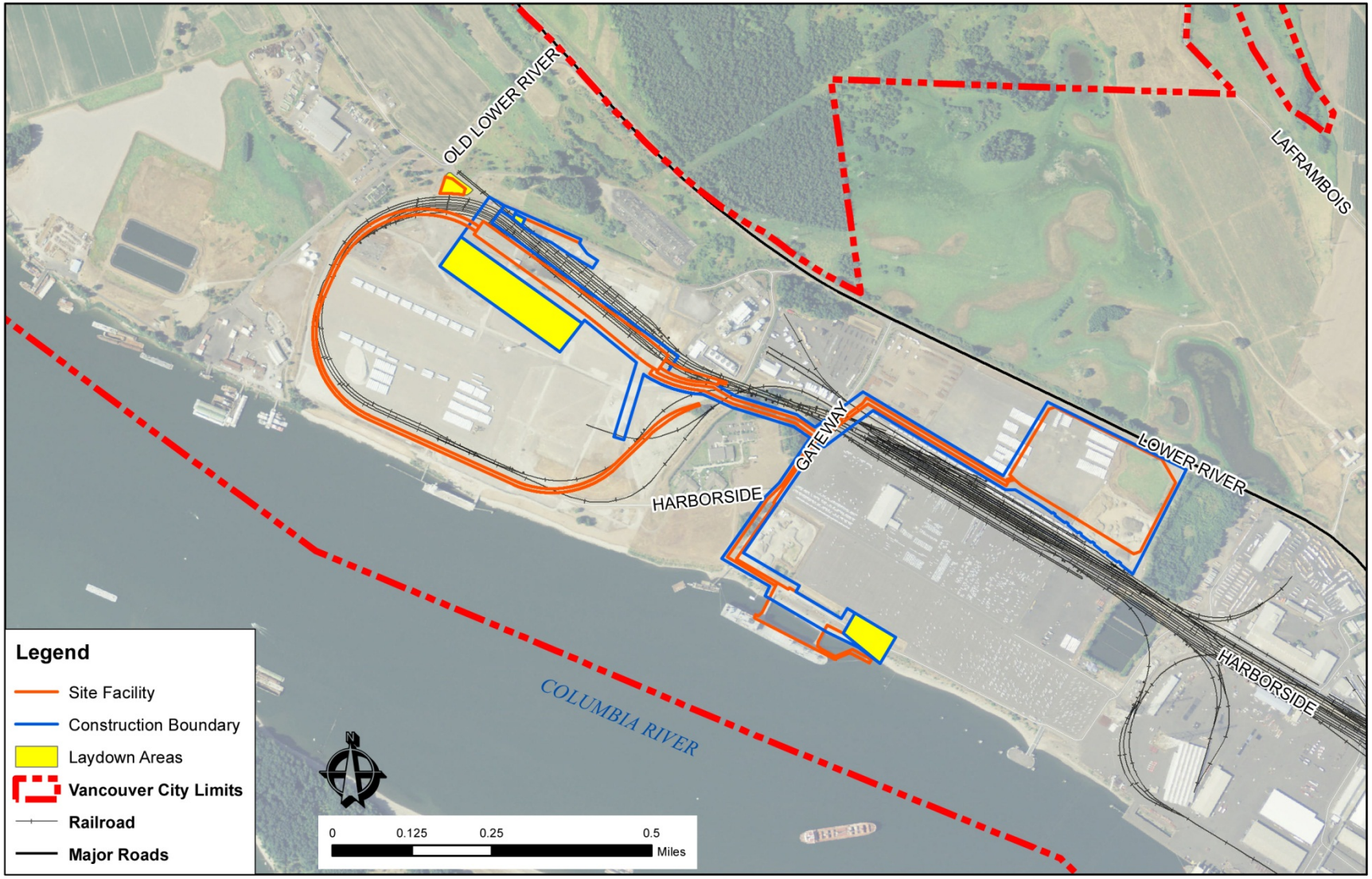

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Figure 2.17-1. Temporary Construction Boundary and Laydown Areas

2.17.2 Site Preparation

During site preparation, the construction contractor will install stormwater pollution prevention measures and the permanent stormwater drainage system. This system is described in detail in the Preliminary SWPPP, Appendix C to this application. A Certified Erosion and Sediment Control Lead (CESCL) will be responsible for ensuring that stormwater pollution prevention measures are implemented and maintained according to the BMPs identified in the project SWPPP and selected in accordance with the Stormwater Manual.

2.17.3 Foundations

Foundations, buildings, storage tanks, and piping systems will be designed to the applicable seismic code, and will take into consideration site-specific soil stability, as described in more detail in Section 3.1. The type of foundation chosen for the offloading building will depend on the results of the detailed site geotechnical investigation conducted prior to final site engineering and construction. It is anticipated that the foundation will consist of either drilled piers, with columns spaced 20 to 25 feet on center, or spread footings approximately 7 feet by 7 feet, placed 20 to 25 feet apart. The locations for piping trenches and pump basins will be excavated and the concrete for the trenches and pump basins poured. The storage tanks are anticipated to be constructed on a piling-supported ring wall foundation.

2.17.4 Storage Area

Following site grading and subsurface preparation, AST support piling will be installed and tank foundations will be poured. Sand and gravel material will be laid throughout the storage tank area, and the surrounding berm constructed. The berm around the storage tank area will be constructed from materials excavated from the loading facility area during the construction of the piping trench. The impervious membrane liner will then be placed covering the berm and storage area, and will either be tied into the AST foundations or will cover the entire containment area.

The storage tanks will be constructed on site from pre-fabricated sections of steel plate. A 100- to 150-ton crane will be brought to the site to move the tank sections into place. During the construction process, the various elements of the storage tank assembly will be tested according to API standards as indicated in section 2.10.3.2: Piping Installation.

Piping will be delivered to the site in prefabricated lengths. Pipe supports will be constructed on pile or stone column-supported concrete foundation designed to the applicable seismic code. Piping will be installed and field welded. Field welds will be inspected per applicable standards.

2.17.5 Rail Improvements

As noted above in section 2.3.3.2, two additional, approximately 8,000-foot-long rail loops will be constructed to accommodate unit trains. Construction of these rail loops will follow typical industry standards. The track alignment and construction limits would be established by field survey. Minor grading of the rail alignment will consider the existing relatively flat ground level at Terminal 5. Soils will be compacted in consideration of subsurface conditions to ensure ground stability. Approximately 12 inches of finely graded compacted granular material (sub-ballast) will be placed as necessary.

After the sub-ballast has been placed, specialized construction equipment will be used to construct the track. The track will consist of railroad ballast (rock), steel rails, timber crossties, and other miscellaneous materials. A stockpile for the track material will be located at one of the

proposed laydown areas. The material will be distributed by truck to the final location and the rails will be spiked to the proper gauge on the crossties. Railroad ballast will be dumped using construction equipment mounted on rails. A specialized piece of construction equipment, called a tamper, will be used to raise the track through the ballast, and the ballast will be compacted under the crossties. The track surface will be smoothed to a tolerance of 1/16th of an inch. The ballast will then be shaped to form a uniform ballast section.

2.17.6 Utilities

Natural Gas

Natural gas service will be obtained from either Northwest Natural Gas or Williams Pipeline. Existing 2 inch service lines are in place for service to the Area 300 Boiler Building and the Area 600 West Boiler Building. The existing service line to the Jail Work Center would be extended further south towards berths 13 and 14 to provide assist gas for the MVCU. A meter would be placed on the facility-side of each of these connections.

Water

The City's existing water distribution facilities are adjacent to or located on the site. The Facility's water service will be connected to the City's existing distribution network in accordance with the City's water design and construction requirements. Necessary water metering and cross-connection control will be installed at each of the connection locations between the on-site water facilities and the public water distribution system. Multiple water service connections will be constructed because of the multiple discontinuous areas that are part of the project.

Electrical

The Facility will obtain electrical service from Clark Public Utilities.

2.17.7 Dock Improvements

Dock Improvements will include in and overwater construction as follows:

- Remove two mooring dolphins, and two breasting dolphins including forty-seven 18-inch steel pipe piles, eight 12-3/4-inch steel fender piles and approximately 1,330 square feet of existing concrete pile cap.
- Remove approximately 3,250 square feet of grated walkway associated with existing breasting dolphins to be removed. One existing 18-inch steel pipe pile supporting the walkways will also be removed.
- Install four new 27-foot-diameter mooring dolphins (approximately 2,140 square feet combined new, solid overwater coverage), including forty 36-inch steel pipe piles.
- Add four 24–inch steel pipe piles to Berth 13 dock platform.
- Add sixteen 24-inch steel pipe piles (all below OHWM) to existing bents at Berth 13 access trestle.
- Add six to twelve 36-inch steel pipe piles at the existing trestle abutment at Berth 13, all above OHWM, including pile cap modifications resulting in an additional 192 square feet of overwater coverage.
- Install structural connection framing consisting of two 24 to 36-inch-diameter steel pipes between the Berth 13 platform and the adjacent upstream and downstream breasting dolphins

totaling 920 square feet. Grated walkways will be installed above one of the steel pipes adding approximately 690 square feet of new grated walkways. Two 24-inch steel pipe piles will be installed to support the structural framing system.

- Add approximately 2,880 square feet of grated walkways between mooring and breasting dolphins with four 24-inch steel piles to support the walkways. Grated walkways will mostly be reused portions of existing walkway that was removed.

Construction Equipment

In water construction will be completed with typical waterborne construction equipment. The contractor will likely conduct most of the work from construction barges. The anticipated equipment includes, but is not limited to:

- Crane and material barge(s) (typical dimensions of 150 feet x 60 feet)
- Cranes
- Work skiff(s)
- Tug(s)
- Impact pile driver (anticipated size of 165,000 to 212,000 ft-lbs)
- Vibratory pile driver
- Concrete pumps or buckets
- Air compressors and generators
- Typical hand held equipment
  - Concrete saws
  - Welding and cutting torches
  - Saws, chainsaws and drilling equipment
  - Impact hammer
  - Underwater chainsaw
- Dump truck or wheeled excavator (for material removal on dock)
- Emergency response and safety equipment

Mobilization

During this task, the contractor will mobilize labor and equipment to the site. Materials and equipment will arrive at the site via land and water.

Demolition

Following mobilization, demolition activities would commence. In-water and overwater demolition will consist of removal of the two existing mooring dolphins, two existing breasting dolphins, and associated walkways. Demolition will generally proceed by removing existing concrete caps, and then removing the associated piles for each structure. Pile removal at the Terminal 5 dock and at Port Terminal 2 for habitat mitigation will also likely proceed at this time. Approximately 250 piles will be removed from below the OHWM of the Columbia River. Piles will be removed by vibratory extraction or by pulling them directly with a crane mounted on a barge. If a pile breaks above or below the mudline, it will be cut off consistent with agency-approved BMPs. Any voids left in the river bottom following pile removal are expected to collapse and fill in rapidly due to the sandy/silty nature of the substrates at the site and natural sediment transport activities in the river. The removed piles will be stored temporarily on a barge

before being sent to an approved recycling center or disposal in a landfill. All activities conducted below the OHWM will be conducted within the in-water work window.

Pile Installation

The project requires the installation of approximately 76, 24- to 36-inch steel piles (66 planned and 10 contingency) below the OHWM of the Columbia River. The diameter of the piles is based on structural and geotechnical design considerations. Pile installation activities will occur via a combination of impact and vibratory methods and will only be conducted during the in-water work window established for the project.

The in-water piles will most likely be installed by a crane located on a derrick barge with piles and materials stored on a supply barge; a tugboat will also likely be required. Shoreline piles at the Berth 13 abutment are expected to be installed from shore by land-based equipment.

To the greatest extent possible, piles will be driven using a vibratory hammer; however, piles will be driven to final tip elevations with an impact hammer. Temporary piles are expected to be used to support the guides that will position and align the permanent piles and for the concrete formwork. It is estimated that up to approximately 40 temporary piles may be required. These temporary piles will be 18- to 24-inch-diameter open-ended steel pipe or H-piles and will be installed with a vibratory hammer.

The vibratory hammer method is a common technique used to drive piles where the type of sediment allows it. This process begins by placing a choker around the pile and lifting it into vertical position with the crane. The pile is then lowered into position and set in place at the mudline. The pile is held steady while the vibratory hammer drives it to the required tip elevation. For this project, it is expected that the vibratory hammer will be used to drive all of the permanent structural piles to the extent practicable as well as all of the approximately 40 temporary piles.

Following vibratory driving to refusal (the point at which the pile will no longer advance with the vibratory hammer), an impact hammer will be used to drive piles to their final tip elevations. An impact hammer will also be needed to proof the structural piles. Proofing is the process of striking piles with an impact hammer to verify their load-bearing capacity.

An impact hammer is a large steel device that works with a hydraulic or diesel piston. Impact hammers have guides (called a lead) that hold the hammer in alignment with the pile while the heavy piston moves up and down, striking the top of the pile and driving it into the substrate from the downward force of the hammer on the top of the pile. Where the impact hammer is used, a bubble curtain or other similar noise attenuation method (such as sound attenuation pile caps, increased hammer size, etc.) will be employed.

Temporary piles may be necessary to support concrete forms or for pile driving templates during pile driving. These will be installed with a vibratory hammer to the greatest extent possible.

The overwater construction portions of the project will generally proceed immediately after pile installation operations. Concrete pile caps will be formed and constructed, and walkways and access trestle decking will be installed. Other overwater portions of the project will include installation of associated on deck infrastructure such as the hanging fendering system, bollards, handrails, etc.

Overwater activities would be conducted according to the BMPs established for the project, which will minimize any potential for impacts to water quality such as inadvertent releases or release of construction debris into the waters at the site. Overwater construction would not be limited to the in-water work window.

Piping, jib cranes, a moveable gangway, an observation and control platform, dock safety unit, pipe trays, and lighting will be installed on the existing berth 13 trestle and dock. The two 24- to 36-inch pipelines from the tank storage will be located on the trestle where they will connect with a manifold on the dock. High velocity hoses will be connected to the manifold and used to transfer the crude oil from the piping system to the marine vessel being loaded. The high velocity hoses will be supported by a pulley or crane system and connected to the grounding grid to protect from the buildup of static electricity. The loading system will incorporate automatic shutoff valves with a maximum 30-second shutoff time.

2.17.8 Commissioning

During commissioning all systems and components, all systems and components of the facility will be checked, inspected and tested to verify that every operational component of the facility is functioning properly.

Hydrostatic Testing

Prior to commissioning the project, the piping systems and storage tanks will be hydrostatically tested to ensure they are free of leaks in accordance with industry standards. Hydrostatic testing water will be obtained from the City or Port municipal supply. The piping systems will be filled with water and then pressurized to check for leaks. Water used to test the piping systems will then be pumped to the first storage tank, which will be filled with additional water and then pressurized. Once the testing process for the first tank has been completed, the water will be drained into the next storage tank, and so forth until all of the tanks have been tested. At the completion of the testing process, the hydrostatic test water will be discharged to the stormwater system. Nothing will be added to the testing water. Upon the completion of testing, the water will be analyzed and treated as necessary before its discharge in compliance with wastewater permits issued by EFSEC. Leaks identified during the testing process will be repaired before final commissioning.

Equipment Commissioning

2.17.9 Project Construction Cleanup

During this final stage all temporary construction features, equipment and excess materials will be removed. Some temporary stormwater BMPs may remain on site until the site is fully stabilized.

Section 2.18 – Protection from Natural Hazards

WAC 463-60-265
Proposal – Protection from natural hazards.

The application shall describe the means to be employed for protection of the facility from earthquakes, volcanic eruption, flood, tsunami, storms, avalanche or landslides, and other major natural disruptive occurrences.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-265, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1). 92-09-013, § 463-42-265, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-265, filed 10/8/81. Formerly WAC 463-42-290.)

Section 2.18 Protection from Natural Hazards

The following sections address the means to be employed to protect the facility natural hazards that could occur on or surrounding the Facility. Existing conditions, potential impacts, and mitigation measures, where appropriate, are discussed below.

2.18.1 Earthquake Hazard

Earthquake-related damage could occur from surface fault rupture, ground motion, and liquefaction and lateral spreading. The project site is located in a region where geologic evidence indicates that significant earthquakes can occur from three sources of seismic energy (Cascadia Subduction Zone [CSZ], intraplate, and crustal earthquakes). Additional details regarding earthquakes and seismicity are provided in section 3.1.3.

2.18.1.1 Surface Fault Rupture

Geologic mapping completed in the vicinity of the project site has not identified evidence of historical or geologically recent surface rupture crossing the site. Potentially active faults have not been mapped or inferred within the site boundaries (Personius et al. 2003). Surface rupture is unlikely to occur at the site.

2.18.1.2 Ground Motion

Ground motion is shaking that occurs during an earthquake set in motion from a passing seismic wave. The project is located in an area that has the potential for strong earthquake ground motion. The potential ground motion during an earthquake event is generally represented by horizontal peak ground motion acceleration (PGA) and is expressed in gravity units (g). The expected earthquake return interval is generally expressed as a probability of exceedance during a given time period or design life. The U.S. Geological Survey (USGS) publishes probabilistic seismic hazard data for the relative contribution of different magnitude-distance combinations for a given location. For an estimated seismic shear wave velocity of 760 meters per second, a PGA of 0.2 g was estimated for a 475-year return period earthquake (10 percent chance of not being exceeded in 50 years), and a PGA of 0.42 g was estimated for a 2,475-year return period earthquake (2 percent probability of exceedance in 50 years), except where subject to deterministic limitations (Leyendecker et al. 2000).

2.18.1.3 Liquefaction and Lateral Spreading

Liquefaction occurs when saturated, loose to medium dense sand, or soft to medium stiff, low-plasticity silt are subject to ground shaking during an earthquake. The ground shaking can result in the rearrangement of the soil particles, which leads to a rise in the pore water pressure within the susceptible soils. If the pore water pressure rises to a level that approaches the total weight of the overlying soil column, the soils begin to behave and deform as a viscous liquid. As soil strength is reduced in the liquefiable layers, there is an increased risk of settlement and the loss of some bearing capacity for both shallow and deep foundations. Unsaturated soils do not liquefy, but may settle during an earthquake (Mabey et al. 1993). Structures can be adversely affected by liquefaction-induced settlement and reduced bearing capacity. The site has been identified as having moderate to high liquefaction susceptible soils (Palmer et al. 2004).

Lateral spreading occurs as blocks of soil moves horizontally toward unsupported banks such as a river or stream channels in response to earthquake ground motion and liquefaction in a

subsurface layer. Ground displacement generally occurs on slopes of less than 3 degrees (Bartlett and Youd 1992). Lateral spreading can have adverse impacts on building foundations, roadways, pipelines, and other utilities built on or across the failure (Youd 1993). Lateral spreading could potentially occur along the banks of the Columbia River. Lateral spreading of the riverbank at the dock during a seismic event would induce large lateral forces on the in-water piles for the trestles and/or dock.

2.18.1.4 Mitigation Measures for Earthquake Hazards

All structures and pipelines constructed for the Facility will be designed and built in accordance with the applicable design provisions and seismic requirements of the 2012 International Building Code, the American Society of Civil Engineers 7-10 standard (Minimum Design Loads for Buildings and Other Structures), America Concrete Institute 318-11 standard (Building Code Requirements for Structural Concrete), American Institute of Steel Construction Manual section 360-10 (Specifications for Structural Steel Buildings) and Seismic Design Manual 2nd Ed., and the American Forest & Paper Association 2008 Special Design Provisions for Wind and Seismic.

Tables 2.18-1 and 2.18-2 list the seismic design criteria for the Facility.

Table 2.18-1. 2012 IBC Seismic Design Criteria Storage (Area 300)

Parameter	Value	2012 IBC/ASCE 7-10 Reference
0.2 Second Spectral Acceleration, S_s	0.94	ASCE 7-10 Figure 22-1
1.0 Second Spectral Acceleration, S_1	0.41	ASCE 7-10 Figure 22-2
MCE_G Peak Ground Acceleration, PGA (Site Class B)	0.41	ASCE 7-10 Figure 22-7
Soil Profile Site Class	N/A*	ASCE 7-10 Section 20.3.1 and 21.3*
0.2 Second MCE_R Spectral Acceleration, S_{Ms}	1.04	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
1.0 Second MCE_R Spectral Acceleration, S_{M1}	0.8	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
MCE_G Peak Ground Acceleration, PGA	0.37	Site Specific Ground Motion, ASCE 7-10 Ch. 21 *
0.2 Second Design Spectral Acceleration, S_{Ds}	0.69	2012 IBC Equation 16-39
1.0 Second Design Spectral Acceleration, S_{D1}	0.53	2012 IBC Equation 16-40
Seismic Design Category	D	2012 IBC Table 11.6-1 (& -2)

* A liquefaction hazard was identified for the Storage area (Area 300). In accordance with ASCE 7-10 Section 11.4.7 and 20.3, a site-specific ground motion analysis was completed for seismic design at the Storage area to develop the criteria listed above.

Table 2.18-2. 2012 IBC Seismic Design Criteria Unloading and Office (Areas 200 and 600)

Parameter	Value	2012 IBC / ASCE 7-10 Reference
0.2-Second Spectral Acceleration, S_s	0.94	ASCE 7-10 Figure 22-1
1.0-Second Spectral Acceleration, S_1	0.41	ASCE 7-10 Figure 22-2
MCE_G Peak Ground Acceleration, PGA (Site Class B)	0.41	ASCE 7-10 Figure 22-7
Soil Profile Site Class	E*	ASCE 7-10 Section 20.3.1*
Site Coefficient, F_a	0.97	2012 IBC Table 1613.3.3(1)
Site Coefficient, F_v	2.40	2012 IBC Table 1613.3.3(2)
Site Coefficient, F_{PGA}	0.9	ASCE 7-10 Table 11.8-1
0.2 Second MCE_R Spectral Acceleration, S_{Ms}	0.91	2012 IBC Equation 11.4-1
1.0 Second MCE_R Spectral Acceleration, S_{M1}	0.98	2012 IBC Equation 11.4-2
MCE_G Peak Ground Acceleration, PGA	0.37	2012 IBC Equation 11.8-1
0.2 Second Design Spectral Acceleration, S_{Ds}	0.61	2012 IBC Equation 11.4-3
1.0 Second Design Spectral Acceleration, S_{D1}	0.66	2012 IBC Equation 11.4-4
Seismic Design Category	D	2012 IBC Table 11.6-1 (& -2)

* A liquefaction hazard was identified for the Unloading and Office area (Areas 200 and 600). Based on ASCE 7-10 Section 20.3.1, Site Class E was used to develop seismic design criteria for the structures in Areas 200 and 600 assuming the fundamental period of the structures in Areas 200 and 600 is less than 0.5 second.

Final analysis of the seismic conditions and determination of the building foundation designs will be completed to address seismic conditions found at the site prior to construction. Ground improvement methods and foundations designs will be selected to meet the criteria identified in Tables 2.18-1 and 2.18-2. Ground motion mitigation includes adhering to local building codes and standard foundation design for the proposed facility and associated buildings and pipelines. The proposed facility would comply with the state building code provisions for seismic hazards applicable to the proposed location and the site conditions disclosed by the geotechnical investigation.

Liquefaction mitigation solutions for the risk of liquefaction may include improving the condition of soils beneath the site to reduce the risk of liquefaction during an earthquake or the use of deep foundations to provide foundation support below the liquefiable soils. Ground improvement methods, such as stone columns, jet grouting, or deep soils mixing, could be designed to reduce the seismic lateral load on the dock foundations and improve seismic slope stability. Ground improvement methods and/or the use of deep foundations, such as driven piles or drilled shafts, could be designed to reduce the risk of seismic settlement impacting the proposed structures. Specific mitigation measures will be identified based on the results of the project-specific geotechnical investigation.

2.18.2 Volcanic Eruption

Volcanoes in the region pose a variety of eruptive hazards. Volcanoes of the Cascade Mountains are found from northern California to British Columbia. Mount St. Helens and Mount Hood are

located within 50 miles of the project, located to the northeast and southeast of the project site, respectively. The Boring Lava Field volcanoes resulted from a smaller series of eruptions and are within approximately 25 miles southeast of the project. The Boring Lava Field volcanoes are low, broad lava shield volcanoes and all are considered extinct.

Mount St. Helens is capable of producing eruptions of ash, lava flows, pyroclastic flows, and lahars (Wolfe and Pierson 1995). However, the Facility is upstream of drainages that extend from the flank of Mount St. Helens and would not be subject to pyroclastic flows or lahars. The USGS estimates that there is between a 0.01 and 0.02 percent annual probability that there would 4 inches or more of ash will be deposited at the site from eruptions throughout the Cascade Range, with the highest probability resulting from. Most Cascade Range contribution in the analysis is from Mount St. Helens (Wolfe and Pierson 1995).

Mount Hood has produced lava and pyroclastic flows, lahars, and debris avalanches (Scott et al. 1997). A future Mount Hood eruption could generate a lahar that would enter the Columbia River 15 miles upstream from the project area at the mouth of the Sandy River. A large lahar entering the Columbia River could produce localized flooding and sediment deposition at the mouth of the Sandy River.

Based on the distance and activity level of nearby volcanoes to the project site, there is a low potential for damaging volcanic processes to reach the project, and these events would be considered extremely rare.

2.18.2.1 Mitigation of Volcanic Eruption

Volcanic events can typically be anticipated through monitoring of earthquakes and other data from the USGS volcano monitoring network. Should an eruption occur and pose a risk to the Facility the operations will be shut down until conditions allow for safe operation.

2.18.3 Flooding

The 100-year floodplain and floodway of the Columbia River are located at 30 feet (NAVD 88) and extend generally to the top of the bank along berths 13 and 14 (FEMA Map 53011C0363D). In addition, there is an isolated floodplain located on Parcel 1A as shown on FEMA Map 53011C0364D. The port filled this area as authorized by City permit GRD2012-00025.

The 100-year floodplain represents the area subject to flooding by a flood with a 1 percent chance of being equaled or exceeded in any given year. Hazards from flooding include an increase in river elevation and current and the amount of debris in the river. During a flood the river levels will rise and can inundate, damage or sweep away buildings or equipment, result in debris accumulation, and present hazards to river navigation.

Facility elements that are located in the Floodplain include berths 13 and 14 and the control room, e-house and motor control center buildings in Area 400.

It is not anticipated that any fill will be placed in the flood fringe or floodway.

2.18.3.1 Mitigation for Flooding

The Facility will be designed to comply with the City's Frequently Flooded Areas provisions of the Shoreline Management Program. These provisions require that buildings and structures located in the floodplain be elevated to at least one foot above the flood elevation or be floodproofed, be anchored to prevent floatation, collapse or lateral movement and incorporate

other design elements to insure safety during a flood event. Compliance with these provisions will be determined during the issuance of construction permits anticipated by EFSEC.

Dock operations will comply with the USCG- and Ecology-approved Terminal Operating Limits as published in the Terminal Operations Manual.

2.18.4 Tsunami

Tsunamis are large damaging waves generated in oceanic areas due to earthquakes. The project site is approximately 95 miles up the Columbia River from the Pacific Coast and is at an elevation of approximately 25 to 35 feet (North American Vertical Datum [NGVD]). Based on the distance from the coast to the site and the elevation of the project site, tsunamis are not considered a potential hazard, and tsunami inundation is not a concern for the project. No mitigation measures are considered necessary for tsunami hazards.

Seiches are earthquake-generated waves that can occur in inland bodies of water, including rivers. The site is adjacent to the Columbia River. After the 1964 Alaska earthquake, a very minor (less than 1 foot) seiche was reported in the upper (non-free flowing) section of the Columbia River system from McNary Reservoir (McNary Dam) to Franklin D. Roosevelt Lake (Grand Coulee Dam) (McGarr and Vorhis 1965). No historic seiches are known from the lower, free-flowing Columbia River. The likelihood that seiches could affect the project is very low. No mitigation measures are considered necessary for seiche hazards.

2.18.5 Storms

Washington State is vulnerable to severe weather events, primarily from storm systems moving into the State from the Pacific Ocean. Severe storms are generally considered to be an atmospheric disturbance with sustained winds of over 40 mile per hours and or significant precipitation events. The County has been subject to infrequent but severe weather events including the Columbus Day Windstorm in October 1962, with recorded wind speeds of up to 92 miles per hour in Vancouver. Tornadoes occur very infrequently but have occurred in Vancouver including a Category F-3 event in April 1972 and an EF-1 event in January of 2008 that touched down NE of the project site near Vancouver Lake. Other severe weather events include ice storms resulting from strong easterly winds through the Columbia Gorge and lightning strikes. Strong winds and tornadoes can damage buildings and equipment. Lighting could strike buildings affecting power and electrical equipment. Ice storms can coat roads, equipment and buildings resulting in unsafe travel and working conditions and increase load on roofs. Heavy rainfall events can result in localized standing water.

2.18.5.1 Mitigation for Storms

The Facility will be designed to comply with the International Building Code requirements to reduce the risk of damage to structures from storm events. Buildings will be designed for a snow load of 25 pounds per square foot and a 135 mph wind speed (exposure c, strength level per ASCE 7-10). Protection against lightning will be provided by proper grounding and use of intrinsically safe electrical installations. All buildings are required to be designed by a structural engineer. Compliance with the code provisions will be determined during the building permits administered by EFSEC.

During severe weather events, the Facility operator will monitor the conditions at the site and if conditions result in risks to employees or facilities, will cease operations until safe to resume.

2.18.6 Avalanche and Landslides

Landslide hazard areas are typically defined as areas that, due to a combination of slope inclination, soil type, geologic structure, and the presence of water, are susceptible to failure and subsequent downhill movement. No landslides have been mapped on the site or in the vicinity of the project area (Fiksdal 1975). With the exception of along the banks of the Columbia River, the project site is relatively flat. The banks of the river near the area of the dock and a small depression in the area of the storage area have portions where slope inclinations are greater than 25 percent. Avalanche is typically associated with the rapid flow of snow downhill. The project site is well below the snow line elevation and climatic conditions generally do not allow the buildup of snow at the site. Avalanches are not a concern for the project and no mitigation measures are considered necessary.

Based on the lack of landslide deposits mapped in the vicinity of the site, its low topographic relief, and the absence of geologic structures that may increase landslide susceptibility, the impact of landslides to the project is negligible. No mitigation for landslide hazard is anticipated.

Section 2.19 – Security Concerns

WAC 463-60-275
Proposal – Security concerns.

The application shall describe the means employed for protection of the facility from sabotage, terrorism, vandalism and other security threats.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-275, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-275, filed 10/8/81. Formerly WAC 463-42-300.)

Section 2.19 Security Concerns

2.19.1 Port of Vancouver Security

The Facility is located at the Port and will be operated in accordance with the Port's security program. Access to the port's marine terminals is allowed primarily through the main security gate at the 26th Avenue overpass. The port's security plan and policies require that all people entering the port's terminal areas show photo identification and have a valid business purpose to be on the facility. This is accomplished through the port's screening process, administered to anyone who enters the port's marine terminals. In addition, this area is secured with fencing, video camera monitors and 24/7 stationary and mobile patrols.

All personnel who perform work (including contractors and consultants) within the Port's maritime facility are required to have a Transportation Worker Identification Credential (TWIC) in order to perform their duties without an appropriate credential person to provide an escort. This program was established by Congress and is administered by the Transportation Security Agency and the USCG.

2.19.2 Construction Phase Security Plan

The Applicant and selected contractor(s) will develop a formal site security plan to safely secure the site during the construction phase. This plan will outline access procedures, roles and responsibilities and identify the methods of physically securing the site. Measures such as perimeter fencing, access gates, CCTV systems and security personnel may be employed. Area 400 will require that construction personnel comply with TWIC requirements. The plan will be developed in coordination with the Port security personnel. .

2.19.3 Operations Site Security Plan

An Operations Site Security plan will be completed pursuant to 33 CFR 105 and will be approved by the Port and USCG. Security measures anticipated at the site include fencing to prevent any public access to project facilities. The northern side of the WVFA rail loop facilities is fenced to prevent public access. Security gating will be provided at the rail loop access at the Gateway overpass. Security provisions for Area 400, Marine Vessel Loading, will be implemented as described in Section 2.19.4 below.

Parking for the facility's operations and maintenance staff will be provided at the administration and support buildings. All other persons, such as vendor equipment personnel, maintenance contractors, material suppliers, and all others, will acquire permission for access from a designated site employee prior to entrance. Access to each project area will be granted on a project/job need basis by the Plant Manager.

2.19.4 Federal Requirements Applicable to Area 400 – Marine Vessel Loading

2.19.4.1 Overview

As a result of the facility's capacity to transfer oil in bulk to a vessel that has a total capacity of all bulk products carried of 250 barrels or more, the facility is regulated under the federal provisions of 33 CFR 154. In turn, the Maritime Transportation and Security Act of 2002 (MTSA), as implemented through 33 CFR 105, establishes federally mandated security requirements for facilities regulated under 33 CFR 154. The provisions of 33 CFR 105 will only

apply to the facilities located, and activities conducted, at Area 400 – Marine Vessel Loading. The primary provisions of 33 CFR 105 are summarized in Table 2.19-1 below.

Table 2.19-1. Summary of 33 CFR 105 Provisions

Subpart	Provisions
Subpart A – General	• Applicability, documentation and compliance dates • Compliance with the Maritime Security (MARSEC) directive
Subpart B – Facility Security Requirements	• Definition of a security organizational structure, including the appointment of a Facility Security Officer, preparation and conducting of a Facility Security Assessment (FSA) in accordance with Subpart C, and implementation of the Facility Security Plan (FSP), including related training, drill and record keeping activities. • Implementation of the TWIC program • Compliance with Maritime Security (MARSEC) level coordination and implementation at the port
Subpart C – Facility Security Assessment (FSA)	• Requirements for conducting and documenting the FSA
Subpart D – Facility Security Plan (FSP)	• Format, Content and preparation of the FSP • Requirements for submittal of the FSP 60 days prior to the beginning of terminal operations • Amendment, annual auditing, and biannual USCG inspection processes

2.19.4.2 Facility Security Plan

The Applicant will conduct a FSA and develop a FSP in accordance with 33 CFR 105; the plan will be submitted to the USCG Captain of the Port (COPT) 60 days prior to beginning operations at Area 400. The plan is sensitive security information and will be protected in accordance with 49 CFR 1520. The contents of the plan will be developed based on the final design and operational parameters of the facility, and are expected to include, but not be limited to, the implementation of the following security actions, subject to final determination by the USCG:

- All unloading, storage, internal pipe lines, and valves will be contained within the facility's restricted area that will be monitored by a dedicated security force at all times.
- Access to the restricted area will be secured and monitored.
- Site security lighting
- Monitored security video camera system
- All persons requiring unescorted access to the facility, including employees and contractors, must possess Transportation Workers Identification Credential (TWIC).
- Conducting security exercises and drills
- Identification of coordination actions with local and state law enforcement agencies.
- Procedures for access during emergency events
- Appointing a Facility Security Office with responsibilities to maintain and implement the FSP.

In addition, the Port will support and supplement the Facility's security efforts with controls to deter access, and fixed and mobile patrols and will coordinate with the Facility for an integrated security posture.

Section 2.20 – Study Schedules

WAC 463-60-285
Proposal – Study schedules.

The application shall furnish a brief description of all present or projected schedules for additional environmental studies. The studies descriptions should outline their scope and indicate projected completion dates.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-285, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-285, filed 10/8/81. Formerly WAC 463-42-130.)

Section 2.20 Study Schedules

The Applicant has not identified or is aware of any additional environmental studies necessary to support the application for site certification. Additional technical documentation will be completed for the design of the facility, including a final Geotechnical Investigation Report. It is possible that additional studies may be required by federal agency consultation.

Section 2.21 – Future Activities

WAC 463-60-295
Proposal – Potential for future activities at site.

The application shall describe the potential for any future additions, expansions, or further activities which might be undertaken by the applicant on or contiguous to the proposed site.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-295, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-295, filed 10/8/81. Formerly WAC 463-42-140.)

Section 2.21 Potential for Future Activities at the Site

At this time, the Applicant does not have any plans for additions, expansions, or future activities within the proposed project boundary or on properties contiguous to the proposed project boundary. The lease between the Applicant and the Port allows for other activities by the Applicant, including handling of other petroleum products, receiving petroleum products at the Marine Terminal and expanding the facility. The Applicant does not presently have plans to conduct these activities, nor does the facility design support these activities. At this time, these activities are speculative and engineering and environmental information is not available to support permitting. If the Applicant chooses to modify the facility to take advantage of the above-described allowances of the lease, an amendment to the Site Certification Agreement would be pursued through EFSEC.

Section 2.22 – Analysis of Alternatives

WAC 463-60-296
Proposal – Analysis of alternatives.

The application shall include an analysis of alternatives for site, route, and other major elements of the proposal.

(04-23-003, recodified as § 463-60-296, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013,§ 463-42-296, filed 10/11/04, effective 11/11/04.)

Section 2.22 Analysis of Alternatives

The Facility's principal purpose is to provide North American sourced crude oil to U.S. refineries to potentially offset or replace declining Alaska North Slope and California crude oil production and more expensive foreign crude oil imports. The Port site is the closest developed deep-water marine water terminal to the Midwest oil fields, therefore minimizing the distance needed for product transportation and shipping to West Coast refineries.

2.22.1 Site Selection

The Facility is designed to receive crude oil by rail, store it on site, and load it on marine vessels for shipment to various consumers and end users located primarily on the West Coast. The Port issued a "statement of interest" seeking proposals to develop a petroleum by rail facility at the Port. Tesoro, a long term Port tenant, teamed with Savage Services Corporation to jointly submit a proposal to the Port for the formation of the Application and development of the Facility. The Port received four proposals and after consideration of a variety of criteria, including safety, environmental, community, financial, market and operations, selected the Applicant to enter into negotiations for the site.

Three elements are necessary to develop a facility of this type: 1) a deep draft Port facility; 2) rail infrastructure capable of handling unit trains; and 3) a site large enough to accommodate the various facility elements. The site selected for the facility meets all of these criteria:

1) The Port of Vancouver is located at head of the deep-water shipping channel on the Columbia River; the facility will use an existing berth built in the 1990s and established specifically for deep draft vessels

2) The Terminal 5 site represents the westernmost extension of the WVFA project and is designed to accommodate unit trains. The WVFA project also involves other improvements specifically designed to increase the ability to the Port to handle train traffic.

3) In addition to the developed WVFA rail loop at Terminal 5, sufficient land is available at Parcel 1A to accommodate the necessary storage tanks for the temporary storage of crude oil. Furthermore, the location proposed for facility elements have all been previously disturbed, and there will be no fill of wetlands or surface water bodies.

The Applicant has worked very closely with the Port to ensure the facility will not impede overall terminal use by existing tenants or the development of other Port projects. All project elements have been carefully sited to avoid conflicts with existing easements and utilities, and to allow continued access to existing and future adjacent activities. In addition, the project will reuse a former brownfield site for job creating activities and reduce pressures for the development of greenfield locations.

2.22.2 Unloading System Alternatives

During project design, the Applicant considered two variations for the unloading facility: An uncovered facility and a covered facility. Ultimately the development of a covered facility was selected for the following reasons:

- A covered facility minimizes the amount of stormwater that can potentially come in contact with an unintentional release of materials, and allows the use of the existing Port stormwater facilities as described in Section 2.11 above; exposure of stormwater in the unloading area to

potential contaminants would have meant that stormwater collected from this area would have needed to be treated as process water and could not be sent to the City's WWTP, resulting in more ground disturbance to construct the necessary capture, treatment and discharge facilities.

- A covered facility minimizes the amount of stormwater that can potentially come in contact with an unintentional release of materials, and allows the use of the existing Port stormwater facilities for disposal as described in Section 2.11 above; exposure of stormwater in the unloading area to potential contaminants would have meant that stormwater collected from this area would have required additional control and treatment resulting in more ground disturbance to construct the necessary improvements.

2.22.3 Wastewater Discharge

As noted in Section 2.9.4, the total discharge amount of the Facility's wastewater flows is not significant when compared to the overall City treatment plant flows or capacity. The boiler units and effluent pretreatment systems are standard equipment. The location of the project within the City's service area and sanitary sewer service basin of the City WWTP eliminates further alternatives analysis. Discharges will be within the City discharge requirements.

2.22.4 Stormwater Discharge

The existing Port stormwater capture and treatment infrastructure at the site is fully developed. As described in Section 2.11, the conveyance facilities have the capacity to accept treated facility stormwater. Establishment of a separate stormwater system would have required substantially more ground disturbance, including a new outfall to the Columbia River.

2.22.5 Marine Terminal

As noted above, overall site selection considered the availability of existing berthing facilities. The existing berths 13 and 14 are suited to the use being proposed by the Facility. Although modifications are required to meet industry standards, the impacts of these modifications are significantly lower than the impacts of developing a new marine terminal. Constructing a new marine terminal would have likely included dredging, driving a large number of pile, creating all new over-water surface, and possible bank modifications. Selection of the existing berths over a green-field location significantly minimized new impacts, and all additional new impacts will be fully mitigated.

2.22.6 Air Emissions Control

As part of the air permitting effort, the Applicant performed a BACT analysis to identify pollutant-specific alternatives for emission control, and the pros and cons of each alternative. This analysis is presented in detail in Section 5.1. This was made on a case-by-case basis and considered the technical, economic, energy and environmental costs of a certain type of control process for each emissions source.

2.22.7 Route Selection

Route Selection is not applicable to this Facility, as the Facility does not have any linear electrical or gas transmission elements.

2.22.8 No Action Alternative

Under the No Action Alternative, the Facility would not be built. U.S. refineries located along the West Coast would continue to receive crude oil from existing sources, i.e., domestic sources connected to existing overland transportation systems capable of moving the crude oil to the west coast, the Alaska North Slope, and foreign sources. More costly foreign imports would likely make up for declining Alaska North Slope and California crude oil production.

Section 2.23 – Pertinent Federal, State, and Local Requirements

WAC 463-60-297
Proposal – Pertinent federal, state and local requirements.

(1) Each application shall include a list of all applicable federal, state, and local statutes, ordinances, rules, permits, and required use authorizations (i.e., leases, easements, rights of way, or similar authorizations) that would apply to the project if it were not under council jurisdiction. For each federal, state, or local requirement, the applicant shall describe how the project would comply or fail to comply. If the proposed project does not comply with a specific requirement, the applicant shall discuss why such compliance should be excused.

(2) Inadvertent failure by the applicant to discover and list a pertinent requirement shall not invalidate the application, but may delay the council's processing of the application.

(04-23-003, recodified as § 463-60-297, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-297, filed 10/11/04, effective 11/11/04.)

Section 2.23 Pertinent Federal, State, and Local Requirements

2.23.1 Applicable Federal, State, and Local Permits and Requirements

Table 2.23-1 includes a list of the federal, state, and local permits and requirements that would apply to the proposed project if it were not reviewed under the EFSEC process. The table includes the name of the permit or approval, the agency responsible for issuing the permit along with the applicable regulation or statute, and the section of the EFSEC application that addresses that requirement. For the meaning of the acronyms used in the table, please see the list of acronyms, initialisms, and abbreviations at the beginning of this application.

Table 2.23-1. Applicable Federal, State, and Local Permits and Requirements

Permit or Approval	Agency/Statute and/or Regulation	Application Section
Federal Permits/Approvals		
NEPA Compliance	USACE (anticipated federal lead agency for this project) 40 CFR 1500-1508	Not Applicable
ESA Section 7 Consultation	USFWS and NMFS Section 7 of ESA	3.4, Appendix H.1
Magnuson Stevens Fisheries Conservation and Management Act	NMFS 50 CFR 600	3.4, Appendix H.1
Marine Mammal Protection Act (MMPA)	USFWS and NMFS 50 CFR 18 and 50 CFR 216	3.4, Appendix H.1
National Historic Preservation Act (NHPA) Section 106 Review	USACE, in consultation with Department of Archeology and Historic Preservation (DAHP) 16 USC 470	4.2.5,
Section 10 Permit	USACE Rivers and Harbors Act 33 CFR 322	Appendix H.2
Private Aids to Navigation (PATON) Permit	USCG 33 CFR 62	4.3
Hazardous Materials & Oil Transportation Regulations	US Department of Transportation Hazardous Material Transportation Act (HMTA), 49 CFR 100-185	4.1.4
Maritime Procedures	USCG 46 CFR 35 (Tank Vessels – Operations)	2.10
MTSA	USCG 33 CFR 101-107	2.19
State Permits/Approvals		
SEPA Compliance	Ecology (EFSEC lead agency for this project) RCW 43.21C and WAC 197-11	Parts 2, 3, and 4
Hydraulic Project Approval (HPA)	WDFW Hydraulic Code (RCW 77.55 and WAC 220-110)	Appendix H.2
Ballast Water Management	WDFW RCW 77.120 and WAC 220-150	Appendix H.1

Permit or Approval	Agency/Statute and/or Regulation	Application Section
Aquatic Land Management	Washington State Department of Natural Resources (DNR) RCW 79.105 and WAC 332-30-123	H.2
NPDES Industrial Stormwater Permit	Ecology Clean Water Act (CWA), 40 CFR 122.28, RCW 90.48 and WAC 173-220	5.2
NPDES Construction Stormwater General Permit	Ecology CWA, 40 CFR 122.28, RCW 90.48 and WAC 173-220	5.3
MTCA Consent Decree/ Restrictive Covenant Work	Ecology RCW 70.105D, RCW 64.70, WAC 173-340	4.1
Facility Oil Handling Standards • Oil Transfer Requirements • Design Standards • Operations Manual • Training/Certification • Oil Transfer Response Plans	Ecology 33 CFR 154 (Facilities Transferring Oil or Hazardous Material in Bulk), 40 CFR 112 (Oil Pollution Prevention), 40 CFR 300 (National Oil and Hazardous Substances Pollution Contingency Plan) WAC 173-180 (Facility Oil Handling Standards)	2.10, 2.19, 4.1
Vessel Oil Transfer Advance Notice and Containment	Ecology 40 CFR 112 (Oil Pollution Prevention) WAC 173-184	4.1
Spill Prevention and Contingency Plans	Ecology 40 CFR 112 (Oil Pollution Prevention) RCW 90.56 (Oil and Hazardous Substance Spill Prevention and Response), WAC 173-180 (Facility Oil Handling Standards), WAC 173-182 (Oil Spill Contingency Plan), WAC 173-183 Oil Spill Natural Resource Damage Assessment	2.10, 2.11, 5.2, 5.3
Dangerous/Hazardous Waste Regulations	Ecology RCRA 40 CFR 260 RCW 70.105 (Hazardous Waste Management), WAC 173-303	4.1
Safety and Health Regulations	Washington State Labor & Industries OSHA RCW 49.17 (WISHA), WAC 296	4.1
Local Permits/Approvals		
Site Plan Review	City VMC 20.270	4.2
Shoreline Substantial Development Permit	City RCW 90.58 and City SMP	Appendix I.1, I.2
Critical Areas Permit	City VMC 20.740	4.2, Appendix H.1
Tree Ordinance	City VMC 20.770	2, Appendix H.1
Archaeological Predetermination Review	City VMC 20.710	4.2.5
Transportation Concurrency	City VMC 11.70	4.3, Appendix J

Permit or Approval	Agency/Statute and/or Regulation	Application Section
Major Grading Permit	City IBC, VMC Title 12 and Title 17	3.1, Appendix G
Civil Engineering Review	City VMC Title 10, Title 11, and Title 14	Appendix F, G, J
Building, Fire, Mechanical and Electrical Permits	City IBC, IMC, IFC, UPC, NEC, Washington State Energy Code, VMC Title 16 and Title 17	2.18, 3.1, 4.1
Industrial Waste Discharge Permit	City Wastewater Discharge Standards WAC 173-221A VMC 14.10	5.2
Air Discharge Permit(s)	SWCAA Clean Air Act Vapor Combustion System design and operation regulation by USCG 33 CFR 154 NSPS 40 CFR 60 Crude Oil Storage Tanks equipment and procedures defined in 40 CFR 60.112b HAPs 40 CFR 61 MACT Standards 40 CFR 63 RCW 70.94 NOC preconstruction permit WAC 173-400-110 Title V air operation permit WAC 173-401 TAPs WAC 173-460 Particulate Matter WAC 173-470 Sulfur Oxides WAC 173-474 VOCs WAC 173-490	5.1

2.23.2 Federal Permits and Approvals

This section covers applicable federal permits and approvals for the proposed project. Where a federal regulation is delegated to the state, it is included under the state process in section 2.23.3 below.

2.23.2.1 National Environmental Policy Act Compliance

Federal lead agency is likely the USACE.
40 CFR 1500-1508

Any project with a federal nexus requires that the lead federal agency comply with the National Environmental Policy Act (NEPA). The federal action of issuance of a permit or approval by the USACE triggers NEPA review, and the USACE typically will take NEPA lead status.

Project Compliance

The USACE, or appropriate lead agency, is responsible for compliance with the requirements of NEPA. For the proposed project, NEPA compliance will require the preparation of an environmental assessment (EA) or environmental impact statement (EIS). The Applicant would provide the USACE with any relevant project studies and information to assist the NEPA review and determination. The USACE handles all NEPA review and documentation requirements as part of the Section 10 permit (see section 2.23.6).

2.23.2.2 Endangered Species Act, Section 7 Consultation

USFWS and NMFS
Section 7 of the Endangered Species Act

The Endangered Species Act (ESA) provides protection for federally listed endangered and threatened species and their habitat. The ESA requires that federal agencies consult with the USFWS and NMFS when actions have the potential to affect listed species or critical habitat. NMFS addresses actions affecting salmon, other marine fishes, marine mammals, and marine reptiles. USFWS addresses actions affecting birds, terrestrial animals, plants, amphibians, and most freshwater fish. The consultation process can be informal if the effects would beneficial or discountable, or formal if the effects are more than discountable. The Columbia River provides habitat for multiple listed salmonids, smelt, sturgeon, and Steller sea lion. The proposed in-water construction elements require federal permits which triggers the need for ESA compliance.

Project Compliance

The USACE, as the federal lead agency for the proposed project, is required to demonstrate compliance with Section 7 of the ESA. A biological evaluation (BE) will be prepared and submitted to the USACE as the federal lead for consultation with the USFWS and NMFS. Because the project may affected listed species and/or critical habitat it is likely to require formal consultation and the USACE will provide the BE to USFWS and NMFS. NMFS and/or USFWS will prepare a biological opinion if warranted that documents the effects on the species and critical habitat and establishes terms and conditions for the USACE to follow in issuance of the permit.

2.23.2.3 Magnuson Stevens Fisheries Conservation and Management Act

NMFS
50 CFR 600

The Magnuson Stevens Fisheries Conservation and Management Act provides for the conservation and management of fishery resources to prevent overfishing, rebuild overfished stocks, and facilitate the long-term protection of essential fish habitats in order to protect the viability of commercial and recreational fisheries. The Act requires that federal agencies consult with NMFS when actions have the potential to affect essential fish habitat. The consultation is done as part of the ESA consultation process described above.

The Columbia River includes habitats that have been designated as essential fish habitat (EFH) under the Act for various life-history stages of Chinook and coho salmon (Pacific salmon EFH composite). The proposed in-water construction elements require federal permits which triggers the need for compliance with the Act.

Project Compliance

The USACE, as the federal lead agency for the proposed project, is required to demonstrate compliance with the Magnuson-Stevens Act. A BE will be completed for this project and will be submitted to the USACE as the federal lead for consultation with NMFS. NMFS will review the BE.

2.23.2.4 Marine Mammal Protection Act

USFWS and NMFS
50 CFR 18 and 50 CFR 216

The Marine Mammal Protection Act (MMPA) provides protection for all marine mammals and prohibits the import, export, sale, hunting, killing, capture, and harassment of marine mammals. Activities that could result in the "take" of marine mammals should be designed and implemented to avoid take. If take is unavoidable, issuance of an Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA) may be required.

The Columbia River provides habitat for California sea lions, harbor seals, and Steller sea lions which are protected by the MMPA under the jurisdiction of NMFS. Steller sea lions are also protected under the ESA. The proposed project, with both in-water work and activities adjacent to the river, has the potential to impact these species.

Project Compliance

The pile driving associated with the improvements to berths 13 and 14 will generate sound levels that exceed established thresholds and can impact marine mammals. It is anticipated that the pile driving will be timed to occur when marine mammals are not likely to present in the Columbia River. If necessary, a marine mammal monitoring plan will be implemented to shut down pile driving operations if a marine mammal is sighted in the area where noise levels exceed the established thresholds.

2.23.2.5 Section 106 Review

Department of Archaeology and Historic Preservation
Section 106 of the National Historic Preservation Act

The National Historic Preservation Act (NHPA) provides for the preservation of sites listed on the National Register of Historic Places and those eligible for listing. The NHPA requires the lead federal agency to consider the impacts of a federal action on any cultural or historic resource listed on or eligible for listing on the National Register.

Project Compliance

The USACE, as the anticipated federal lead agency for the proposed project, is required to demonstrate compliance with Section 106 of the NHPA. State and local compliance with cultural resources regulations is addressed below in section 2.23.4.5. A cultural resources report will be prepared and submitted the USACE as part of the Section 10 permit process.

2.23.2.6 Section 10 Permit

United States Army Corps of Engineers (USACE)
Rivers and Harbors Act 33 CFR 322

A Section 10 permit issued by the USACE is required when work occurs in, over, or within a navigable waterway. The Columbia River is a navigable waterway, and proposed work associated with the ship loading and the existing dock at berths 13 and 14, triggers the requirement for a Section 10 permit.

Project Compliance
A Joint Aquatic Resource Permit Application (JARPA) (Appendix H.2) has been prepared for the project and will be submitted to the USACE for review and issuance of the Section 10 permit. The JARPA is submitted with applicable reports and studies completed for the project to demonstrate how the project complies with the permitting requirements.

2.23.2.7 Private Aids to Navigation Permit

United States Coast Guard (USCG)
33 CFR 62

A Private Aids to Navigation (PATON) permit issued by the USCG is required for all activities involving in-water structures that may affect marine traffic or involve the installation of navigational aids (lights and/or markings). In-water construction elements may elect to, or be required to, install lights or other markings to aid in navigation. A permit is required to install new navigational aids and/or modify existing navigational aids.

Project Compliance
The USACE will provide the USCG with a copy of the submitted JARPA and the USCG will review the application to determine if navigational aids will be required. Any new or modified navigational aids will follow the requirements for navigational aids per 33 CFR 62.

2.23.2.8 Hazardous Materials & Oil Transportation Regulations

U.S. Department of Transportation (USDOT)
49 CFR 100-185

The USDOT regulates the transportation of hazardous materials for all modes of transportation, including air, highway, rail and water under the hazardous materials regulations (HMR) contained in 49 CFR 100-185. The Marine Terminal elements, as a portion of the facility used to transfer oil in bulk to a vessel, must comply with the applicable HMRs.

Project Compliance
Facility design, procedures, policies, and operations of the proposed elements at the Marine Terminal will be carried out in accordance with the rules and regulations of 49 CFR 100-185.

2.23.2.9 Maritime Procedures

USCG
46 CFR 35

The purpose of 46 CFR 35 is to regulate the operations of tank vessels. Specifically, 49 CFR 35.03 requires that work vests be worn by crew members when working near or over water under favorable working conditions. Section 49 CFR 35.30 covers general safety rules and subpart 35.35 covers requirements that apply to cargo handling on tank vessels.

Project Compliance
All vessels calling on the Facility will comply with the provisions of the program in the operation of the vessel.

2.23.2.10 Maritime Transportation Security Act (MTSA)

USCG
33 CFR 101-107

The Maritime Transportation Security Act (MTSA) is designed to protect ports and waterways from a terrorist attack. The law requires vessels and port facilities to develop security plans and conduct assessments of the vulnerability of their facilities. The USCG collaborates on the plans to help secure ports and vessels in or adjacent to U.S. waterways.

Project Compliance

The proposed project will produce the required facility plans for the operation of the oil terminal in compliance with the MTSA. These plans are discussed in further detail in section 2.19 of this application.

2.23.3 State Permits and Approvals

2.23.3.1 State Environmental Policy Act Compliance

Ecology (EFSEC will be lead agency for this application)
RCW 43.21C and WAC 197-11

The SEPA requires that any decisions by state or local agencies related to issuance of permits, construction of public facilities, or adoption of regulations or policies, is reviewed to understand how the proposal affects the environment. Environmental review is required under SEPA for any project or activity not meeting the categorical exemption thresholds found in WAC 197-11-800. Typically, the agency responsible for the project or permits is the lead agency. EFSEC is the lead agency for projects requiring site certification.

Project Compliance

Absent EFSEC review, Ecology and/or the City will be the likely SEPA lead agency. It is anticipated that EFSEC will be the lead agency for the project because the project is applying for EFSEC site certification. As lead agency, EFSEC will issue a scoping notice to receive comments from the public, other agencies and jurisdictions, and interested tribes. Scoping will help identify what will be studied in the environmental impact statement (EIS). The lead agency will then evaluate the proposal and issue a draft EIS, followed by a final EIS.

2.23.3.2 Hydraulic Project Approval

Washington State Department of Fish and Wildlife (WDFW)
Hydraulic Code (RCW 77.55 and WAC 220-110)

Hydraulic Project Approval (HPA) is required for any construction activities that use, divert, obstruct, or change the natural flow or bed of any fresh water or saltwater of the state (e.g., the Columbia River). The proposed project will likely require an HPA for work proposed in the water.

Project Compliance

It is anticipated that EFSEC will contract with WDFW to prepare a recommendation to issue an HPA as part of the site certification. A JARPA has been completed for the project. WDFW can use it in the review and recommendation for issuance of the HPA. The JARPA is submitted with

applicable reports and studies completed for the project to demonstrate how the project complies with the permitting requirements.

2.23.3.3 Ballast Water Management

WDFW
RCW 77.120 and WAC 220-150

The WDFW Ballast Water Program regulates the management of ballast water for all vessels of 300 gross tons or more that have operated outside the waters of the state. The owner or operator of a vessel is required to complete a ballast water reporting form at least 24 hours before arriving in waters of the state. Discharge of ballast water is allowed only if there has been open sea exchange or if the ballast water has been treated and meets standards as set in the law.

Project Compliance
All vessels calling on the Facility will comply with the provisions of the program in the operation of the vessel.

2.23.3.4 Aquatic Land Management

Washington State Department of Natural Resources (DNR)
RCW 79.105 and WAC 332-30-123

The DNR Aquatic Resources Program manages the use of state-owned aquatic lands to ensure that their use is appropriate and done in a manner that considers the environmental risks, public health and safety risks, and financial risks of the proposed use. DNR regulates use of aquatic lands by issuing a use authorization.

Most of Area 200 is located on land that is under ownership by the Port. A small portion of Berth 13 is located on DNR lands, and the Port and DNR have entered into an agreement that allows the Port to assume management of state owned aquatic lands on behalf of DNR.

Project Compliance
The Port will make appropriate notice to DNR as required by the Port management area agreement.

2.23.3.5 NPDES Industrial Stormwater Permit

Ecology
Clean Water Act, 40 CFR 122.28, RCW 90.48 and WAC 173-220

A NPDES permit is required for any surface water discharges of stormwater from industrial facilities. Stormwater from the project site will be discharged to the Port's stormwater system, which in turn discharges to the Columbia River through existing outfalls. Wholesale petroleum bulk stations and terminals (SIC Code 5171) are listed in the general permit as requiring coverage under the industrial general stormwater permit. However, WAC 463-76-031 only allows coverage under the general permit for areas not associated with the industrial activity. Therefore, the need for an individual permit is anticipated.

Project Compliance
Section 5 includes the required application materials for the NPDES permit.

2.23.3.6 NPDES Construction Stormwater General Permit

Ecology
Clean Water Act, 40 CFR 122.28, RCW 90.48 and WAC 173-220

An NPDES Construction Stormwater General Permit is required for any construction disturbing more than 1 acre of land. The project will disturb more than an acre of land and will require obtaining permit coverage.

Project Compliance
A Notice of Intent (NOI) is the application form required to obtain coverage under this permit. Along with the NOI, an impaired water body analysis – and supplemental reports (if necessary) – may be required for issuance of the permit coverage. In addition, an SWPPP must be developed and maintained and inspection, monitoring, and reporting are required during construction. An NOI is provided in section 5.3 of this application.

2.23.3.7 MTCA Consent Decree/Restrictive Covenants

Ecology
RCW 70.105D, RCW 64.70, WAC 173-340

The proposed project site was previously the location of industrial activities that resulted in soil and groundwater contamination. Final removal of contaminated soils on the project site was completed in March 2010 as required by the Cleanup Action Plan and Consent Decree for the site. However, residual concentrations of contaminants remain on the site and an Environmental Restrictive covenants have been placed on the property. In addition, there are four locations within the proposed project boundary that have more restrictive conditions (described further in section 4.1). The proposed project will be required to demonstrate conformance with the requirements of the consent decrees and restrictive covenants for the site.

Project Compliance
Any project activities that propose changes within the locations on the project site under consent decrees or restrictive covenants will be required to receive Ecology approval and demonstrate that the project complies with the consent decree. It is anticipated that EFSEC will coordinate with the Port, as land owner subject to covenant, and with the Industrial Section of Ecology through the site certification process.

2.23.3.8 Facility Oil Handling Standards

Ecology
WAC 173-180, 33 CFR 154, 40 CFR 112 (Oil Pollution Prevention), 40 CFR 300 (National Oil and Hazardous Substances Pollution Contingency Plan),

The Facility oil handling standards in WAC 173-180 cover all aspects of operations for the proposed project, including oil transfer requirements, design standards, operations manuals, training and certification, and oil transfer response plans. These standards require that the proposed Facility prepare facility operation plans, security plans, emergency and spill response plans to address potential security and safety concerns for the Facility.

Project Compliance
The proposed project will produce the required facility plans for the operation of the oil terminal in compliance with WAC 173-180. These regulations are discussed in further detail in sections 2.10, 2.19 and 4.1 of this application.

2.23.3.9 Vessel Oil Transfer Advance Notice and Containment

Ecology
40 CFR Part 112 (Oil Pollution Prevention), WAC 173-184

An advance notice of oil transfer (ANT) is required for the project during operations any time oil is transferred to a ship. The purpose of these notices is to ensure the safe transfer of oil on or over water to meet the zero spill goal established by WAC 173-184.

Project Compliance
When submitted to Ecology through the online ANT system, the ANT will demonstrate compliance with the requirements of WAC 173-184. These notices will be required during operations of the site and not during construction activities.

2.23.3.10 Spill Prevention and Contingency Plans

Ecology
40 CFR 112, RCW 90.56, WAC 173-180 and WAC 173-182, WAC 173-183

An SPCC plan is required for both construction and operation of the proposed project to help prevent any discharge of oil into navigable waters or adjoining shorelines. The SPCC plan for construction is a required submittal item for the NPDES permits described above and the various prevention and facility operating plans required for the project. An oil spill contingency plan is also required for the project and will be developed and in place prior to operations beginning at the site.

Project Compliance
An outline of the contents of an SPCC plan is included per WAC 463-60-205 and described in Section 5.2 and 5.3 as part of the applications for wastewater and stormwater discharges. Compliance with WAC 173-180, 173-182, and 173-183 is further discussed in sections 2.10 and 2.11 of this application. Final SPCC plans for both construction and operations will be completed prior to the beginning of construction or operations.

2.23.3.11 Dangerous/Hazardous Waste Regulations

Ecology
RCRA, RCW 70.105, WAC 173-303

Any business that produces dangerous waste is referred to as a “dangerous-waste generator” under WAC 173-303 and is legally responsible to identify dangerous waste and how much may be generated by business activities. Dangerous waste, according to state law, includes both federally identified hazardous waste and Washington “state-only” dangerous waste. The proposed project will comply with the requirements of WAC 173-303 with regards to any hazardous waste generated during construction, operation and decommissioning activities.

Project Compliance
Facility design and operations of the proposed project will be in accordance with the rules and regulations of WAC 173-303. Compliance with the dangerous waste regulations is addressed in section 4.1.3 of this application.

2.23.3.12 Safety and Health Regulations

Washington State Labor & Industries (L&I)
OSHA, RCW 49.17 (WISHA), WAC 296

Employers in Washington must comply with all applicable safety and health rules as identified in WAC 296. The proposed project, as an industrial facility, must also comply with the Washington Industrial Safety and Health Act (WISHA) under RCW 49.17. Compliance with the state regulations results in compliance with the federal Occupational Safety and Health Act (OSHA) that ensures employees do not suffer any material impairment of health and functional capacity due to occupational exposure to hazards.

Project Compliance
Facility design and operations of the proposed project will be carried out in accordance with the rules and regulations of WISHA and WAC 296. Section 4.1.4 of this application provides additional detail regarding compliance with these regulations.

2.23.4 City Permits and Approvals

This section discusses applicable City permits and approvals for the proposed project. As explained in this application, the proposed project will be reviewed and approved through the EFSEC site certification process. The Applicant conducted a pre-application conference with the City and the report is included as Appendix I.1, which identified applicable development standards that would apply to the project absent EFSEC jurisdiction. The applicable City requirements have been stated below. Section 4.2 addresses applicable and use plans and regulations in more detail and how the Facility is consistent with the application standards. Table 2.23-1 lists the applicable city standards and approvals.

Project Compliance
If not reviewed through the EFSEC process, the proposed project would be subject to the City's Type II site plan review process as described in VMC 20.210.050. The City's land use procedures ordinance requires that all land use applications required for a project shall be considered under the highest review process. The Type II process applies to quasi-judicial permit and actions that involve discretion by the responsible official, in this case the planning director. The Type II process includes a public notice but does not involve a public hearing. Appeals of the planning director's decision can be made to the City's land use hearing examiner. Because the project also involves a shoreline substantial development permit, the decision of the City would also be provided to Ecology and appeals of the decision on the shoreline permit could be made to the Washington Shoreline Hearings Boards.

Following approval of the preliminary land use application through the Type II process and resolution of any appeals the City requires approval of final site plan documenting compliance with conditions identified in the land use decision and the approval of engineering plans documenting compliance with City construction standards (for city owned utilities and

roadways). These are followed by the review and issuance of grading, building and other construction permits.

Section 4.2 lists how the project is in compliance with the application city land use standards.

2.23.4.1 Transportation Concurrency

City
VMC 11.70

VMC 11.70 requires that projects that generate additional weekday PM peak hour vehicle trips be reviewed for transportation impacts.

Project Compliance
If not reviewed through the EFSEC process, the proposed project would be subject to the City's Type II site plan review process. The City would address compliance with transportation concurrency standards through the site plan review process.

It is estimated that, at full project build-out, the project as proposed will result in approximately 332 average daily trips (ADT), with approximately 48 trips occurring in the weekday AM peak hour and 46 trips occurring in the weekday PM peak hour. Traffic generation is based on the anticipation that approximately 110 full-time staff will be employed by the Facility at full build-out. The trip estimates are based on trip rates from *Trip Generation*, 9th Edition published by the Institute of Transportation Engineers using data for land use code 110 (Light Industrial).

A transportation impact analysis was completed by Kittelson & Associates for the project. Based on the analysis, all intersections within the study area will operation adequately during the AM and PM peak hours and all concurrency corridors will maintain acceptable levels of service. Additional information is included in section 4.3 and Appendix J of this application.

2.23.4.2 Major Grading Permit

City
IBC, VMC Title 12 and Title 17

A major grading permit is required by the City for any grading, cuts, fills, and or stockpiling of more than 500 cubic yards or by the presence of a critical area no matter the grading volume. Grading permits are required for general site grading and not for excavations for utilities or building foundations.

Project Compliance
If not reviewed through the EFSEC process, the proposed project would be subject to a major grading permit from the City. The grading permit would require the submittal of an application form, grading plans, and geotechnical report. It is anticipated that EFSEC will contract with the City for the review and issuance of this permit.

2.23.4.3 Civil Engineering Review

City
VMC Title 10, Title 11, and Title 14

The City requires that development complete a civil engineering design and review process. This process ensures compliance with the City's engineering standards.

Project Compliance

If not reviewed through the EFSEC process, the proposed project would be subject to the City's civil engineering review process.

The City's civil engineering review requires the submittal of the following documentation: preliminary and final civil plans, erosion/sediment control, water, sewer, contaminated materials management plan, an SPCC plan, and a stormwater report. It is anticipated that EFSEC will contract with the City for the review and issuance of this permit.

Streets and Sidewalks – The project does not include any proposed improvements to existing streets or sidewalks. Primary vehicular access to the proposed project will be to the administration building portion of Area 200, on NW Old Lower River Road, a private road owned and maintained by the Port. NW Old Lower River Road connects with NW Lower River Road (SR 501) approximately 1,000 feet west of the proposed office building. Area 300 will be accessed from a shared drive with Farwest Steel from NW Lower River Road. Area 300 is not anticipated to require full-time staffing and parking will be provided for routine maintenance needs. Area 400 will be accessed by Gateway Avenue and Port-maintained access roads. An existing asphalt area at the berths will be used by project personnel during ship loading operations. Area 600 will not be occupied full time, but parking will be provided for maintenance vehicles and access will be from NW Old Lower River Road. Driveways will comply with the provisions of VMC 11.80.110.

Water – The proposed project location is currently served by City water and a Port-operated private water system. According to the pre-application conference report (lines 1397-1398), City records show an existing 12-inch, 14-inch, and 16-inch ductile iron (DI) main in NW Old Lower River Road, a 16-inch DI main in SR 501, and a 10-inch DI main in NW Harborside Drive in the dock area. Existing fire hydrants are currently available on or adjacent to all areas of the proposed project with an estimated minimum fire flow of 3,500 gallons per minute (gpm). Consistent with City standards as stated in the pre-application report (lines 1407-1430), the proposed project will meet Fire Marshal pipe size requirements.

Sanitary Sewer – The anticipated sanitary sewer discharges include domestic sewerage from the administration and support buildings in Area 200, treated boiler blowdown water (wastewater generated from solids left behind during the steam generation process) in areas 300 and 600, domestic sewerage from a restroom located inside of the boiler building in Area 300, and a sump pump located in the pump basin in Area 300. Boiler blowdown water will be pre-treated for heat before discharge to the City sanitary sewer system. New service laterals will be installed to existing manholes. Pretreatment, sewer connections, and lateral installations will meet applicable City standards. As stated in the pre-application report (lines 1496-1501), the construction of public sewers will not be required.

Erosion Control – The project's grading plans are designed to minimize and control erosion and sedimentation. A site-specific construction SWPPP will be developed and implemented. A preliminary construction SWPPP is included in this application; this preliminary SWPPP was developed based on the Facility level of design at the time of submittal. A final construction SWPPP will be developed prior to beginning any Facility-related ground disturbance.

BMPs will be used in accordance with the SWPPP for the project to ensure compliance with City and state regulations and are further described in Section 3.3.

Stormwater – Stormwater improvements have been analyzed and designed in accordance with City development standards and the Washington State Department of Ecology (Ecology) 2012 Stormwater Management Manual for Western Washington (Stormwater Manual). The stormwater report prepared for the project is contained in Appendix F. Stormwater from the site will be discharged through manmade conveyances to the Columbia River; therefore, the proposed project is exempt from the flow control minimum requirement. Stormwater treatment technologies will be implemented to treat and monitor stormwater quality in accordance with the required NPDES stormwater permits.

2.23.4.4 Building, Fire, Mechanical and Electrical Permits

City
RCW 19.27, IBC, IMC, IFC, UPC, NEC, Washington State Energy Code, VMC Title 16 and Title 17

The Washington State Building Code Act adopts by reference building and related codes that local jurisdictions must adopt and enforce. Titles 16 and 17 of the VMC establish these requirements in the City. Applications and plans are required to be submitted and reviewed by the City prior to issuing permits.

Project Compliance
It is anticipated that EFSEC with contract with the City of Vancouver for review and issuance of permits under the required code provisions as well as for providing the required inspections and issuance of occupancy permits. The project will be required to submit the required permit applications, building, electrical, mechanical, fire, plumbing, and other plans. All plans will be designed in compliance with the codes referenced above. Application and issuance of building permit applications will be completed following issuance of the site certification agreement.

2.23.5 Industrial Waste Discharge

City
VMC 14.10

The City requires industrial waste discharge permits for the discharge of industrial wastewater to the sanitary sewer system. The permit type will be based on the volume and nature of the discharge. New industrial wastewater dischargers must complete a permit application and submit the application at least 120 days prior to the desired date of discharge and the permit must be obtained prior to commencing discharge.

Project Compliance
It is anticipated that EFSEC will contract with the City of the review and issuance of this permit. As required by VMC 14.10.180, the project will submit an application for a new connection and ensure that a permit is issued prior to discharging to the stormwater system.

2.23.6 Southwest Clean Air Agency Permits and Approvals

2.23.6.1 Air Discharge Permits

SWCAA

Clean Air Act, 33 CFR 154, 40 CFR 60, 40 CFR 60.112b, 40 CFR 61, 40 CFR 63, RCW 70.94 and WAC 173-400-110, WAC 173-401, WAC 173-460, WAC 173-470, WAC 173-474, and WAC 173-490

An air discharge permit is required for the installation and operation of all facilities with the potential for discharge of air pollutants. Per WAC 463-60-537 an application is included with this Site Certification Application.

The application includes an application form, narrative, air emission model results, and a BACT analysis in compliance with permitting requirements. See section 5.1 of this application for the air permit and air quality analysis.

Tesoro Savage
Vancouver Energy Distribution Terminal

PART 3 NATURAL ENVIRONMENT

Section 3.1 – Earth

WAC 463-60-302
Natural environment - Earth.

(1) The applicant shall provide detailed descriptions of the existing environment, project impacts, and mitigation measures for the following:

(a) Geology. The application shall include the results of a comprehensive geologic survey showing conditions at the site, the nature of foundation materials, and potential seismic activities.
(b) Soils. The application shall describe all procedures to be utilized to minimize erosion and other adverse consequences during the removal of vegetation, excavation of borrow pits, foundations and trenches, disposal of surplus materials, and construction of earth fills. The location of such activities shall be described and the quantities of material shall be indicated.
(c) Topography. The application shall include contour maps showing the original topography and any changes likely to occur as a result of energy facility construction and related activities. Contour maps showing proposed shoreline or channel changes shall also be furnished.
(d) Unique physical features. The application shall list any unusual or unique geologic or physical features in the project area or areas potentially affected by the project.
(e) Erosion/enlargement of land area (accretion). The application shall identify any potential for erosion, deposition, or change of any land surface, shoreline, beach, or submarine area due to construction activities, placement of permanent or temporary structures, or changes in drainage resulting from construction or placement of facilities associated with construction or operation of the proposed energy project.

(2) The application shall show that the proposed energy facility will comply with the state building code provisions for seismic hazards applicable at the proposed location.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-302, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-302, filed 11/6/92, effective 12/7/92.)

Section 3.1 Earth

The following sections describe the geology, geologic hazards, soils, topography, unique physical features, and erosion/enlargement of land area at the project site. Existing conditions, potential impacts, and, where appropriate, mitigation measures are discussed below. This section provides additional background detail related to the geology of the site to support section 2.18 that addresses how the project will be protected from earthquakes and volcanic eruptions.

Site-specific measures have been identified to mitigate potential hazards. With standard and site-specific mitigation measures, impacts on the natural earth environment from the construction and operation of the Facility are expected to be minor.

3.1.1 Methodology

The assessment of the geology of the project study area was completed by first reviewing previously completed geotechnical studies on and near the proposed project site, followed by field explorations. Field explorations of subsurface materials and conditions included 25 borings and six cone penetration test probes. An experienced geotechnical engineer from GRI directed the drilling and maintained a detailed log of the materials and conditions disclosed during the course of the work. The results of the review of previously completed studies, field explorations, and mitigation recommendations will be included in the final geotechnical report anticipated to be completed in September 2013.

3.1.2 Geology

The site is situated in the Portland Basin area of the Willamette Lowland geomorphic province. The site is located on the North American continental tectonic plate near a convergent plate boundary with the Juan de Fuca oceanic tectonic plate. The offshore CSZ is the contact area of these two converging plates. The convergent tectonic forces have generated northwest-trending fault zones and crustal blocks (Orr and Orr 1999) resulting in areas of uplifted mountainous terrain and depressed structural basins.

The Portland Basin is a northwest-elongated structural basin bordered to the east by the foothills of the Cascade Mountains, to the west by the Tualatin Mountains, to the south by the Clackamas River, and to the north by the Lewis River (Evarts et al. 2009). The Portland Basin began to form about 20 million years ago with folding and uplift of Tertiary basement marine and volcanic rocks, and was subsequently filled with volcanic and sedimentary rocks. About 15 to 16 million years ago, flood-basalt flows of the Columbia River Basalt Group (CRBG) entered the basin through a broad Columbia River valley transecting the Cascade Range and emptying into the Pacific Ocean (Beeson et al. 1989). The CRBG consists of numerous dark gray to black, dense, crystalline basalt lava flows which cover approximately 63,000 square miles and extend to thicknesses greater than 6,000 feet. By 14 million years ago, the uplift of the Portland Hills diverted the Columbia River northward (Evart et al. 2009).

The Columbia River deposited up to 600 feet of fine-grained river and lake sediments that compose the Sandy River Mudstone into the subsiding Portland Basin (Trimble 1963). Sandy River Mudstone is poorly cemented siltstone, sandstone, and claystone. Overlaying the Sandy River Mudstone is up to 600 feet of consolidated and cemented sandstone and conglomerate of the Troutdale Formation (Tolan and Beeson 1984). The Troutdale Formation resulted from a high-energy braided river system (Evarts et al. 2009) that was eroded during the last ice age by

the ancestral Columbia and Willamette rivers and by catastrophic glacial outburst floods (Allen et al. 2009). Glacial outburst floodwaters from Montana washed across eastern Washington and through the Columbia River Gorge to spread out in the Portland Basin and pool to elevations of about 400 feet, depositing boulders, cobbles and gravel sediment grading to thick blankets of micaceous sand. This deposit is subdivided into two facies by Madin (1994) and Phillips (1987): a fine-grained facies (Qff) that consists of primarily coarse sand to silt and coarse-grained facies (Qfc) that consists of pebble to boulder gravel with a coarse sand to silt matrix. The sea level rose by about 300 feet after the last of the glacial outburst floods about 15,000 years ago, forming an estuary environment that extends far upstream in the Columbia River. These low energy environments rapidly filled with Holocene sandy alluvium and broad floodplains developed along the primary Columbia River channel (Peterson et al. 2011) (see Figure 3.1-1).

At the Facility, fill material, consisting primarily of sand and silt, was placed to modify the site for industrial use. Much of this material was derived from suction dredging techniques where Columbia River channel sand was piped on shore for dewatering and grading. This fill material mantles the project site and is common in the historically industrial developed areas in the vicinity.

3.1.2.1 Impacts

The primary impacts of the project on geologic conditions and materials at the site are on the foundation construction, excavation, grading, trenching, backfill, and compaction associated with site development. The impacts generally will be limited to shallow soil at the site as the proposed excavations, utilities, and structures generally will not exceed 20 feet in depth. However, the results of preliminary geotechnical investigation conducted at the site have determined that site improvements will be required to mitigate static and seismic settlement and lateral deformations.

3.1.2.2 Mitigation

The project will have no adverse impacts on geologic conditions at the site and mitigation is not considered necessary for impacts to geology. While the project will not adversely impact geologic conditions at the Facility, the project has been designed to meet all applicable requirements and codes based on the seismic and soil conditions of the site as described in further detail in sections 3.1.3 and 3.1.4 below.

3.1.3 Seismicity

As previously discussed in section 2.18 of this application, the project is located in a regional tectonic regime that is capable of producing earthquakes of magnitude (M) 9 or greater (Atwater 2005). The convergence of the Juan de Fuca and the North American tectonic plates results in folding and faulting of rocks where sudden movement along faults generate strong ground motions. The general lack of surface expressions of faults, faults buried under hundreds of feet of recent alluvial deposits, and the limited 150-year recorded history of earthquakes in the area make it difficult to estimate the occurrence, magnitude, and frequency of earthquakes. However, an estimate of the maximum plausible earthquake magnitude can be made based on several seismicity studies (Bott and Wong 1993; Mabey, Black, Madin et al. 1997; Mabey, Madin, and Palmer 1994; Mabey, Madin, Youd et al. 1993; Atwater and Hemphill-Haley 1997; Wong et al. 2000; Pratt et al. 2001; Palmer et al. 2004).

Available earthquake information indicates the potential seismic sources that may affect the site can be grouped into three independent categories: subduction zone earthquakes, intraplate earthquakes, and local crustal earthquakes (see Figure 3.1-2)

3.1.3.1 Subduction Zone Earthquakes

Large subduction zone earthquakes result from the sudden slip between the upper surface of the Juan de Fuca tectonic plate and the lower surface of the North American tectonic plate. Geological studies show that subduction zone earthquakes have occurred repeatedly in the past 7,000 years (Atwater et al. 1995; Clague 1997; Goldfinger 2003; and Kelsey et al. 2005), and geodetic studies (Hyndman and Wang 1995 and Savage et al. 2000) indicate rate of strain accumulation consistent with the assumption that the CSZ is locked beneath offshore northern California, Oregon, Washington, and southern British Columbia (Fluck et al. 1997 and Wang et al. 2001).

Published estimates of the probable maximum size of subduction zone events range from magnitude M8 or greater. Numerous detailed studies of coastal subsidence, tsunamis, and turbidites yield a wide range of recurrence intervals, but the most complete records (>4,000 years) indicate recurrence between 200 and 700 years with an average of approximately 300 years between earthquakes on the CSZ (Adams 1990; Atwater and Hemphill-Haley 1997; Witter 1999; Clague et al. 2000; Kelsey et al. 2002; Kelsey et al. 2005; Goldfinger et al. 2012; Witter et al. 2003). Historical evidence of tsunami inundation in Japan suggests that the last subduction zone earthquake occurred on January 26, 1700 (Mabey et al. 1993; Wong et al. 2000; Atwater et al. 2005; and Nelson et al. 1996). The 1700 earthquake most likely ruptured along virtually the entire length of the CSZ for almost 1,000 miles and was approximately between M8.7 and 9.2 (Atwater et al. 2005). Evidence for tsunami inundation of buried marshes along the Washington and Oregon coasts and stratigraphic evidence from the Cascadia margin support these recurrence intervals (Atwater et al. 2005; Kelsey et al. 2005; and Goldfinger et al. 2012).

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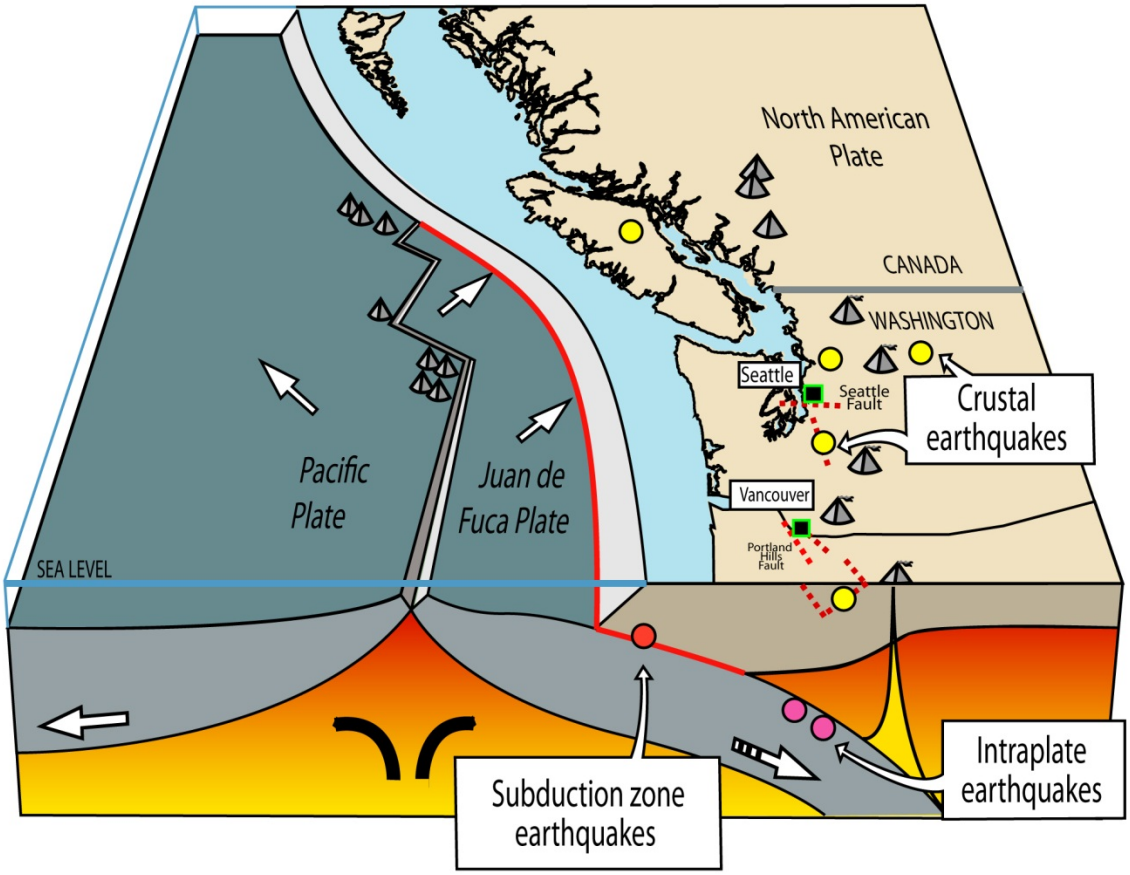
Figure 3.1-1. Site Geology



MODIFIED FROM USGS CASCADIA EARTHQUAKE SOURCES
(http://geomaps.wr.usgs.gov/pacnw/pacnweq/casceq.html)

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Figure 3.1-2. Tectonic Setting

3.1.3.2 Intraplate Earthquakes

Intraplate earthquakes result from the remains of the Juan de Fuca Plate fracturing as it dives beneath the North America Plate. Historical intraplate earthquakes near the project site have not been recorded. Puget Sound and northern California have recorded historical intraplate earthquakes. In the Puget Sound area, these moderate to large earthquakes are deep (25 to 37 miles) and over 124 miles from the deformation front of the subduction zone. Offshore, along the northern California coast, the earthquakes are shallower (less than 25 miles) and located near the deformation front. Estimates of the probable size, location, and frequency of subcrustal events in Southwest Washington are generally based on comparisons of the CSZ with active convergent plate margins in other parts of the world and on the historical seismic record for the region surrounding Puget Sound, where significant events known to have occurred within the subducting Juan de Fuca plate have been recorded. Significant intraplate earthquakes have occurred in the Pacific Northwest in 1949, 1965, and 2001. These M7.1, M6.5, and M6.8 earthquakes, respectively, have epicenters in the Puget Sound area approximately 124 miles from the project site. However, a M4.6 intraplate earthquake occurred northwest of Corvallis, Oregon in 1963 (Barnett et al. 2009); smaller (<M3.0) intraplate earthquakes occur in the Portland area (Mabey et al. 1994); and the Nisqually earthquake of 2001 (M6.8) was felt as far south as Salem, Oregon (Dewey et al. 2002).

Published estimates of the probable maximum size of these events range from magnitude M7.0 to 7.5. Published information regarding the location and geometry of the subducting zone indicates a focal depth of 31 miles is probable (Weaver and Shedlock 1989).

3.1.3.3 Crustal Earthquakes

Crustal earthquakes occur during the rupture of shallow faults of depths up to approximately 15 miles. The precise relationship between specific earthquakes and individual faults is not well understood, since few of the faults in the area are expressed at the ground surface, and the foci of the observed earthquakes have not been located with precision. The history of local seismic activity is commonly used as a basis for determining the size and frequency to be expected of local crustal events. Although the historical record of local earthquakes is relatively short (the earliest reported seismic event in the area occurred in 1920), it can serve as a guide for estimating the potential for seismic activity in the area.

Several shallow crustal faults are mapped within the vicinity of the project area; however, active crustal faults have not been mapped within the project site (Phillips 1987; Madin 1994; Mabey, Madin, Youd et al. 1993; Mabey, Madin, and Palmer 1994; Wong 2005; Personius et al. 2003; and Geomatrix Consultants 1995). Based on Quaternary (less than 1.6 million years before present) fault mapping conducted by the USGS in the vicinity of the project area, the East Bank Fault and Portland Hills Fault southwest of the project site and the Lacamas Lake Fault northeast of the project area are considered to be active (Phillip, 1987; Madin 1994; Personius et al. 2003). The locations of these faults relative to the project site are shown on Figure 3.1-3.

The maximum plausible magnitude for local shallow crustal earthquakes is anticipated to be approximately M6.5 to M7.1 (Mabey et al. 1993; Wong et al. 2000). The recurrence rate of maximum plausible magnitude crustal earthquakes within the project area is approximately 1,000 to 2,000 years (Bott and Wong 1993).

Table 3.1-1.Possible Earthquake Sources

Earthquake Source	USGS Fault No.	Distance from Project Site (km)[a,c]	Magnitude Max (M)[a]	Length (km)[a]	Dip Angle [a,b,c]	Slip Rate (mm/yr)	Most Recent Deformation (years ago) [b,c]
Cascadia Subduction	781	100-200	9.0	1,100	9°-11°E	>5	300 yr
Intraplate	--	40-60	7.5	~1,000	>9°E	>5	>150 yr
Portland Hills Fault	877	6	6.6-7.1	49	70°SW	<0.2	<1.6 m.yr
East Bank Fault	876	4	6.8-7.1	29	70°NE	<0.2	<15 k.yr
Lacamas Lake Fault	880	11	6.5-6.9	24	>75° SW	<0.2	<750 k.yr

a Wong et al., 2000.
b Gregor et al., 2002.
c Personius et al., 2003, information is approximate.
km = kilometer
mm = millimeter
yr = year
m.yr = million years
k.yr = thousand years

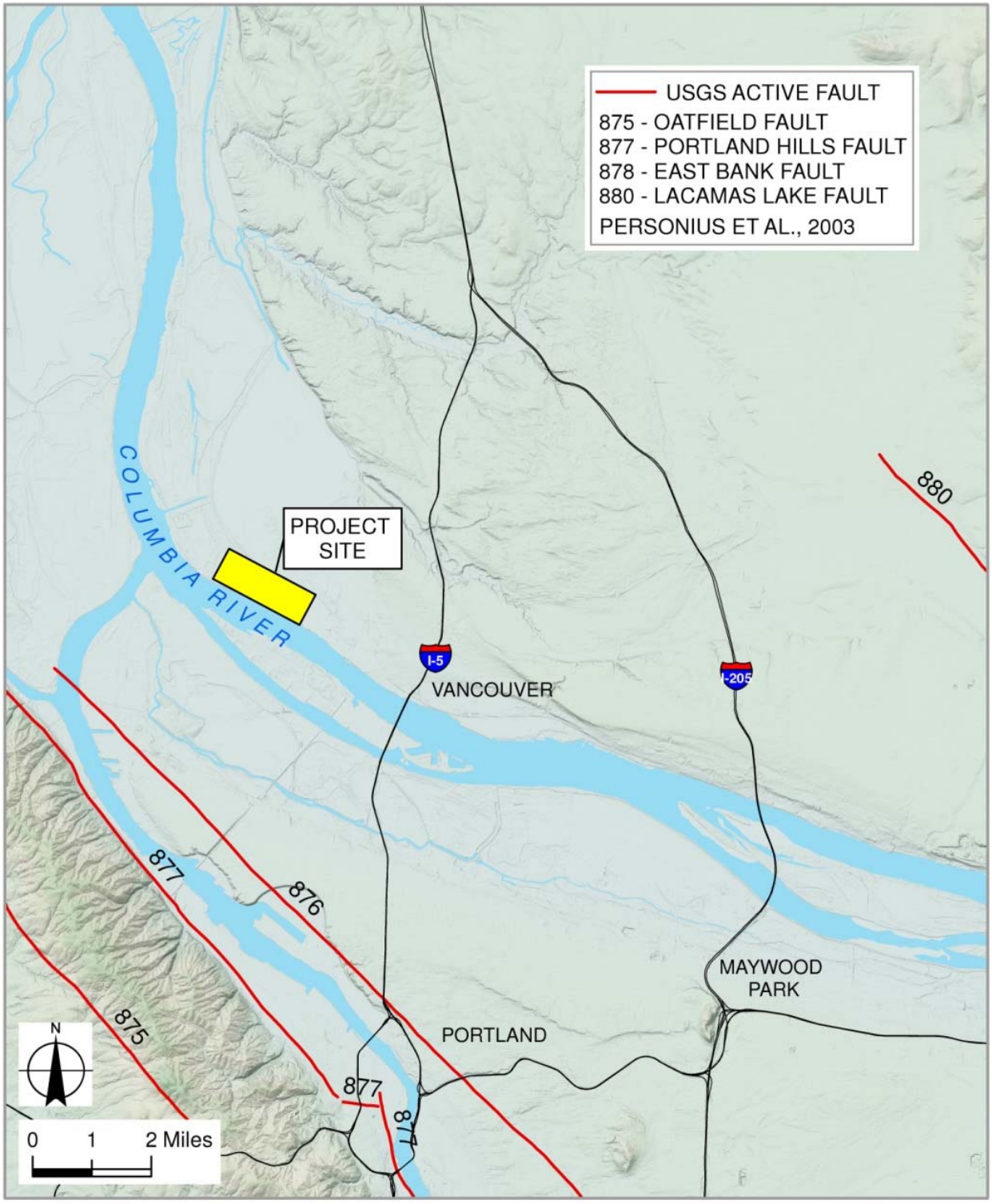
3.1.3.4 Volcanic Eruptions

As stated above in section 2.18.3, volcanoes in the region pose a variety of eruptive hazards. Volcanoes of the Cascade Mountains are found from northern California to British Columbia. Mount St. Helens and Mount Hood are located within 50 miles of the project, located to the northeast and southeast of the project site, respectively. Mount St. Helens is capable of producing eruptions of ash, lava flows, pyroclastic flows, and lahars (Wolfe and Pierson 1995). However, the site is upstream of drainages that extend from the flank of Mount St. Helens and would not be subject to pyroclastic flows or lahars.

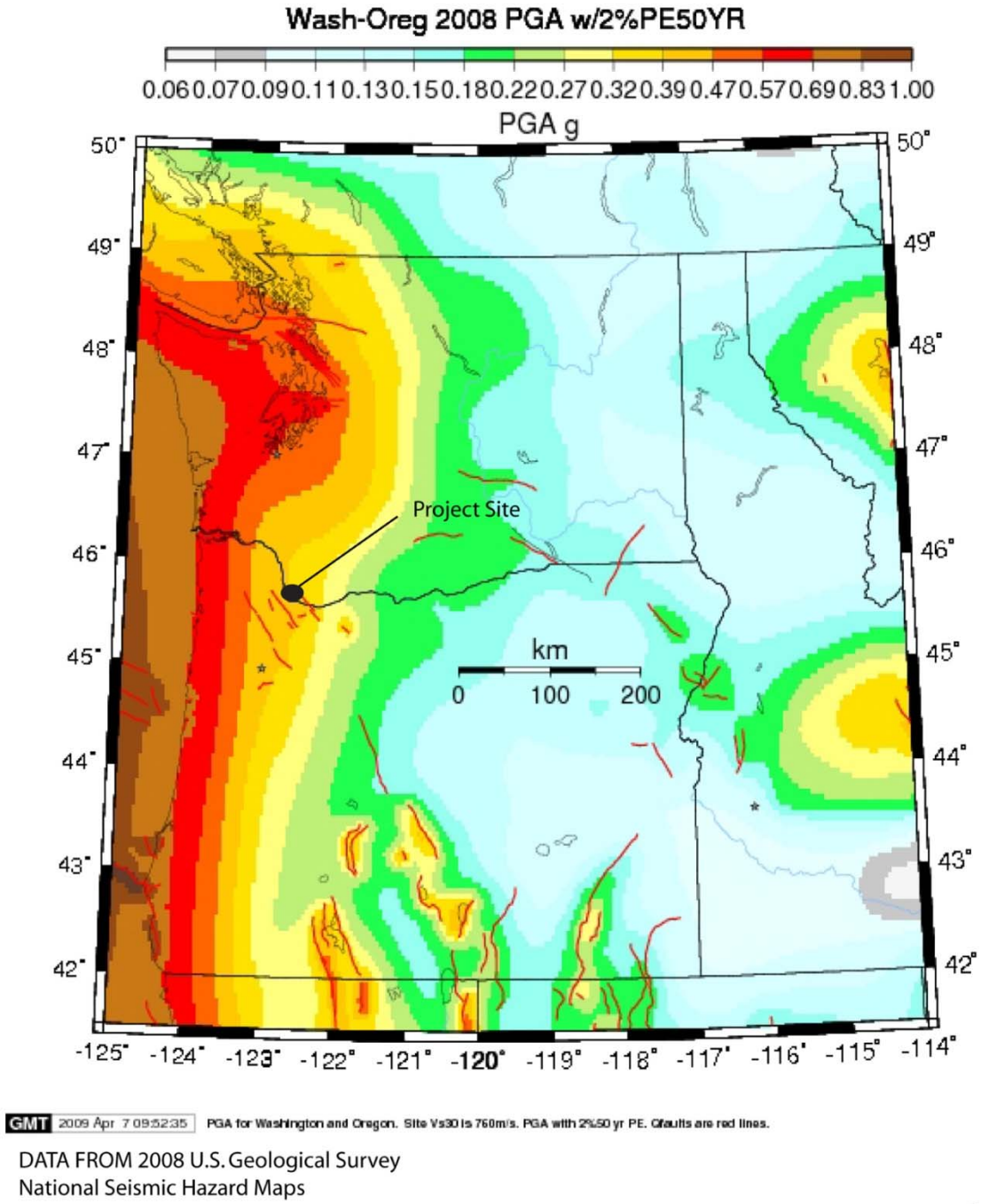
3.1.3.5 Impacts

The potential impacts of earthquakes and seismicity include fault rupture, ground motion, soil liquefaction, lateral spreading, and volcanic eruptions. Active faults have not been identified at the project site (see Figure 3.1-3). Surface fault rupture is not considered a potential impact. The potential ground motion during an earthquake event is generally represented by horizontal PGA estimated to range from 0.2 g (9.81m/s^2 [g-force]) to approximately 0.42 g in the vicinity of the project site (Figure 3.1-4). Ground motion can also cause soil to lose strength as the seismic waves allow the collapse of soil pore space. As pore space is decreased, pore water pressure increases and the liquefiable soil layers behave more like a viscous fluid during ground shaking. As a result, there is an increased risk of settlement and the loss of some bearing capacity for both shallow and deep foundations when soil liquefaction occurs. Structures can be adversely affected by liquefaction-induced settlement and reduced bearing capacity. Lateral spreading can occur during ground shaking as blocks of soil move horizontally toward unsupported banks such as the Columbia River. The site is located in a high liquefaction-susceptible soil area (Palmer et al. 2004) (Figure 3.1-5).

As illustrated in Figure 3.1-6, the USGS estimates that there is between a 0.01 and 0.02 percent annual probability that there would 4 inches or more of ash will be deposited at the site from eruptions throughout the Cascade Range, with the highest probability resulting from. Most Cascade Range contribution in the analysis is from Mount St. Helens (Wolfe and Pierson 1995). However, based on the distance and activity level of nearby volcanoes to the project site, there is a low potential for damaging volcanic processes to reach the project, and these events would be considered extremely rare.



BergerABAM	**Figure 3.1-3. Local Fault Map**



BergerABAM	**Figure 3.1-4. Ground Motion**

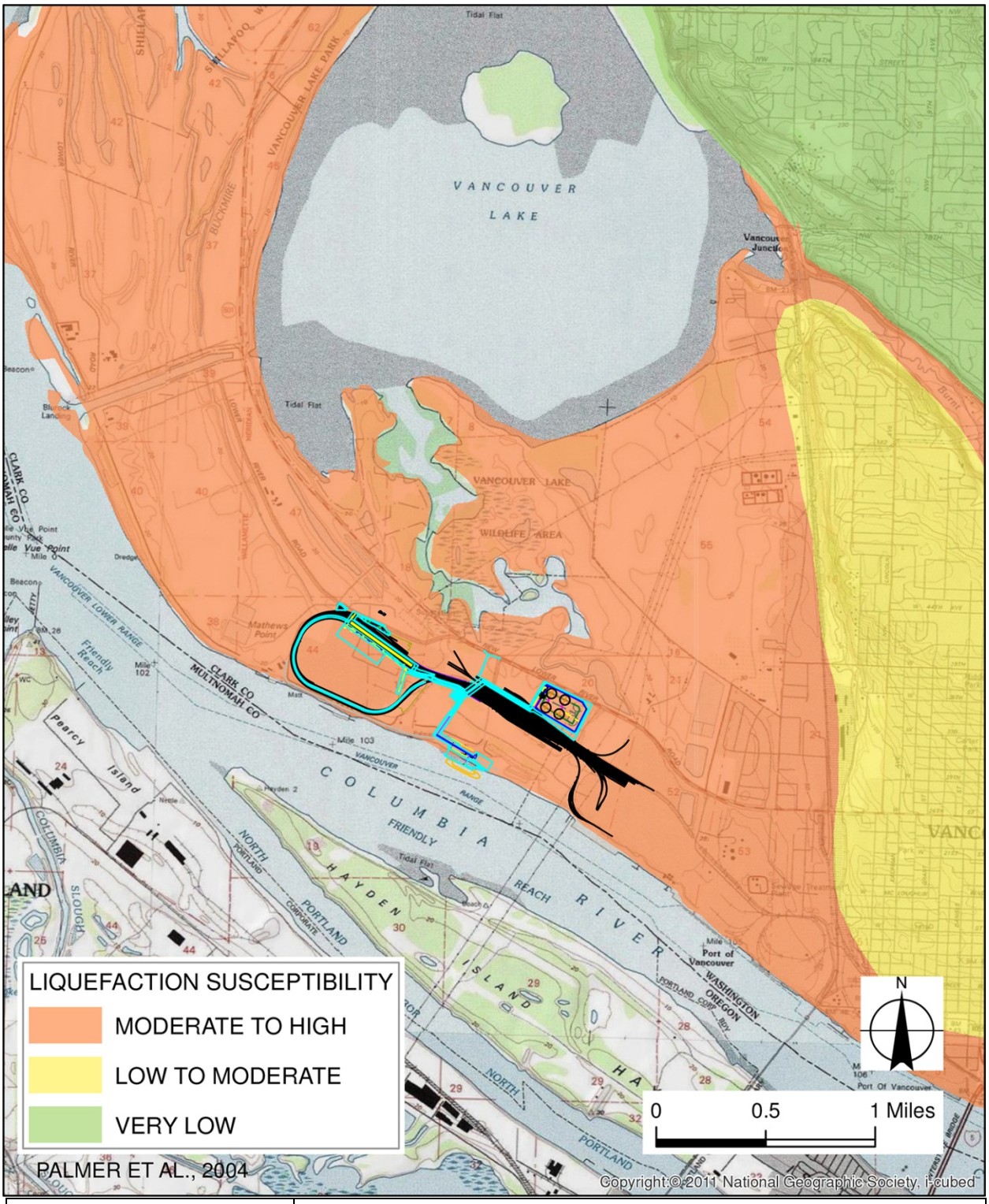


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Figure 3.1-5. Site Liquefaction Susceptibility

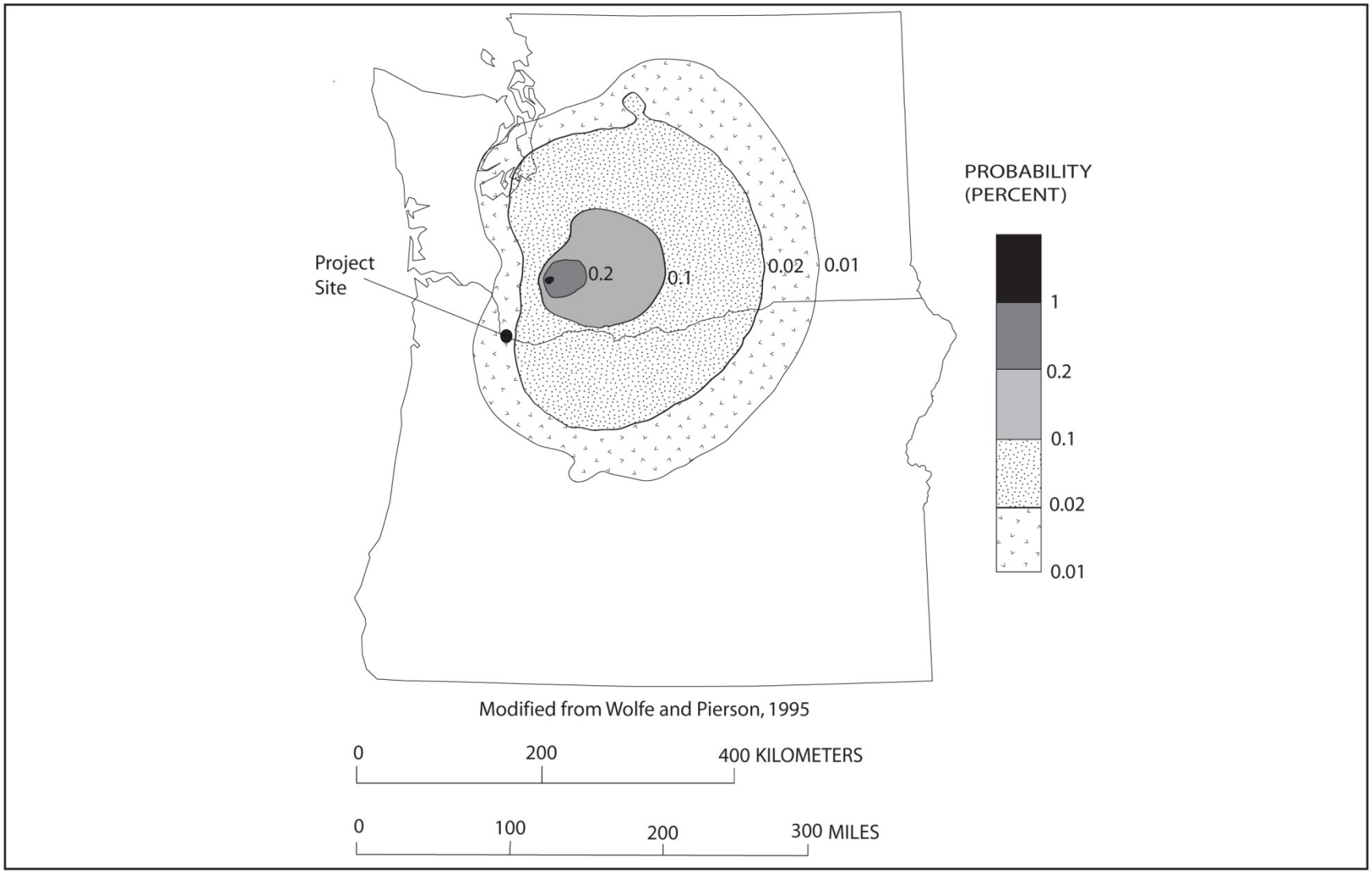

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Figure 3.1-6. Ash Accumulation

3.1.3.6 Mitigation

A geotechnical investigation completed for the project identified site-specific subsurface soil conditions and seismic hazards. Based on the subsurface conditions at the site, it is anticipated that site improvements will be required to mitigate static and seismic settlement and lateral deformations. Ground motion mitigation will adhere to local building codes and standard foundation design for the proposed Facility and associated buildings and pipelines. Liquefaction mitigation may include improving the condition of soils beneath the site to reduce the risk of settlement and large horizontal slope movements during an earthquake. Ground improvement could reduce the seismic lateral load on the dock foundations and reduce the risk of soil and debris sliding into the Columbia River.

Site improvement alternatives include the following;

- Ground improvement techniques such as vibro-replacement (stone columns), soil mixing, jet grouting, vibro-densification.
- Preloading or surcharging with temporary fill soils.
- Pile foundation systems.

Appropriate types of improvements will be selected during final design based on the specified performance criteria for the elements of the Facility. The proposed final design of the Facility will comply with the provisions of the building codes and requirements for seismic hazards that apply to the proposed location. These include the following;

- 2012 International Building Code (IBC), chapters 16, 17, 18, 19, 22 and 23
- ASCE 7-10 (Minimum Design Loads for Buildings and Other Structures), chapters 11, 12, 13, 14, 15, and 23
- ACI 318-11 (Building Code Requirements for Structural Concrete), Chapter 21 and Appendix D
- AISC Steel Construction Manual, 14th Edition, including AISC 360-10 (Specifications for Structural Steel Buildings), Part 2
- AISC Seismic Design Manual 2nd Edition, including AISC 341-10 (Seismic Provisions for Structural Steel Buildings), General Sections
- AF&PA SDPWS 2008 (AF&PA Special Design Provisions for Wind and Seismic), General Sections

The Washington State Building Code Act adopts by reference building and related codes that local jurisdictions must adopt and enforce. Titles 16 and 17 of the VMC establish these requirements in the City. It is anticipated that EFSEC will contract with the City for the review and issuance of permits under the required code provisions as well as for providing the required inspections and issuance of occupancy permits. The Applicant will submit the required building permit applications and all plans will be designed in compliance with the codes and requirements referred to above.

3.1.4 Soils

Soil types in the vicinity of the site have been identified by the Natural Resource and Conservation Service (NRCS) of the U.S. Department of Agriculture (USDA) (McGee, 1972). The following soil types are found within the vicinity of the project site (Figure 3.1-7).

- **Fill Land (Fn) –** These are nearly level areas that have been filled artificially with earth, debris, or both, and then smoothed over. Large areas along the Columbia River waterfront have been filled in with sand and silt dredged from the river. These areas do not have any clearly defined soil characteristics.
- **Newberg Silt Loam 0 to 3 percent slopes (NbA) –** This soil occurs mainly along the Columbia River. It is loamy soil that developed mainly in recent alluvium derived from basic igneous parent material. This soil is well drained. It is easily tilled. Permeability is moderately rapid. Surface runoff is very slow, and there is little to no erosion hazard.
- **Newberg Silt Loam 3 to 8 percent slopes (NbB) –** This soil is on side slopes of natural levees on bottom lands along the Columbia River. The slopes are short and slightly convex or undulating. The soil is similar to Newberg silt loam, 0 to 3 percent slopes, except that surface runoff is slow, and the erosion hazard is slight.
- **Pilchuck fine sand, 0 to 8 percent slopes (PhB) –** This soil is on terraces along streams. It is subject to overflow and deposition during periods when the water level is high. This sandy soil formed in parent material of recent sandy alluvium deposited by streams. The slopes are generally undulating and in most places are less than 5 percent. This soil is somewhat excessively drained and rapidly permeable. Surface runoff is very slow. The hazard of erosion is normally slight unless there is flooding, at which time the erosion hazard is severe.
- **Sauvie silty clay loam, 0 to 8 percent slopes (SpB) –** This soil is on the broad tops of old natural levees on the bottom lands along the Columbia River. In most places, the slopes are smooth or gently undulating. This soil is somewhat poorly drained and has moderately slow permeability. Surface runoff is slow. The hazard of erosion is slight, except in some areas that are subject to flooding from the Columbia River, where scouring can be a severe erosion hazard. A high water table is common in winter and spring.
- **Sauvie silt loam, 0 to 3 percent slopes (SmA) –** This soil is on the broad tops of old natural levees on bottom lands along the Columbia River and in many of the depressional areas. The soil is moderately well drained, and there are fewer mottles in the profile. Surface runoff is very slow, and the hazard of erosion is slight.
- **Sauvie silt loam, 3 to 8 percent slopes (SmB) –** This soil is on the side slopes of the old natural levees on bottom lands along the Columbia River. Surface runoff is slow, and the erosion hazard is slight.

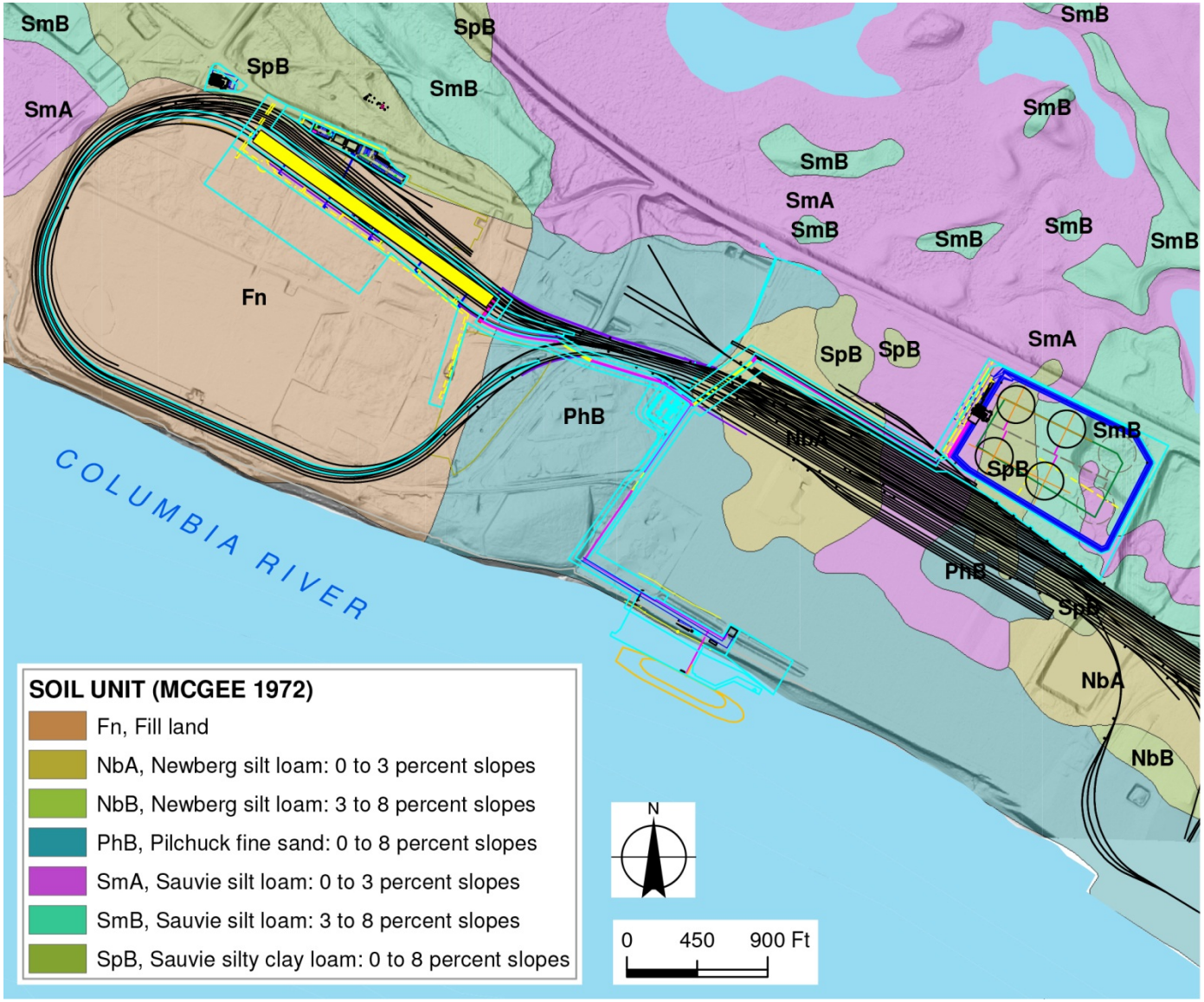

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Figure 3.1-7. Soil Map

3.1.4.1 Impacts

The impacts to soils consist of excavation and trenching for building and loop track foundations, associated piping, and utilities. Most soil at the site has been modified by the placement of fill, excavation and trenching for industrial facilities, and grading for roads and laydown yards. Site soils may need to be densified using ground improvement techniques. Solidification treatment such as soil mixing or jet grouting may be necessary for soils that are susceptible to settlement or liquefaction. Limited grading and/or placement of additional fill may be performed to obtain necessary grades. Because most soils on the site consist of fill or have been modified by prior industrial activities, no adverse impacts to soils are anticipated from the grading, excavation for foundations and piping, or ground improvement.

3.1.4.2 Mitigation

The site-specific geotechnical engineering investigation conducted for the project identified site improvement alternatives and methods of construction that will be employed. A qualified geotechnical engineer will monitor the fill placement during construction and conduct appropriate field tests to verify the proper compaction of the fill soils. Appropriate types of ground improvements will be selected during final design based on the specified performance criteria for the elements of the Facility.

3.1.5 Topography

The ground surface in the upland portion of the project area is relatively flat and ranges from about Elevation 28 to 35 feet (NAVD). The riverbank near the dock area slopes down from the top of the bank at about 2 horizontal to 1 vertical (27 degrees) to a more level beach area at low water level. A depression is present in the proposed tank farm area and also has side slopes of about 27 degrees.

3.1.5.1 Impacts

The proposed project includes changes in the topography of the site. The rail unloading area (Area 200) will require the excavation of two trenches approximately 1,800 feet long, 5 feet deep, and 10 feet wide for a volume of approximately 180,000 cubic feet. The proposed storage tanks (Area 300) will be located in the northeast corner of the site. A portion of this area includes a 4.5-acre depression that will need approximately up to 15 feet of additional fill to reach final grade. The Port previously received permits to conduct this work. Other areas of the site have been graded, filled, and generally modified from their original state over the past several decades. Impacts to the topography due to the construction of the project will include grading for access roads, excavation of unloading trenches, piping trenches, building foundations, and leveling the ground in the tank farm area. Based on the industrial zoning of the site and surrounding area, impacts to topography are not considered to be appreciable considering the heavily modified land.

3.1.5.2 Mitigation

The overall topography of the site will not be appreciably modified; therefore, no mitigation measures will be required.

3.1.6 Unique Physical Features

The project site is relatively flat, and was the location of historical industrial activities, and nearly all of the surface area of the site has been modified significantly. Therefore, unique physical features are not present at the site.

3.1.6.1 Impacts

Because there are no unique physical features, at the site, there will be no impacts to unique physical features.

3.1.6.2 Mitigation

No mitigation efforts are anticipated.

3.1.7 Erosion/Enlargement of Land Area (Accretion)

Erosion is the breakdown and transport of soils and bedrock by chemical and mechanical processes. The susceptibility of a soil to erosion is based on its properties, the ground slope; and the effects of rainfall, surface water, wind, and vegetation cover. These features are identified by NRCS and used in the determination of potential soil erosion susceptibility. As noted in section 3.1.4 above, the on-site soils have a low to slight erosion hazard, except in cases where flooding may occur. Erosion can occur along unprotected portions of the riverbank of the Columbia River, particularly during periods of elevated river levels. The riverbank slope at the docks is currently protected with riprap.

Enlargement of land area or accretion includes the deposition, or change of land surface, shoreline, beach, or submarine area due to project-related activities. The project does not include plans for increased land area. Excess soils may be generated due to removal of unsuitable soils during unloading trench excavation and piping trenches and placement of base coarse or structural fill. These soils may be disposed of off site at a suitable facility or reused at other locations on site where appropriate. Structural fill may also be necessary to level the ground surface in various areas of the site. In addition, material will be required for construction of the containment berm for the tank farm.

3.1.7.1 Impacts

Project activities, including excavation, grading and fill placement, and temporary stockpiling of excess soils for construction, may disturb soils resulting in a localized increase in soil erosion susceptibility. Proposed modifications of the marine terminal area will include in-water and over-water construction activities for the installation of mooring dolphins, dock platforms, walkways, and steel piles. In-water work may result in the disturbance of riverbed soils that could suspend soils within the water column and lead to increased turbidity. Other work activities proposed for Area 400 will occur above the OHWM and include the construction of the MVCU, control room, maintenance parking area, and transfer pipeline. Construction in these areas may disturb soils and could lead to potential soil erosion. The project will not significantly impact the potential for erosion along the riverbank.

3.1.7.2 Mitigation

The potential erosion impacts will be minimized through the use of erosion and sedimentation control measures outlined in the preliminary SWPPP (Appendix C) and as described in section 2.11 of this application, which states that construction activities will be sequenced and controlled to limit erosion. Clearing, excavation, and grading will be limited to the areas

necessary to construct the Facility. Interim surface protection measures, including dust control, straw matting, and erosion control blankets, will be required to prevent erosion. Final surface restoration will be completed within 14 days of an area's final disturbance. All construction practices will emphasize erosion control over sediment control. Temporary cutoff swales and ditches will be installed to route stormwater to the appropriate sediment trap and discharge location. As identified above in section 3.1.4, soils found on the site are classified as having little to no erosion hazard.

Section 3.2 – Air

WAC 463-60-312
Natural environment - Air.

The application shall provide detailed descriptions of the affected environment, project impacts, and mitigation measures for the following:

(1) Air quality. The application shall identify all pertinent air pollution control standards. The application shall contain adequate data showing air quality and meteorological conditions at the site. Meteorological data shall include, at least, adequate information about wind direction patterns, air stability, wind velocity patterns, precipitation, humidity, and temperature. The applicant shall describe the means to be utilized to assure compliance with applicable local, state, and federal air quality and emission standards.

(2) Odor. The application shall describe for the area affected all odors caused by construction or operation of the facility, and shall describe how these are to be minimized or eliminated.

(3) Climate. The application shall describe the extent to which facility operations may cause visible plumes, fogging, misting, icing, or impairment of visibility, and changes in ambient levels caused by all emitted pollutants.

(4) Climate change. The application shall describe impacts caused by greenhouse gases emissions and the mitigation measures proposed.

(5) Dust. The application shall describe for any area affected all dust sources created by construction or operation of the facility, and shall describe how these are to be minimized or eliminated.

(Statutory Authority: Chapter 80.50 RCW and RCW 80.50.040. 09-05-067, § 463-60-312, filed 2/13/09, effective 3/16/09. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-312, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-312, filed 11/6/92, effective 12/7/92.)

Section 3.2 Air

3.2.1 Air Quality

Air quality in Washington is regulated by several agencies. In Vancouver, the Southwest Region Clean Air Agency (SWCAA) is the local authority for air quality permitting of industrial sources, and permits minor sources through the Air Contaminant Discharge Permit (ACDP) process. The Department of Ecology (Ecology) generally retains the authority for air quality permitting of major sources in attainment areas through the Prevention of Significant Deterioration (PSD) permit process. The United States Environmental Protection Agency (USEPA) also has a role in the PSD process and in ensuring all states have plans in place to maintain compliance with ambient air quality standards.

EFSEC has jurisdiction over projects such as the facility, including air quality preconstruction permitting. EFSEC has adopted virtually all of the air quality regulations established by Ecology that would otherwise apply to the facility. EFSEC and EPA will issue the preconstruction permits that allow construction of the facility to begin. Tesoro Savage must apply for an operating permit within a year of commencing operation of the facility.

The distinction between emissions and concentrations is important in the review of air quality issues. Emission regulations limit the amount of a particular air pollutant that can be emitted from a stack or facility (e.g., 10 pounds per hour [lbs/hr] of particulate matter). Ambient air quality standards limit concentrations of certain air pollutants (in parts per million [ppm] or millionths of a gram per cubic meter of air [$\mu g/m^3$]) in the outdoor (ambient) air.

The air quality dispersion modeling analysis summarized in Section 5.1 of this Application determined that worst-case emissions from the facility would result in ambient concentrations that comply with Washington and National Ambient Air Quality Standards (WAAQS and NAAQS) and Washington's toxic air pollutant (TAP) criteria. .

3.2.1.1 Emission Standards

USEPA has established performance standards for a number of air pollution sources in 40 CFR Part 60. These New Source Performance Standards (NSPS) represent a minimum level of control that is required for a new source. NSPSs that apply to the facility emission units include:

- Subpart Dc, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units;
- Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels;
- Subpart IIII--Standards of Performance for Stationary Compression Ignition Internal Combustion Engines; and
- Subpart A, General Provisions.

Emission limits imposed by these NSPS are discussed in more detail in Section 5.1.3.1.1. In general, NSPS limits are less stringent than the emission limits that result from applying Best Available Control Technology (BACT) and, therefore, are not particularly restrictive when BACT is required.

Under the provisions of Section 112 of the 1990 Clean Air Act Amendments, EPA is required to regulate emissions of a total of 187 HAPs from stationary sources. EPA does this by specific industry categories to tailor the controls to the major sources of emissions and the HAPs of

concern from that industry. As discussed in greater detail in Section 5.1.3.1.2, the following MACT standards apply to the facility:

- Part 61, Subpart M – National Emission Standards for Asbestos
- Part 63, Subpart ZZZZ -- National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines; and
- Subpart A, General Provisions.

As discussed in Section 5.1, Attachment 1, BACT is the best control technology that is feasible for a specific application, considering the economic, energy and environmental and other costs of each alternative. Chapter 173-460 also requires BACT for TAPs. Generally, the same technologies or operations that reduce criteria pollutants also reduce TAPs. For example, the use of combustion controls to optimize combustion also reduces both criteria and TAPs.

General standards for maximum emissions from air pollution sources are outlined in WAC 173-400-040. This section limits visible emissions to 20 percent opacity except for 3 minutes per hour; controls nuisance particulate fallout, fugitive dust, and odors; and limits SO_2 emissions to no more than 1,000 ppm (hourly average, 7 percent O_2, dry basis). WAC 173-400-050 identifies emission standards for combustion and incinerator units, and limits particulate matter emissions to 0.1 grains per dry standard cubic foot at 7 percent O_2.

SWCAA regulations mirror Ecology's emission limits from new sources. The SWCAA regulation's opacity standard limits the plume to 20 percent opacity except for 3 minutes of any hour. Particulate matter emissions are limited to 0.1 grains per dry standard cubic foot. Sulfur emissions, calculated as sulfur dioxide, are limited to 1,000 ppm. The facility will comply with all of the general emission standards established by Ecology and SWCAA.

3.2.1.2 Ambient Air Quality Standards

Ambient air quality standards have been established by USEPA and Ecology (Table 3.2-1). Some of the pollutants in Table 3.2-1 are subject to both "primary" and "secondary" NAAQS. Primary standards are designed to protect human health with a margin of safety. Secondary standards are established to protect the public welfare from any known or anticipated adverse effects associated with these pollutants, such as soiling, corrosion, or damage to vegetation.

Table 3.2-1. Ambient Air Quality Standards

Pollutant	National Ambient Air Quality Standards		Washington
	National Primary	National Secondary	
Total Suspended Particulate Annual Geo. Mean ($\mu g/m^3$) 24-hour Average ($\mu g/m3$) [b]			 60 150[a]
Inhalable Particulate (PM_{10}) Annual Arith. Mean ($\mu g/m^3$) 24-hour Average ($\mu g/m^3$) [b]	 150	 150	 50 150[b]
Fine Particulate ($PM_{2.5}$) Annual Arith. Mean ($\mu g/m^3$) [c] 24-hour Average ($\mu g/m^3$)[d]	 12 35	 12 35	
Sulfur Dioxide (SO_2) Annual Arith Mean ($\mu g/m^3$) 24-hour Average ($\mu g/m^3$)	 80 365		 52 365

Pollutant	National Ambient Air Quality Standards		Washington
	National Primary	National Secondary	
3-hour Average ($\mu g/m^3$)		1300	
1-hour Average ($\mu g/m^3$)	196[e]		655[f]
Carbon Monoxide (CO)			
8-hour Average ($\mu g/m^3$)	10,000		10,000
1-hour Average ($\mu g/m^3$)	40,000		40,000
Ozone (O_3)			
8-hour Average (ppm) [g]	0.075	0.075	0.075
Nitrogen Dioxide (NO_2)			
1-hour Average ($\mu g/m^3$)[h]	188		
Annual Arithmetic Average ($\mu g/m^3$)	100	100	100
Lead (Pb)			
Quarterly Average ($\mu g/m^3$)	0.15	0.15	

$\mu g/m^3$ = micrograms per cubic meter; **ppm** = parts per million

[a]Not to be exceeded on more than once per year.

[b] Based on the 99th percentile of 24-hr PM10 concentrations at each monitor.

[c] Based on the 3-year average of annual arithmetic mean PM2.5 concentrations.

[d] Based on the 3-year average of the 98th percentile of 24-hour PM2.5 concentrations at each monitor within an area.

[e] Based on the 3-year average of 99th percentile of daily maximum 1-hour averages

[f] A second hourly standard limits concentrations to 655 $\mu g/m^3$, not to be exceeded more than once in a consecutive 7-day period.

[g] Based on the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration.

[h] Based on the 3-year average of the 98th percentile of daily maximum 1-hour averages

Annual standards never to be exceeded unless otherwise noted.

Short term standards not to be exceeded more than once per year unless otherwise noted.

Sources include: NAAQS (40 CFR 50), WAAQS (WAC 173-470, 474, and 475)

3.2.1.3 Toxic Air Pollutant Regulations

Washington regulates emissions of TAPs from new and modified air pollution sources (Chapter 173-460 WAC). This regulation establishes acceptable outdoor exposure levels (called Acceptable Source Impact Levels, or ASILs) for hundreds of substances. The ASILs were set conservatively to protect human health. The regulations also identify Small Quantity Emission Rates (SQERs). If the total emissions of a given pollutant are greater than its SQER, dispersion modeling is required to determine compliance with the ASILs.

If ASILs are exceeded, the Applicant must reduce project emissions or submit a health risk assessment demonstrating that toxic air pollutant emissions from the source are sufficiently low to protect human health.

3.2.1.4 Notice of Construction and Application for Approval

WAC 173-400-110 requires a NOC application for the construction of new air contaminant sources in Washington. SWCAA maintains a similar regulation (SWCAA 400-109) for new or modified sources in its jurisdiction. The NOC application provides a description of the facility and an inventory of pollutant emissions and controls. The reviewing agency, EFSEC, considers whether BACT has been employed and evaluates ambient concentrations resulting from these emissions to ensure compliance with ambient air quality standards. Pollutant emissions not governed by the PSD permit process are addressed in an Order of Approval that results from the

NOC application. In the case of the Facility, all pollutants except greenhouse gases are addressed in the NOC application.

3.2.1.5 Prevention of Significant Deterioration (PSD)

For the Facility, EFSEC and USEPA administer the PSD permit process. The PSD regulations were established by USEPA to ensure that new or expanded major stationary sources that emit Clean Air Act-regulated pollutants above a significance rate do not cause air quality in areas that currently meet the standards (i.e., attainment areas) to deteriorate significantly. These regulations require the application of BACT, and set PSD increments, which limit the increases in SO_2, NO_2 and PM concentrations that may be produced by a new source. Increments have been established for three land classifications. The most stringent increments apply to Class I areas, which include wilderness areas and national parks. The vicinity of the site is designated Class II, where less stringent PSD increments apply. There are no Class III areas in Washington so those increments are not pertinent to this analysis.

The Facility will be subject to PSD regulations because it will emit more than 100,000 tons per year of greenhouse gases (see Table 5.1-12). Once subject to the PSD process, emissions of other regulated pollutants that exceed specific significant emission rates must be evaluated. However, facility-wide emissions of all regulated air pollutants other than greenhouse gases are less than the significant emission rates established in the PSD regulations. Consequently, only greenhouse gas emissions are subject to review in the PSD process.

Together, the minor and major source air quality permits will include monitoring, record-keeping, and reporting conditions sufficient to ensure compliance with permit conditions and other emission standards.

3.2.1.6 Existing Air Quality

Ecology and USEPA designate regions as being “attainment” or “nonattainment” areas for particular air pollutants based on monitoring information collected over a period of years. Attainment status is therefore a measure of whether air quality in an area complies with the health-based ambient air quality standards displayed in Table 3.2-1.

The Facility is located in a region considered to be in attainment for all criteria pollutants, but it remains subject to maintenance plans that ensure continued compliance with ozone and carbon monoxide ambient standards

Existing air quality conditions at the project site can be inferred from several sources of information. First, conditions can be estimated from measurements collected by Ecology and the Oregon Department of Environmental Quality air quality monitoring networks. Current and archived air quality data are accessible from the EPA AirData website.[7] The 2012 AirData database files for several monitoring sites near to the project site were accessed to characterize background air quality. The maximum values reported from these sites represent the conservatively highest background air quality values in the region because monitoring sites are often specifically selected to identify the highest regional pollutant concentrations. Air quality values for each pollutant were estimated using measurements from the following monitors:

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[7] U.S. EPA AirData website archive of monitoring data. http://www.epa.gov/airquality/airdata/

- CO: SE Lafayette, Portland, Oregon, EPA AQS Site No. 41-051-0080 (about 10 miles SE of the project site), 2012 maximum and second highest maximum values.
- NO_2: SE Lafayette, Portland, Oregon 2011 Annual mean , 2012 1-hour maximum and 98th percentile daily maximums.[8]
- O_3: Sauvie Island, Oregon, EPA AQS Site No. 41-009-0004 (about 8 miles north-northwest of the project site), 2011 8-hour maximum and fourth highest 8-hour maximum.
- $PM_{2.5}$: Fourth Plain Boulevard East, Vancouver, Washington, EPA AQS Site No. 53-011-0013 (about 10 miles east of the project site), 2012 24-hour maximum and 98th percentile concentrations, annual average estimated using annual average of 1-hour values.
- PM_{10}: N. Roselawn Emerson Playfield, Portland, Oregon, EPA AQS Site No. 41-051-0246 (about 7 miles southeast of the project site), 2012 24-hour average maximum value and 98th percentile 24-hour average value, annual average estimated using annual average of 24-hour values.
- SO_2: SE Lafayette, Portland, Oregon, EPA AQS Site No. 41-051-0080, 2012 maximum and 99th-percentile 1-, 3-, and 24-hour values. Annual average estimated using annual average of 1-hour values.

Background concentrations can also be estimated using a tool provided by Ecology. Ecology provides the 2009-2011 "design values" for background air quality throughout the state using the output from the AIRPACT-3 regional air quality model, with adjustments from assimilated monitor data. The tool is a product of the Northwest International Air Quality Environmental Science and Technology Consortium and is used to support air permitting and regulation in the State.[9] Use of this database may provide a more accurate estimate of the actual background air quality at the project site than the conservative measurements from the monitoring network. Design values were collected in July 2013 using the tool for project site coordinates (46.643 Lat., -122.705 Long.).

[8] Reported in Oregon Dept. of Environ. Quality (2012): 2011 Oregon Air Quality Data Summaries, DEQ 11-AQ-021

[9] NW-Airquest "design values" tool website: http://lar.wsu.edu/nw-airquest/index.html

The background air quality values estimated from these sources of information are listed in Table 3.2-2.

Table 3.2-2. Background Air Quality

Pollutant	Averaging Time	State Monitoring Network Max. Value	State Monitoring Network Regulatory Value[1]	Design Value
CO	1-hour	3.8 ppm	3.1 ppm (2nd high)	2.065 ppm
	8-hour	2.3 ppm	2.2 ppm (2nd high)	1.276 ppm
NO_2	1-hour	59 ppb	36 ppb (98th percentile)	37 ppb
	Annual	9 ppb	9 ppb	7 ppb
O_3	1-hour	0.068 ppm	0.064 ppm (4th high)	NA
	8-hour	0.057 ppm	0.053 ppm (4th high)	0.056 ppb
$PM_{2.5}$	24-hour	31.2 µg/m^3	20.5 µg/m^3 (98th percentile)	20 µg/m^3
	Annual	7.0 µg/m^3	NA	5.8 µg/m^3
PM_{10}	24-hour	36 µg/m^3	34 µg/m^3 (98th percentile)	31 µg/m^3
	Annual	13 µg/m^3	NA	NA
SO_2	1-hour	9.8 ppb	4.9 ppb (99th percentile)	9.5 ppb
	3-hour	7.0 ppb	2.7 ppb (99th percentile)	7.1 ppb
	24-hour	2.5 ppb	1.7 ppb (99th percentile)	3.6 ppb
	Annual	1.5 ppb	NA	3 ppb

NA: not available/applicable

[1] Values that are applicable for comparison to the NAAQS

3.2.1.7 Meteorology and Climate

The evaluation of air pollutant emissions associated with the facility requires meteorological data to characterize dispersion conditions near the site. The dispersion modeling techniques used to simulate transport and diffusion require hourly meteorological data, including wind speed, wind direction, temperature, atmospheric stability class, and mixing height.

A five-year meteorological dataset of hourly-averaged meteorological variables was developed for the air quality modeling study summarized in Section 5.1.4 and is sufficient to summarize the local wind climate at the project site. The 5-year dataset was produced using the AERMOD meteorological preprocessor AERMET utilizing meteorological data from the Vancouver Airport / Pearson Airfield (KVUO), located about 4 miles east of the project site also located on the north bank of the Columbia River. A “wind-rose” plot of the 2008-2012 wind speed and direction measured with a cup-anemometer at 10-meters elevation at KVUO is illustrated in Figure 3.2-1. Surface winds are heavily influenced by local topography, aligning west-southwest to east-northeast along the Columbia River. Hourly-averaged winds were classified as calm (<1 knot) roughly 5.72 percent of the time and the average wind velocity was 2.32 meters per second. The maximum hourly-averaged windspeed was 21.5 knots from the west-southwest occurring March 15, 2009.

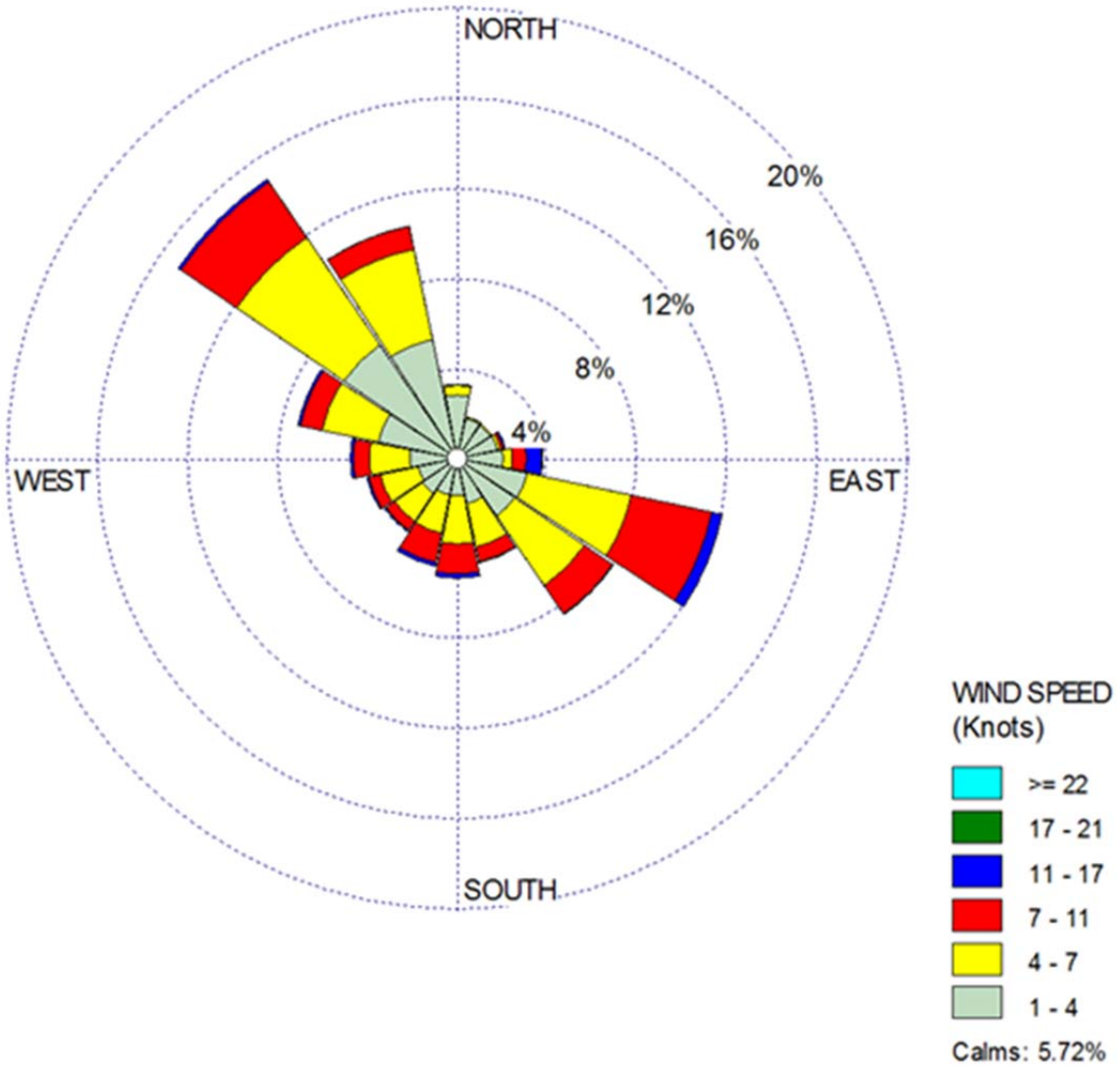

Figure 3.2-1. Pearson Field Airport Windrose (2008-2012)

Atmospheric stability has traditionally been classified using the Pasquill-Gifford (P-G) system ranging from class "A" (very unstable) to class "F" (very stable). The categories indicate the level of thermal stratification within the atmospheric boundary layer, which determines the vertical advection of air and pollutants. Unstable conditions typically result in greater vertical dispersion of pollutants while stable conditions can lead to stagnation by limiting vertical dispersion. The P-G classification system is summarized in Table 3.2-3. The 5-year meteorological dataset produced with AERMET does not include an estimate of atmospheric stability classification. However, stability can be inferred through the Monin-Obukhov scaling length (L): a measure used to define the buoyancy characteristics within the atmospheric surface layer. The range of L corresponding to each stability class is also included in Table 3.2-3.

Table 3.2-3. Atmospheric Stability

Class	Condition	L range (m)	General description and plume behavior	Project site % of time[1]
A	Very unstable	-20 < L < 0	Significant daytime heating, looping plumes	14
B	Unstable	-200 < L < -20	Daytime with heating, some plume looping	21
C	Slightly unstable	-400 < L < -200	Daytime	10
D	Neutral	|L| > 400	Cloudy and/or windy periods	5
E	Slightly stable	20 < L <400	Nights and dusk, some stagnation	31
F	Very stable	0 < 20	Cold clear nights and mornings, strong stagnation	16

1Analysis of 5-year (2008-2012) dataset utilizing Vancouver-Pearson airfield (KVUO) met. tower data

Temperature and precipitation measurement records from the "Vancouver 4 NNE" agricultural meteorological station were accessed to analyze the climate at the project site. This station is located about 4 miles northeast of the project site and has been collecting measurements since 1856. The monthly climate summary, based on 157 years of data, is included in Table 3.2-5.[10] The maximum temperature ever recorded at the site was 106° F on July 30, 2009 and minimum temperature recorded was -8.0° F in 1909. The site averages about 40 inches of rainfall and 6.5 inches of snow a year, with most of the precipitation occurring during the winter months.

A 17-year dataset of relative humidity and dewpoint temperature collected at the Portland Int. Airport ASOS meteorological station was retrieved from the National Weather Service archives to analyze these variables. Higher concentrations of water vapor typically occur in autumn and spring months when warm-conveyer-belt winds associated with mid-latitude cyclones advect warm tropical air into the region. Peak dewpoints higher than 60° generally occur in summer during periods of warm advection from the south and dewpoints near 70° can occur in rare periods of monsoonal advection. Lowest concentrations of water vapor generally occur in mid-winter or mid-summer months during periods of offshore flow. The lowest humidity is observed in winter during rare periods of modified-arctic air outflow through the Columbia Gorge. Cold, dry continental air with very low dewpoints advects out of Canada and leaks through the Gorge as a strong gap wind.

[10] Data provided by the U.S. Western Regional Climate Center, Reno, NV www.wrcc.dri.edu

Table 3.2-4. Project Site Temperature and Precipitation Climatological Averages[1]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	44.8	49.8	55.2	61.2	67.3	72.5	78.9	79.2	73.9	63.6	52.3	45.9	62.1
Average Min. Temperature (F)	32.5	34.3	37.3	40.5	45.5	50.4	53.7	53.4	49.1	43.3	38.0	34.1	42.7
Average Total Precipitation (in.)	5.76	4.39	3.83	2.73	2.28	1.68	0.62	0.85	1.80	3.20	6.03	6.45	39.62
Average Total SnowFall (in.)	3.8	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	6.5

[1]Based on 158-year climate record from Vancouver 4 NNE Met. Co-op station (458773)

3.2.1.8 Air Quality Modeling Analysis

A dispersion modeling analysis was conducted for the project based on the emission rates described in Section 5.1.2 of this Application using the five years of meteorological data described above. Full details of the analysis are outlined in Section 5.1.4. Computer-based dispersion modeling techniques were applied to simulate the dispersion of criteria pollutant and TAP emissions from the facility to assess compliance with NAAQS, WAAQS, and Ecology's ASILs for those TAPs that exceed the SQER. The dispersion modeling techniques that were employed in the analysis follow USEPA regulatory guidelines (40 CFR Part 51, Appendix W).

Compliance with ambient air quality standards may be conservatively assessed by summing the highest model-predicted concentrations attributable to facility and maximum measured (existing) concentrations to represent other sources of emissions. The influence of background sources is based on the air quality monitoring data discussed in Section 3.2.1.6 and as summarized in Table 3.2-2.

Total predicted concentrations are compared to the WAAQS and NAAQS in Table 3.2-5. The analysis indicates that when maximum predicted concentrations are added to the highest monitored values, total concentrations comply with Washington and National ambient air quality standards.

Table 3.2-5. Comparison of Cumulative Concentrations with Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Modeled Concentration	Measured Background Concentration	Maximum Total Concentration	NAAQS	WAAQS
		($\mu g/m^3$)				
NO_2	1-hour	19.5	70	89.1	188	-
	Annual	0.8	13	14.0	100	100
SO_2	1-hour	28.6	25	53.5	196	655
	3-hour	19.5	19	38.1	1300	-
	24-hour	10.8	9	20.2	-	262
	Annual	0.3	8	8.1	-	52
PM_{10}	24-hour	8.8	31	39.8	150	150
	Annual	0.1	13	13.1	-	50
$PM_{2.5}$	24-hour	8.8	20	28.8	35	-

Pollutant	Averaging Period	Maximum Modeled Concentration	Measured Background Concentration	Maximum Total Concentration	NAAQS	WAAQS
		(µg/m^3)				
	Annual	0.1	6	5.9	15	-
CO	1-hour	87.5	2364	2451.9	40,000	40,000
	8-hour	50.5	1461	1511.5	10,000	10,000

1)Note:
Although it is assumed that all PM10 emissions are PM2.5, predicted concentration differ because of the difference in the statistics used to determine compliance with the standard.

The dispersion modeling analysis of the eight TAPs emitted at rates exceeding the SQERs was conducted in the same manner as for the criteria pollutants. TAP emissions estimates for the facility are discussed in Section 5.1.2.2 of the Application and comparison to SQERs is presented in Table 5.1-14.

Maximum TAP concentrations attributable to the facility are compared with Ecology ASILs in Table 3.2-6. Predicted maximum concentrations are less than the Ecology ASILs for all TAPs that are emitted at rates exceeding the SQERs.

Table 3.2-6. Maximum Predicted TAP Concentrations

CAS #	Compound	Maximum Predicted Concentration (ug/m3)	ASIL (ug/m3)
10102-44-0	Nitrogen dioxide	19.5	470
7446-09-5	Sulfur dioxide	28.6	660
57-97-6	7,12-Dimethylbenz(a)anthracene	1.20E-06	1.41E-05
7440-38-2	Arsenic	1.50E-05	3.03E-04
71-43-2	Benzene	2.36E-02	3.45E-02
7440-43-9	Cadmium	8.26E-05	2.38E-04
18540-29-9	Chromium, (hexavalent)	4.19E-06	6.67E-06
N/A	Diesel Engine Particulate	1.45E-03	3.33E-03

3.2.2 Odor

Background odor can likely be attributed to natural sources, diesel-fueled vehicles, and industrial activities in the vicinity of the project site. The site is located along the Columbia River, which may be a source of odors associated with marine activity. Heavy industrial use of adjacent sites may also contribute to the existing odor at the project site.

Construction of the facility would include some activities that would generate odors. If oil based paints are applied to structures or equipment at the site, paint odors may be perceptible nearby. Some of the site would be paved with asphalt, and asphalt fumes may be perceptible for a short period during the paving operation. These impacts are anticipated to be slight and of short duration.

The project as planned will not result in any significant release of offensive odors into the surrounding region. Sulfurous gases (such as H_2S) and petroleum hydrocarbon vapors vented

from vessels are to be routed through the vapor containment system to a vapor combustor. The vapor combustor will reduce sulfurous compounds to SO_2 gas and convert most hydrocarbons to odorless carbon dioxide. The detection threshold of SO_2 is below the SO_2 NAAQS, and the local ambient air quality modeling analysis summarized in Section 5 demonstrates that this threshold will not be exceeded at any time.

Slight minor odor impacts due to road and rail diesel traffic may occur but will more than likely not be discernible from the background traffic odor impacts in the area.

3.2.3 Climate, Visible Plumes, Fogging, Misting, and Icing

There are no cooling towers proposed for construction at the facility. Except for infrequent and short visible water vapor plumes from the boilers, no visible plumes are expected from the facility emissions units. Consequently, no off-site fogging, misting, or icing is expected.

3.2.4 Climate Change

Although most scientists concur that anthropogenic global emissions of greenhouse gases are affecting climate, there are no analytical tools or established procedures for evaluating climate impacts from individual projects.

Ecology estimates 2010 state-wide greenhouse gas emissions were 95.1 million metric tons (CVO_{2e}).[11] As indicated in Section 2.12, the facility has the potential to emit 136,000 metric tons of greenhouse gases (CO2e) annually. The facility greenhouse gas emissions are approximately 0.14 percent of the state greenhouse gas emissions. Consequently, the incremental effect of the project on global climate change is insignificant.

3.2.5 Dust

Because the site is flat, there would be very little grading of the site prior to construction. Therefore, dust generated by excavation and grading would be short term. Dust from access roads would be controlled by applying gravel or paving the access road and watering as necessary.

After the facility is completed and operational, virtually no dust would be generated on site.

3.2.6 Mitigation

- To control dust during construction, water would be applied as necessary. Site access and travel roads would be graveled or paved.
- BACT would be incorporated into the facility design and implemented to minimize air pollution emissions.

[11] Washington Department of Ecology, December 2012. Washington State Greenhouse Gas Emissions Inventory (1990-2010). Publication no.12–02-034.

Section 3.3 – Water

WAC 463-60-322
Natural environment - Water.

(1) The application shall provide detailed descriptions of the affected natural water environment, project impacts and proposed mitigation measures, and shall demonstrate that facility construction and/or operational discharges will be compatible with and meet state water quality standards.

(2) Surface water movement/quality/quantity. The application shall set forth all background water quality data pertinent to the site, and hydrographic study data and analysis of the receiving waters within one-half mile of any proposed discharge location with regard to: Bottom configuration; minimum, average, and maximum water depths and velocities; water temperature and salinity profiles; anticipated effluent distribution, dilution, and plume characteristics under all discharge conditions; and other relevant characteristics which could influence the impact of any wastes discharged thereto.

(3) Runoff/absorption. The application shall describe how surface water runoff and erosion are to be controlled during construction and operation, how runoff can be reintroduced to the ground for return to the groundwater supply, and to assure compliance with state water quality standards.

(4) Floods. The application shall describe potential for flooding, identify the five, fifty, and one hundred-year flood boundaries, and describe possible flood impacts at the site, as well as possible flood-related impacts both upstream and downstream of the proposed facility as a result of construction and operation of the facility and all protective measures to prevent possible flood damage to the site and facility.

(5) Groundwater movement/quantity/quality. The application shall describe the existing groundwater movement, quality, and quantity on and near the site, and in the vicinity of any points of water withdrawal associated with water supply to the project. The application shall describe any changes in surface and groundwater movement, quantity, quality or supply uses which might result from project construction or operation and from groundwater withdrawals associated with water supply for the project, and shall provide mitigation for adverse impacts that have been identified.

(6) Public water supplies. The application shall provide a detailed description of any public water supplies which may be used or affected by the project during construction or operation of the facility.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-322, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-322, filed 11/6/92, effective 12/7/92.)

Section 3.3 Water

The Facility will connect to the City's existing water distribution network and construct necessary water service connections to receive potable water, process water, and emergency fire suppression water.

3.3.1 Surface Water Resources (Movement/Quality/Quantity)

The project site is generally flat and includes a total vertical relief of 12 feet (MacKay Sposito dated July 17, 2013). As described in section 3.5.3.1, a significant complex of wetlands, associated with the southern end of Vancouver Lake, is located to the north of the project site, but is functionally separated from the site by SR 501. Approximately 148 acres of wetlands providing water quality functions are located to the northwest of the project site. The Parcel 1A wetland is located to the east of the Facility and is separated from it by a private access road. The Parcel 2 wetland mitigation site is located north of Area 200 and is separated from the site by a private Port road. The project site is bounded by the Columbia River directly to the south.

With the exception of the Columbia River, there are no wetlands, streams or other jurisdictional surface water conveyances at the site. No other water features, such as ditches or wet areas, have been noted on site. Site soils consist of artificial fill material, typically consisting of sand and silt. Much of this surface material was derived from suction dredging, when Columbia River channel sand was piped on shore for dewatering and grading. Most of the project site has been filled, paved, and/or capped in association with previous development and cleanup activities, thereby providing significant stabilization of surface soils.

Manmade surface water conveyance features at the site consist of an existing sediment pond located southwest of the proposed Area 200 unloading and office area. The sediment pond is a temporary construction feature and will be filled in the near future since the Terminal 5 site has been largely stabilized following grading, rail, and roadway construction projects, both ongoing and constructed within the past few years. Excess surface water currently flows through shallow concentrated flow to the existing underground stormwater conveyance pipelines and through the Terminal 5 West water quality ponds before discharging to the Columbia River through an existing outfall.

The USGS Oregon Water Science Center reports an average annual rainfall of 38.9 inches at the Simmons Rain Gage Weather Station No. 139 at 16001 North Simmons Road in Portland. Over the 41.5-acre site, the volume of precipitation will total approximately 135 acre-feet per year.

3.3.1.1 Impacts to Surface Water

As noted above, except for the Columbia River, no natural surface water features exist at the site; therefore, no impacts will occur to surface water features as a result of the construction and operation of the Facility. Construction will occur in and over the Columbia River as part of the proposed dock improvements described in section 2.3. Impacts of the proposed in-water construction are described in section 3.4. The only other naturally occurring surface water features within a half-mile of the site consist of the wetland complex associated with the southern edge of Vancouver Lake. These wetlands are not hydraulically connected to surface water at the site, and are physically separated from the site by SR 501. Stormwater will be managed on site in accordance with local and state regulations and, therefore, impact to surface water is mitigated through the use of on-site stormwater management BMPs as discussed in

section 2.11. The Port manages three stormwater treatment ponds within a half-mile of the site: the Terminal 5 water quality ponds, Terminal 4 water quality ponds, and Parcel 8 water quality pond. Discharges from the site will be contributed only to Terminal 5 ponds and discharges will be treated to basic water quality standards in accordance with the discharge requirements of the Port and the Port's NPDES Municipal Phase II Stormwater General Permit as discussed in section 2.11.

As noted above, the site topography is relatively flat and already developed; minimal surface grading will be necessary to prepare the site for construction activities and no surface soils or natural vegetation will be stripped. Ground-moving activities will focus on excavating soils in Area 200 for the construction of the piping trenches associated with the rail unloading area, tank foundations, soil improvement facilities, and the installation of the administrative and support buildings. Excavated soils, if determined suitable by testing, will be used as fill for the construction of the containment berm in Area 300.

Protecting surface water during construction will focus on erosion control resulting from the interaction of surface water conditions with active ground disturbances. A site-specific construction SWPPP will be developed and implemented. A preliminary construction SWPPP is included in this Application in Appendix C; this preliminary SWPPP was developed based on the preliminary design in place when this Application was submitted. A final construction SWPPP will be submitted for review and approval before any facility-related ground disturbance begins. The SWPPP details specific applications in which BMPs will be installed to prevent and mitigate any construction-related impacts to surface water. Construction-related BMPs are further identified in the SWPPP.

Stormwater from the Facility site is currently collected, treated, and released to the Columbia River through existing outfalls permitted under existing NPDES permits. A complete description of the existing stormwater systems in place is provided in section 2.11 of this Application and in the preliminary stormwater report in Appendix F. This project will reduce the amount of impervious surface coverage and convert a portion of the existing pollution-generating impervious area to non-pollution-generating roof areas. All stormwater and wastewater discharges are connected to existing permitted collection and treatment systems and outfalls as described in sections 2.9 and 2.11 of this Application.

Stormwater will be discharged from the site in accordance with the existing NPDES permits which dictate effluent water quality. On-site stormwater management techniques and BMPs will increase the level of treatment, convert existing polluting generating surfaces to non-polluting surfaces and reduce the quantity of stormwater discharged from the site. The Applicant is discharging to existing collection systems owned by the Port. Actual outfall water quality, and discharge rates will be impacted by other tenants, the Port, and operations and maintenance of the downstream conveyance systems.

Mitigation Measures

A permanent stormwater management system will be constructed to serve the Facility; this system will be constructed during site grading and construction of the Facility surface and subsurface elements. The permanent stormwater management system is described in section 2.11.2, and is designed in accordance with VMC 14.024, 14.025, and 14.026 and Ecology's administrative codes for stormwater and spill prevention, preparedness, and response and the

Ecology stormwater manual. The final design and stormwater report will be prepared and submitted for approval by EFSEC prior to construction.

Surface water quality will be protected through the use of the BMPs designed and constructed in accordance with Ecology's stormwater manual. BMPs, such as oil water separators, hydrodynamic separation, particulate filters, biofiltration swales, and permanent vegetation, will be used in the permanent Facility installation to protect surface water. Once all permanent stormwater BMPs are in place, operations-related impacts to surface water will be minimized through the use of operational BMPs and operational procedures.

The most serious risk – although it is unlikely with the mitigation measures in place – to surface water quality will be an accidental crude oil release during an exceptionally high rainfall event. Numerous spill prevention and control systems have been included in the design of the Facility (see section 2.10). Containment rail drip pans, pumps, and containment sump tanks will be provided for the rail unloading area; the capacity of the containment systems will be sufficient to contain and store the entire volume of a single rail car staged within the unloading building. The tank farm will be surrounded by a containment berm 6 feet high with a full impervious liner capable of containing 110 percent of the largest tank and a 100-year 24-hour rainfall event. Spill, containment will be designed to meet or exceed API, EPA, NFPA, City and other applicable requirements. Tank monitoring, inspection, and testing will be in accordance with API 653, the industry standard for the inspection of aboveground petroleum storage tanks.

The transmission pipeline will be constructed of welded steel pipe, designed specifically for oil conveyance. Safety measures built into the design include thickened pipe walls, pipeline expansion for thermal and/or seismic movement, pressure and temperature sensors, and emergency shutoff valves. The pipeline will largely be constructed aboveground, on concrete foundations, with the exception of a few portions that will be constructed underground to accommodate existing rail and road crossings. The above-grade portion of the pipeline will be subject to visual inspection for leaks and double-walled pipe will be used underground with monitoring to detect any leaks, see Sections 2.10, 2.11 and Appendices B.2 and C for additional spill control and prevention measures.

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. The most likely spill events are small releases of less than 5 gallons resulting from nicks, corrosion pinholes, or gasket seal failures. An example of secondary containment that can address these discharges is to confirm or retrofit all stormwater inlets within the contributory drainage area of the pipeline alignment with spill control devices to contain small oil leaks or spills.

All facility piping systems and storage tanks will be hydrostatically tested prior to being placed into operation. Hydrostatic test water for the pipeline will be acquired from the City's water system. Test water will be discharged to existing storm drain conveyance systems in accordance with the stormwater permit issued for the project.

BMPs have been described in the preliminary SWPPP included in Appendix C of this Application, and will be finalized based on the final Facility design and submitted to EFSEC for review prior to construction. Flow control, controlling the rate at which stormwater is released to surface waters from the site, is not required for the Facility because all site stormwater runoff will be conveyed to the Columbia River through a manmade non-erodible conveyance system. The Columbia River is listed as a flow-control-exempt receiving water per section 2.5.7 and

Appendix I-E volume 1 of the Ecology stormwater manual. A comprehensive strategy for spill prevention and control will also be implemented as described in detail in section 2.10 of this Application.

With the mitigation measures in place, stormwater discharges from the Facility will meet state and local water quality standards.

3.3.2 Runoff/Absorption

3.3.2.1 Existing Runoff/Absorption Conditions

As discussed in section 3.3.1.1, site soils are filled, paved, and/or capped in association with previous development and cleanup activities. Existing runoff largely flows to existing manmade conveyances, pipelines, and treatment units. Based on the nature of the existing development on the site and the industrial nature of the existing sites, it is assumed that stormwater currently does not infiltrate.

Stormwater runoff from the Marine Terminal (Area 500) is part of an existing 25-acre drainage basin that is treated through two water quality bio-swales and then flows into two infiltration swales.

3.3.2.2 Impacts to Runoff/Absorption

The site is currently considered to be fully impervious. Construction will improve this existing condition by converting approximately 2.21 acres of impervious area to landscaping and approximately 10.78 acres from pollution-generating impervious to non-pollution-generating roof area. Landscaping and screening will be constructed in accordance with the City's requirements, primarily where Facility elements are situated adjacent to frontage areas along SR 501. Landscaping and stormwater areas will be constructed to allow infiltration where possible.

Currently the MVCU is proposed to impact a portion of the treatment bio-swale described above in 3.3.2.1. The impact to the existing treatment facility will be mitigated by installing a filter strip to treat the proportional amount of impacted land area. Runoff contributing to the infiltration facilities will be maintained. Proposed mitigation will add additional treatment facilities increasing the water quality prior to infiltration.

The Facility as proposed will decrease the total amount of impervious surfaces and add additional impervious areas and treatment facilities. Overall, natural absorption and infiltration from the Facility will be increased.

Construction stormwater will be managed in accordance with the conditions of the State General Construction Stormwater Permit. Construction stormwater BMPs will be utilized to control erosion and sediments on the site. Additional detail on construction BMPs are included in the preliminary SWPPP located in Appendix C. Selected construction stormwater BMPs will provide water treatment and will discharge stormwater to the existing on-site conveyance systems. Construction stormwater will not be routed to infiltration facilities.

3.3.2.3 Mitigation Measures

The designed BMPs are expected to minimize erosion and control sedimentation. Construction-phase erosion and sedimentation control BMPs, as described in sections 2.11 and 5.3 of this Application, will be implemented to mitigate the impacts of soil disturbance. Permanent

operations-phase runoff control and water quality treatment will be implemented to mitigate any impacts from the project.

3.3.3 Floodplains

3.3.3.1 Existing Conditions

Portions of the site are within the 100-year floodplain and floodway of the Columbia River. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps #53011C0363D and 364D include the project area. The maps indicate that most of the area is located in Zone X and outside the Special Flood Hazard Area representing the 100-year floodplain. The 100-year flood elevation is designated as 30 feet NAVD 88 and extends generally to the top of the bank along berths 13 and 14 in Area 400. In addition, an isolated floodplain is located in Area 300, as shown on FEMA Map Number 53011C0364D, and in a portion of Area 500. Figures 3.3-1 and 3.3-2 indicate the mapped floodplain. The Port filled Area 300 as authorized by City permit GRD2012-00025 and the area is now above the 100-year flood elevation. The floodplain within Area 500 is completely surrounded by land above the 100-year flood elevation, which separates it from overland flooding from the Columbia River or Vancouver Lake.

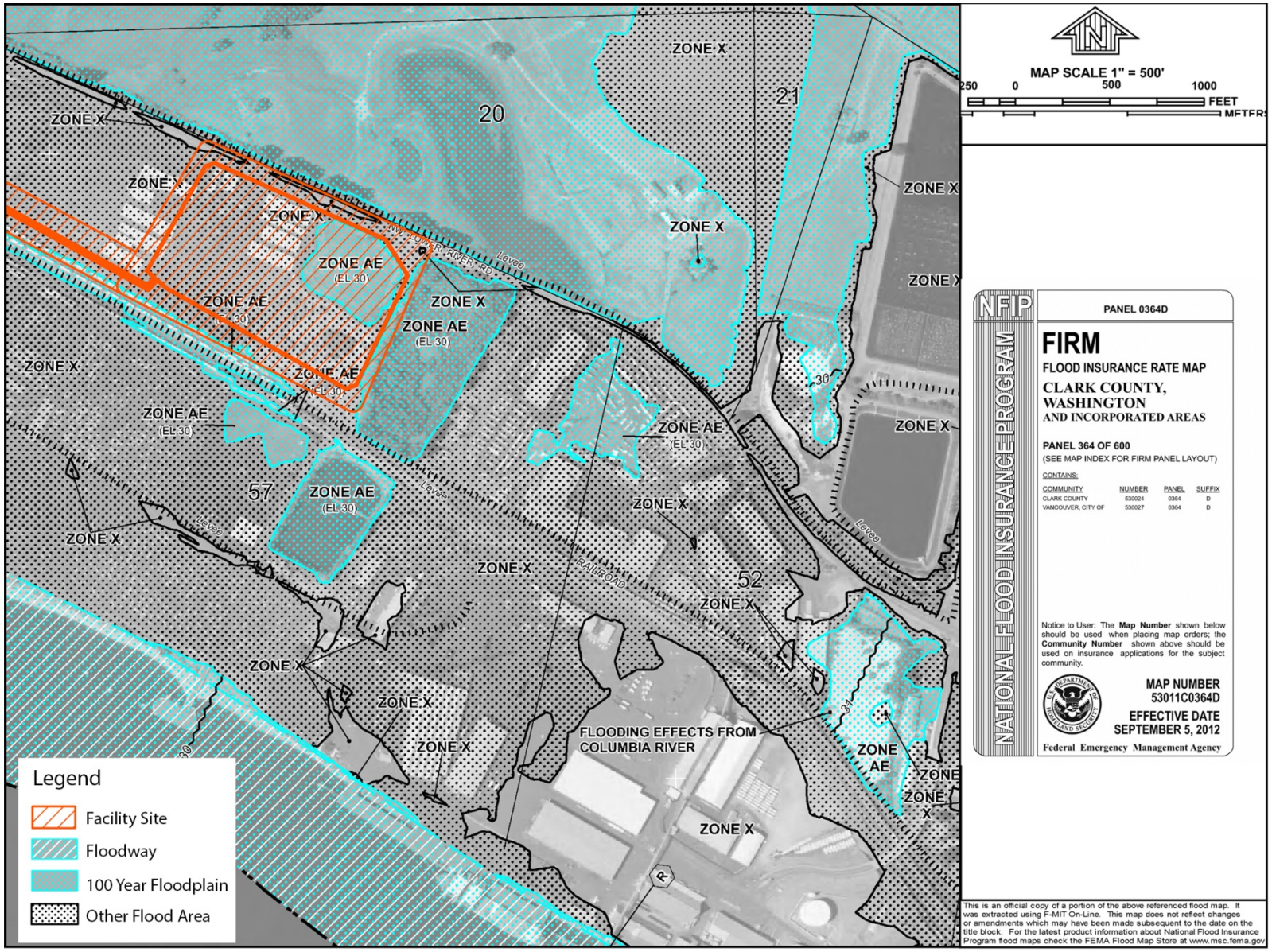

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Figure 3.3-1. Mapped Floodplains - West

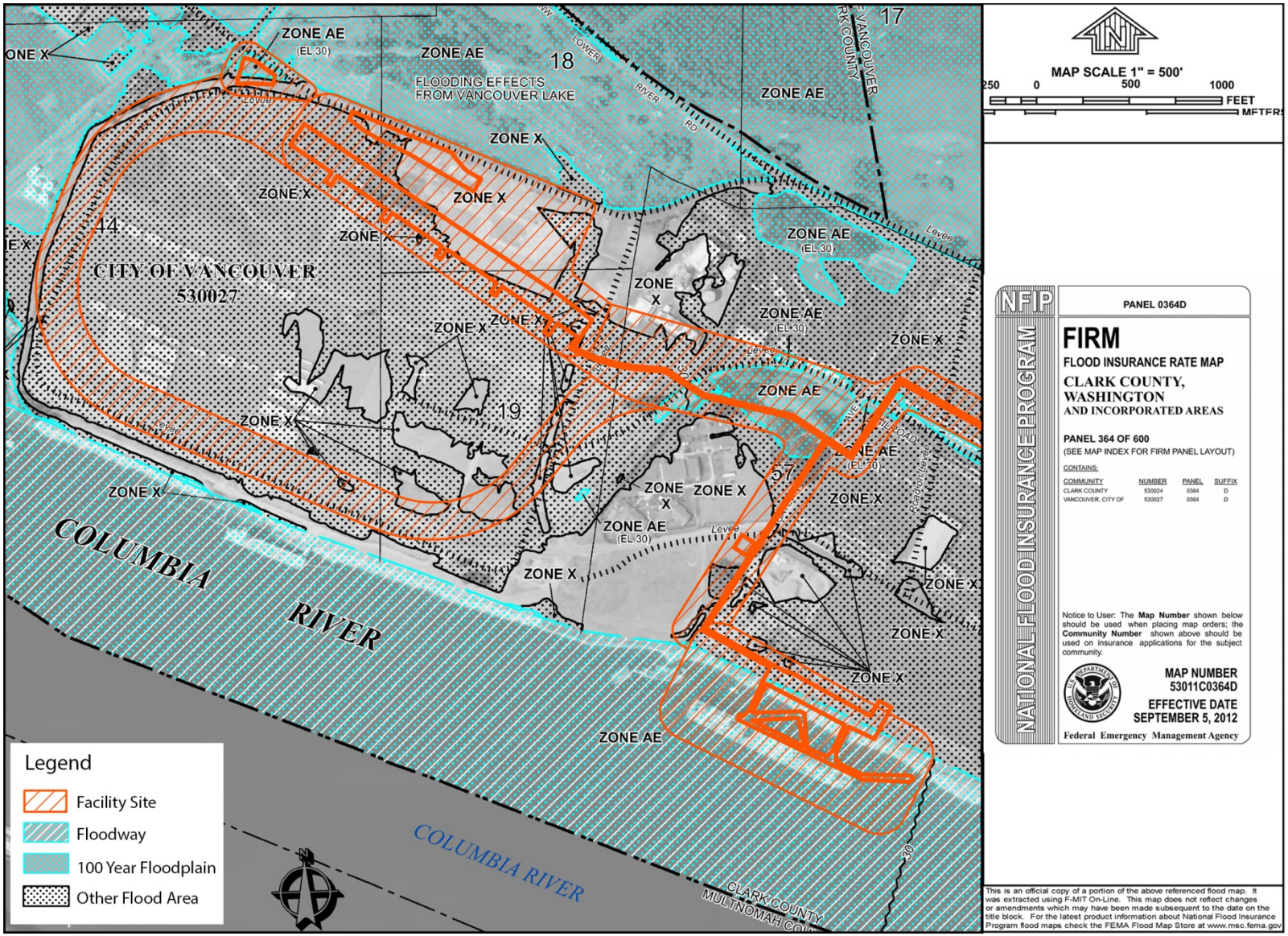

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Figure 3.3-2. Mapped Floodplains - East

3.3.3.2 Potential for Flooding and Protective Measures

Portions of the proposed pipeline route and improvements at existing berths 13 and 14 will be located within the 100-year floodplain. No fill is proposed within the 100-year floodplain, and there will be no potential to affect upstream or downstream properties through increases to the base flood elevation.

Where the pipeline route lies in the floodplain, the pipeline will be elevated aboveground. Because the floodplain is isolated from overland flows from the Columbia River it will not be subject to flowing water and no risk from floods is anticipated for this element. Regardless, the pipeline will be designed by a professional engineer to withstand potential impacts from flooding.

Berths 13 and 14 in Area 400 are existing pile-supported structures located in the Columbia River. The existing and planned improvements will be located with deck elevations above the 100-year flood elevation and have been (or will be) designed by a professional engineer to withstand the forces imposed by flooding conditions.

All or portions of the proposed structures located in Area 400 will be located in the 100-year floodplain. These include a dock transformer pad, control room/E-house and fire pump and foam building. These structures will be elevated so that the floor is at least 1 foot above the base flood elevation. They will also be anchored to resist movement and designed with utilities and other connections that are designed to withstand flood events consistent with the requirements of VMC 20.740.120 Frequently Flooded Areas.

3.3.4 Groundwater Resources

The hydrogeologic setting controls the availability, quantity, and quality of groundwater resources at the project site. This section presents an overview of the hydrogeologic units, potential impacts from the project, and mitigation options.

A hydrogeologic unit is any geologic unit that controls groundwater occurrence or the movement of groundwater based on the hydrologic properties of the material. Within the Portland Basin, eight hydrogeologic units have been identified (Swanson et al. 1993). These units are further subdivided based on regionally continuous contacts between units of different textures and hydrologic characteristics into two sedimentary subsystems (Upper Sedimentary Subsystem and Lower Sedimentary Subsystem) and an older rock subsystem. The very productive Upper Sedimentary Subsystem contains most water supply wells and is the primary aquifer system for drinking water. The Upper Sedimentary Subsystem is composed of unconsolidated material associated with Quaternary alluvium deposits, catastrophic flood deposits, and the Troutdale Formation. These units are composed of coarse-grained materials, predominantly sands and gravels, and are permeable and productive.

The relatively flat groundwater surface and flow direction along the banks of the Columbia River are influenced by tidal fluctuations, precipitation events, supply well pumping, and upstream dam releases. The effect of the relatively flat groundwater surface and the hydraulic connection of the aquifer to the Columbia River results in diurnal fluctuations of groundwater flow direction at the site. The aquifer response to river stage is slightly offset near the bank and decreases with distance from the river. When the river stage increases with high tide, groundwater flow direction is from the river into the aquifer. Conversely, when the river stage decreases with low

tide, groundwater flow direction is from the aquifer into the Columbia River. However, net groundwater flow is from the aquifer to the Columbia River.

Within the Facility site, groundwater quality has been impacted by the historical industrial operations that have occurred. Alcoa owned and operated an aluminum smelter and fabrication facility at the project site for approximately 55 years. Alcoa conducted a cleanup of the site and limited groundwater contamination is currently found within the site. The COCs identified at the site by Ecology include VOCs, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), cyanide, fluoride, and petroleum hydrocarbons. Multiple site investigations into the nature and extent of contamination at the site indicate that groundwater contamination occurred as a result of waste disposal activities on the site. The groundwater contamination detected in the vicinity of the East Landfill area includes trichloroethene above state and federally designated human health-based risk levels. The current cleanup action includes monitored natural attenuation that will continue until groundwater cleanup standards are achieved.

The site and surrounding areas are within the City's water service boundary. The City receives its water from the Orchards, Troutdale, and Sandy River Mudstone aquifers. The EPA designated the aquifers used by the City for drinking water as a sole-source aquifer in July 2006 (EPA 2006). The aquifer will continue to be the source of water supply as demands increase. The City has designated the entire area within the City's boundaries as a CARA, as specified by its Water Resources Protection Ordinance (VMC 14.26). The project site falls within this boundary. The ordinance requires minimum standards to protect critical aquifers, establishes compliance standards for business and industry to manage hazardous materials, and creates special protection areas around City wellheads. Section 3.3.5 discusses the City water supply and well locations.

3.3.4.1 Impacts

Municipally supplied water obtained from the City is planned to be the source of water for the site. The water will be obtained from the existing City water system; no new groundwater wells will be constructed to serve the Facility, either at the site or elsewhere. Therefore, there are no anticipated adverse impacts to existing ground water sources resulting from City supply of potable, process and emergency fire suppression water.

Some foundations and utility and pipeline excavations for the project may require dewatering of the excavations during the construction process. Groundwater extraction during construction will result in the temporary drawdown of groundwater in the areas immediately surrounding the work site. Because the excavations are shallow (the majority under 5 feet) the extraction of groundwater will have a negligible long-term effect on groundwater abundance and availability. Because of the presence of contaminated groundwater on the site, there is the potential that contaminated groundwater may be extracted during construction dewatering.

Groundwater that is pumped out of the excavations will be stored on site in mobile water tanks and analyzed and managed in accordance with local, state and federal regulations prior to reuse, infiltration or disposal. If conditions and water quality allow bypass of the mobile water tanks may occur. Potential options for management of groundwater from the excavations will depend on the chemical and physical qualities of the water and are expected to include:

- Discharge to surface areas for infiltration.

- Discharge to the stormwater system if the water meets the quality criteria per the construction stormwater permit issued for the project (see section 5.3).
- Discharge to the City's sanitary sewer if contaminants are present at concentrations that meet the City's criteria as regulated in the VMC 14.10.080.
- Collection and offsite disposal by a licensed commercial facility if contaminants are present at concentrations greater than the criteria for discharge to the sanitary or stormwater systems.

It is unlikely that the project's water withdrawals related to construction activities will have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities. Therefore, impacts to groundwater resources are considered negligible.

3.3.4.2 Mitigation

Disposal will be conducted in accordance with the stormwater permit issued for the project. If dewatering wells are necessary, well points used for construction dewatering will be completed in accordance with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells. If groundwater extracted for construction dewatering is directed to the City's sanitary sewer it will be disposed in accordance with VMC 14.12 Discharge of Industrial Wastes to the Industrial Wastewater Pretreatment Facility.

3.3.5 Public Water Supplies

As stated above, the City receives its water from the Orchards, Troutdale, and Sandy River Mudstone aquifers. The City's water rights total 108 MGD. Current maximum day demands are approximately 55 MGD. Current source development efforts by the City allow the City to provide a current capacity without storage of 80.6 MGD. There is 24.5 million gallons of storage within the City's water supply and an additional two emergency interties with Clark Public Utilities (CPU).

The City uses its sources and reservoirs to satisfy all of the water demands on its system. The present municipal water supply has an additional 25.6 MGD of capacity above its current maximum day demand.

3.3.5.1 Proposed Water Usage

Water consumption at the Facility is anticipated to result in a maximum day demand of approximately 60 gpm. Water consumption consists of approximately 78,900 gpd of process water, and 8,500 gpd of domestic potable water, and 2,200 gpd of irrigation water during a maximum day demand. Additional information related to Facility water use is included in section 2.6 of this Application. The City has reviewed estimated water demands and provided a letter (Appendix E) confirming adequate source and distribution capacity to meet the water demands of the Facility.

3.3.5.2 Water Supply During Construction

Construction water will be purchased from the City; the uses include spraying roads for dust control, concrete curing, hydrostatic testing, miscellaneous construction support, and restroom facilities for an estimated construction and support crew of 250 people. The water demand during construction is conservatively estimated at 20,000 gallons per day, with a peak demand of approximately 500 gallons per minute. Water will be provided to the site through existing pipeline systems. The contractor will coordinate with the City for construction water and all

applicable regulations requiring backflow devices and metering of construction water. Additional information related to construction water is included in section 2.6 of this Application.

In addition to the average daily needs during construction, a minimum of 20 million gallons of water will be required for hydrostatic testing and flushing of the pipeline and tank facilities. Testing and commissioning will be sequenced to minimize the use of water for a single test. To the maximum extent possible, commissioning water will be utilized in multiple facilities to reduce water consumption. Water used for flushing and testing the tank and pipeline facilities will be treated and discharged to onsite stormwater facilities according to the discharge limits required in the State Construction General Stormwater Permit.

3.3.5.3 Future Conditions

The water demand for the Facility is assumed to be constant from year to year. The water use figures presented in the Application for site certification represent full build-out.

3.3.5.4 Impacts to Public Water Supplies

Based on the City's current excess source capacity described above in 3.3.5 of 25.6 MGD and excess water right of 53 mgd, the proposed Facility impact of approximately 87,400 gpd represents 0.3 percent of the available capacity. City-wide long-term growth is not anticipated to be affected by the water demands of this project.

A wellhead protection map is included in the preliminary stormwater report in Appendix F. The project is not located within a wellhead special protection area, defined by the City in VMC 14.26 as a 1,900-foot diameter around a City- or CPU-owned drinking water well. The closest City well to the project site is Water Station #3 located near Washington and 41st Street approximately 1.9 miles to the northeast of Area 300. The Port well #2 is located approximately 1.3 miles southeast of Area 300 near the United Grain Terminal. CPU maintains the South Lake Wellfield approximately 1.5 miles northeast of Area 300 near the intersection of Fruit Valley Road and NW 61st Street.

3.3.5.5 Mitigation Measures

Mitigation for the use of and impact on the public water system includes payment of system development charges, connection fees, and utility rates. These fees and rates are to support capital and operating expenses of the water system.

3.3.6 Private Water Supplies

The Clark County GIS wellhead protection mapping system was used to determine the existence of any wells in the vicinity of the Facility. This research identified five wells within 1 mile of the site. Two of the wells are classified as a Group B Public Water System. One is classified as a Group A Public Water System. The remaining two are classified as an unclassified Water System. All wells were identified as drilled wells. Where depth information was available, the two wells located east of the site were drilled at depths of 40 to 50 feet, while the wells to the west were drilled at depths of 130 to 135 feet. There is an additional Port well (PW-20) located at Terminal 5, which has been used in the past for water needs during construction projects at Terminal 5. This well yields a flow of between 600 and 1,500 gallons per minute.

3.3.6.1 Impacts

The Facility will purchase its water supply from the City. The development of new water sources or wells is not required for this Facility. Relative to the existing system demands and total City water rights, the project is not anticipated to have an effect upon the private water supplies in the vicinity of the project site.

Section 3.4 – Habitat, Vegetation, Fish, and Wildlife

WAC 463-60-332
Natural environment - Habitat, vegetation, fish and wildlife.

The application shall describe all existing habitat types, vegetation, wetlands, fish, wildlife, and in-stream flows on and near the project site which might reasonably be affected by construction, operation, decommissioning, or abandonment of the energy facility and any associated facilities. For purposes of this section, the term "project site" refers to the site for which site certification is being requested, and the location of any associated facilities or their right of way corridors, if applicable. The application shall contain the following information:

(1) Assessment of existing habitats and their use. The application shall include a habitat assessment report prepared by a qualified professional. The report shall contain, but not be limited to, the following information: (a) A detailed description of habitats and species present on and adjacent to the project site, including identification of habitats and species present, relative cover, density, distribution, and health and vigor; (b) Identification of any species of local importance, priority species, or endangered, threatened, or candidate species that have a primary association with habitat on or adjacent to the project site; (c) A discussion of any federal, state, or local special management recommendations, including department of fish and wildlife habitat management recommendations, that have been developed for species or habitats located on or adjacent to the project area;

(2) Identification of energy facility impacts. The application shall include a detailed discussion of temporary, permanent, direct and indirect impacts on habitat, species present and their use of the habitat during construction, operation and decommissioning of the energy facility. Impacts shall be quantified in terms of habitat acreage affected, and numbers of individuals affected, threatened or removed. The discussion of impacts shall also include: (a) Impacts to water quality, stream hydrology and in-stream flows; (b) Impacts due to introduction, spread, and establishment of noxious or nonnative species; (c) Impacts and changes to species communities adjacent to the project site; (d) Impacts to fish and wildlife migration routes; (e) Impacts to any species of local importance, priority species, or endangered, threatened, or candidate species; (f) Impacts due to any activities that may otherwise confuse, deter, disrupt or threaten fish or wildlife; (g) An assessment of risk of collision of avian species with any project structures, during day and night, migration periods, and inclement weather; (h) An assessment for the potential of impacts of hazardous or toxic materials spills on habitats and wildlife.

(3) Mitigation plan. The application shall include a detailed discussion of mitigation measures, including avoidance, minimization of impacts, and mitigation through compensation or preservation and restoration of existing habitats and species, proposed to compensate for the

impacts that have been identified. The mitigation plan shall also: (a) Be based on sound science; (b) Address all best management practices to be employed and setbacks to be established; (c) Address how cumulative impacts associated with the energy facility will be avoided or minimized; (d) Demonstrate how the mitigation measures will achieve equivalent or greater habitat quality, value and function for those habitats being impacted, as well as for habitats being enhanced, created or protected through mitigation actions; (e) Identify and quantify level of compensation for impacts to, or losses of, existing species due to project impacts and mitigation measures, including benefits that would occur to existing and new species due to implementation of the mitigation measures; (f) Address how mitigation measures considered have taken into consideration the probability of success of full and adequate implementation of the mitigation plan; (g) Identify future use of any manmade ponds or structures created through construction and operation of the facility or associated mitigation measures, and associated beneficial or detrimental impacts to habitats, fish and wildlife; (h) Discuss the schedule for implementation of the mitigation plan, prior to, during, and post construction and operation; (i) Discuss ongoing management practices that will protect habitat and species, including proposed monitoring and maintenance programs; (j) Mitigation plans should give priority to proven mitigation methods. Experimental mitigation techniques and mitigation banking may be considered by the council on a case-by-case basis. Proposals for experimental mitigation techniques and mitigation banking must be supported with analyses demonstrating that compensation will meet or exceed requirements giving consideration to the uncertainty of experimental techniques, and that banking credits meet all applicable state requirements.

(4) Guidelines review. The application shall give due consideration to any project-type specific guidelines established by state and federal agencies for assessment of existing habitat, assessment of impacts, and development of mitigation plans. The application shall describe how such guidelines are satisfied. For example, wind generation proposals shall consider Washington state department of fish and wildlife Wind Power Guidelines, August 2003, or as hereafter amended. Other types of energy facilities shall consider department of fish and wildlife Policy M-5002, dated January 18, 1999, or as hereafter amended.

(5) Federal approvals. The application shall list any federal approvals required for habitat, vegetation, fish and wildlife impacts and mitigation, status of such approvals, and federal agency contacts responsible for review.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-332, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-332, filed 11/6/92, effective 12/7/92.)

Section 3.4 Habitat, Vegetation, Fish, and Wildlife

The purpose of this section is to document the habitat, vegetation, fish, and wildlife resources that could be affected by the construction, operation, decommissioning, or abandonment of the proposed project. A biological resources report, which provides additional detail about biological resources present in the vicinity of the project, including detailed habitat descriptions, species life histories, and impacts assessments, is included as an appendix to this application (Appendix H.1).

Figure 3.4-1 is an overview of the biological resources in the study area and of the important habitat areas and features that are referred to in this section. Because mappable biological resources (habitat types, wetlands, surface waters) at the project site are limited, this analysis did not include detailed mapping of biological resources.

3.4.1 Methodology

3.4.1.1 Study Area

The assessment of biological resources examined the project study area, defined as all of the areas that could be affected directly or indirectly by the proposed project, and was conducted at three scales.

Project Site

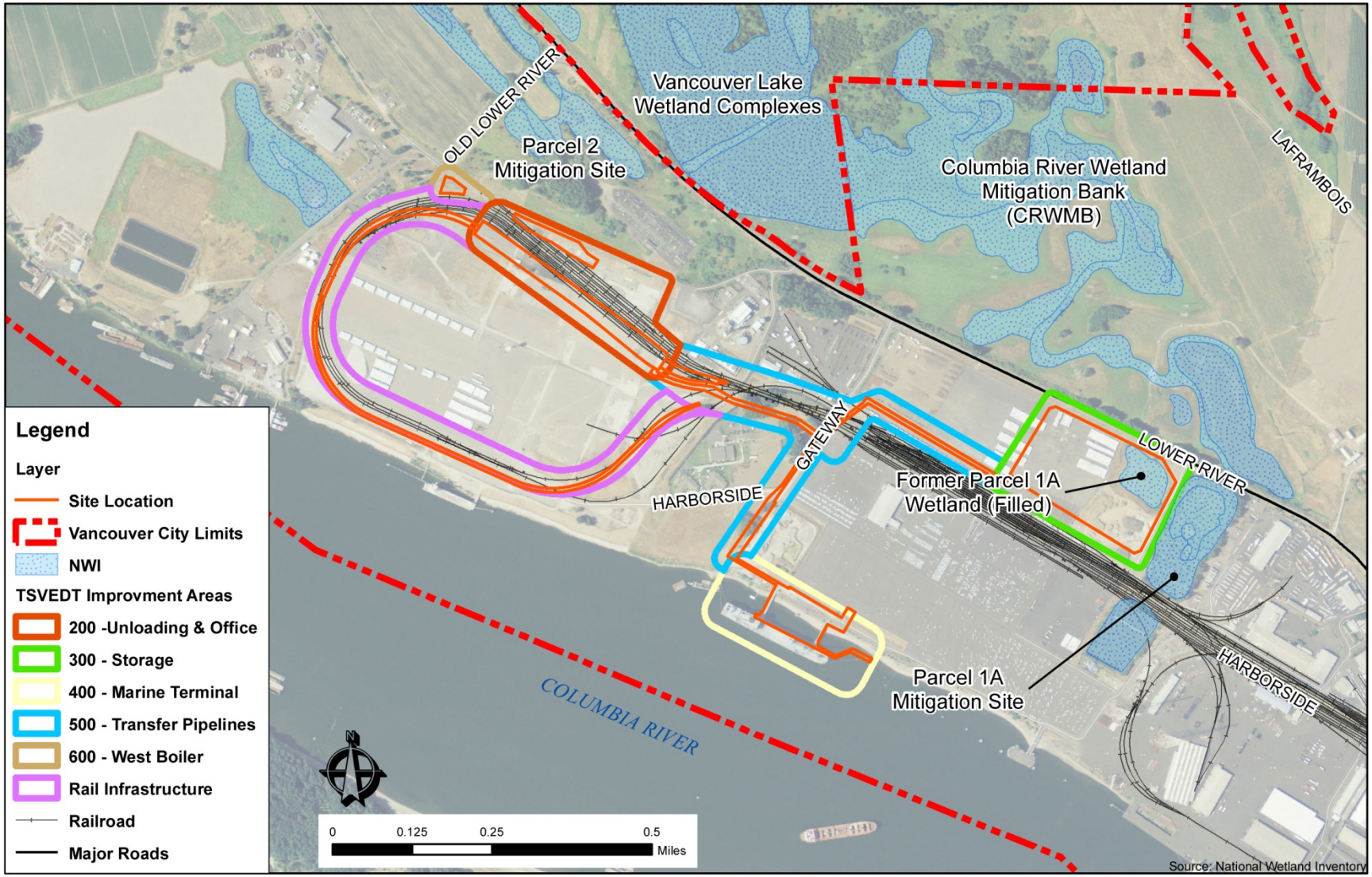
Most of the analysis is focused at the project site scale, where effects to biological resources have the greatest potential to occur. The project site is limited to the proposed physical footprint of the project. Ground-disturbing activities associated with project construction will occur in the area within the project footprint, and may result in impacts to biological resources.

Project Vicinity

The project vicinity includes parcels adjacent to the proposed project site as well as biologically important features within approximately 1 mile of the site. Examples of features included within the project vicinity biological area of potential effect (BAPE) include the wetland complexes associated with Vancouver Lake and the Shillapoo National Wildlife Refuge (NWR), the CRWMB, the Port's Parcel 1A and Parcel 2 wetland mitigation sites, and wetlands and agricultural habitats on Port Parcel 3. Biological resources present within the project vicinity would not be impacted directly by the proposed project, but may be subject to indirect effects associated such as elevated noise from construction or operation, or by issues related to water quality.

Project Shipping Prism

Finally, the analysis included a third scale – the project's shipping prism, defined as the area in which effects associated with increased shipping could occur. This BAPE includes the entirety of the Lower Columbia River downstream of the site, as well as marine habitat off the coasts of Washington, Oregon, and California, out to the extent of the Exclusive Economic Zone (EEZ), a distance of 200 miles offshore. Biological resources that are outside the immediate project site and vicinity could be affected by the effects associated with increased shipping traffic such as potential for ship wake stranding of fish, bank erosion from ship propeller (prop) wash, transport of exotic species, ballast water issues, and/or direct injury as a result of ship strikes (potentially including marine mammals.



BergerABAM

Figure 3.4-1. Biological Resource Overview

3.4.1.2 Methodology

Project scientists coordinated with regulatory agency biologists, conducted a review of existing literature and reference material, and conducted field investigations at the project site.

Information regarding the potential presence of special status plant species was obtained from the USFWS web site (USFWS 2013), and from a review of the Washington Natural Heritage Program (WNHP) database (WNHP 2013a). A list of species documented as occurring within the project vicinity, or with the potential to occur, was generated based on the potential presence or absence of appropriate habitat for each species.

Information regarding the potential presence of special status fish and wildlife species was obtained from the USFWS web site (USFWS 2013) and the NMFS web site (NMFS 2013) on June 27, 2013. Additional information came from data provided by WDFW's two on-line databases, Priority Habitat and Species (PHS) on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b), as well as from the 2008 PHS list (WDFW 2008).

Information regarding the potential presence of wetlands at the project site included reviews of National Wetlands Inventory (NWI) (USFWS 1989) and soils data (NRCS 2013) and review of recent and historic permitting documentation.

Biologists from BergerABAM visited the site on May 28 and June 27, 2013 to delineate the OHWM of the Columbia River, conduct a riparian habitat assessment and tree inventory, and assess terrestrial site conditions throughout the project site.

3.4.2 Habitat and Vegetation

Habitat and vegetation resources are addressed together in this section of the document, as habitat function and suitability is largely dictated by the species composition of the vegetation community. This section describes the habitat types that are present at the project site and within the vicinity and shipping prism and the special status plant species that have the potential to occur within the project site or vicinity. The shipping prism does not provide habitat for any special status plant species, and there are no special status plant species known to occur within the shipping prism, and therefore an analysis of impacts to special status plants in the shipping prism is not necessary.

3.4.2.1 Existing Conditions

Habitat and Vegetation

Project Site – Terrestrial vegetation and wildlife habitat at the project site is of limited quality and quantity. As a result of past development and cleanup activities, there is very little vegetation or wildlife habitat present on the upland portions of the site. Most of the project site has been filled, paved, and/or capped in association with previous development and cleanup activities. Terrestrial habitat at the project site can be described according to the following subcategories.

- *Unvegetated Industrial* – The unvegetated industrial habitat type comprises most of the project site, and consists of unvegetated areas that are completely developed with industrial infrastructure such as buildings, rail lines, roads, and other paved and graveled surfaces. These areas are devoid, or nearly devoid, of vegetation and largely impervious. They provide little to no wildlife habitat function.

- *Ruderal Upland Grass/Forb* – Upland vegetation within the ruderal upland grass/forb habitat type is primarily limited to small patches of grasses and a mix of native and non-native weedy herbaceous species including colonial bentgrass (*Agrostis capillaris*), rabbitfoot clover (*Trifolium arvense*), white sweet clover (*Melilotus alba*), and Canada thistle (*Cirsium arvense*). [12] These areas provide very little vegetation or wildlife habitat function, as they are small, isolated patches of vegetation with little potential or opportunity to provide significant function.
- *Riparian* – The extent of riparian habitat within the project site is very limited, as the bank drops steeply from the upland portion of the property down to the river, and the upland extent of functional riparian habitat is limited by existing impervious surfaces. The riparian area within the proposed project site is mostly devoid of vegetation, with the exception of scattered trees and vegetation below the top of the bank. Impervious surfaces include existing roadways, material laydown areas, compacted soil, access trestles, and stormwater facilities. Vegetation within the functional portion of the riparian habitat at the site consists primarily of small-diameter black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), willows (*Salix* spp.), non-native false indigo bush (*Amorpha fruticosa*), and Himalayan blackberry (*Rubus armeniacus*). The bank is armored with riprap, and above the riprap, there is a narrow band of ruderal grass/forb habitat.

  The terrestrial portion of the riparian buffer most likely provides a small amount of habitat for wildlife species that can tolerate a wide range of habitat conditions and are conditioned to living in industrialized environments (e.g., ground squirrels, rabbits, opossum, raccoons, coyote, and common rodent species). In addition to these terrestrial mammals, the riparian buffer likely provides a small amount of seasonal foraging habitat for resident and migratory songbirds and shorebirds, as well as raptors.

  Riparian habitats are defined by WDFW as a priority habitat for the important hydrologic, water quality, and habitat functions they provide (WDFW 2008). However, due to the highly altered nature of the riparian habitat at the site (i.e. riprap armored bank, minimal riparian vegetation, lack of structural complexity), riparian habitat at the project site does not provide any significant hydrologic, water quality or habitat functions.

- *Upland Cottonwood Stands* – Small upland stands of black cottonwood are present on the County Jail Work Center (Jail Work Center) property adjacent to the project site. These are small stands dominated almost exclusively by a closed canopy black cottonwood overstory, with occasional Oregon ash (*Fraxinus latifolia*) and limited understory vegetation. These stands are isolated from other forested areas in the vicinity by industrial infrastructure including rail tracks, roads, fences, and other paved surfaces. The isolated nature of these stands limits their habitat function and values. However, they do likely provide refuge and foraging habitat for migratory songbirds and small mammals as well as perching and nesting habitat for raptors.

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[12] Definition of ruderal: Weedy vegetation growing on compacted, plowed, or otherwise disturbed ground and showing a preference for this type of habitat. Source: http://www.biology-online.org/dictionary/Ruderal

Project Vicinity – While there is little habitat present at the project site, there are several areas of relatively higher quality habitat adjacent to the project site, and within the immediate vicinity. These include emergent and forested wetland and forested habitats, and agricultural lands.

- *Wetlands* – The project site is located within the Vancouver Lake Lowlands, an area historically subject to seasonal flooding from Vancouver Lake and the Columbia River. Human activities, including dam construction, floodplain fills, diking, and streambank armoring, have significantly altered the hydrology of the Columbia River. These activities also resulted in a significant reduction in the quantity and quality of wetland habitats in the Vancouver Lake Lowlands. However, there are still significant portions of the Vancouver Lake Lowlands that remain influenced by seasonal inundation and high groundwater tables, and these wetland habitats provide important water quality, hydrology, and habitat function. The highest quality forested and emergent wetland habitat in the project vicinity is associated with the southern end of Vancouver Lake. The CRWMB, an approximately 154-acre wetland mitigation bank established in 2010, is located at the southern extent of this wetland complex. These wetlands provide high quality seasonally inundated habitats that most closely resemble the original hydrologic and wetland habitat functions of the Vancouver Lake Lowlands.

  There are also two wetland mitigation sites in the vicinity of the project site. These sites were created and/or enhanced from upland sites, as compensatory mitigation for wetland impacts. The Parcel 1A wetland mitigation site, located immediately east of Parcel 1A, was created in 1994. The site is an approximately 7.9-acre depressional, palustrine, forested wetland, vegetated with mature black cottonwood trees and a variety of native shrubs and herbaceous species. The fifth and final year of monitoring was conducted in 2001 (David Evans and Associates 2001). This site is owned and maintained by the Port.

  The Parcel 2 wetland mitigation site, also owned and maintained by the Port, is an approximately 16.4-acre mitigation site, situated on an approximately 31.3-acre parcel north of the existing Terminal 5 site. The mitigation site was established in 2000, and received final regulatory approval and release from further monitoring obligation from USACE in 2007. The site is currently a mosaic of forested, scrub-shrub, and emergent vegetation.

  Several emergent wetlands also exist on Port parcels 3, 4, and 5, west of the Terminal 5 site. Because of their limited structural diversity, these wetlands primarily provide water quality functions but likely also provide some wildlife habitat functions.

  Freshwater wetlands are a WDFW priority habitat, and they provide important habitat functions in addition to water quality and hydrologic functions. Wetlands can provide habitat for several species of waterfowl (i.e., mallard ducks, pintail, wigeon, merganser, gadwalls, green-winged teal, Canada goose, and snow goose), great blue heron, sandhill crane, and a variety of migratory songbird species. Mammals typically found in wetland habitats in the vicinity include beaver, raccoon, and coyote. Various reptile and amphibian species are frequently encountered as well.

- *Riparian* – Riparian habitats throughout most of this industrial reach of the Columbia River are heavily armored, with little native vegetation and little habitat function. While most of the shoreline within the Port is armored, some shoreline areas contain sandy banks, scattered rock, and large woody debris. According to the natural resources inventory management plan completed for the Port in 2004, the shoreline area located at Berth 10 (east of the Facility)

consists of sandy shorelines with willows and cottonwoods colonizing portions of the riprap bank (Vigil Agrimis, Inc. and Herrera Environmental Consulting 2004). This stretch of sandy shoreline provides higher levels of habitat functions compared to the armored shorelines within the Port. In addition, there is an existing aquatic habitat enhancement site approximately 350 feet downstream of the Berth 14 trestle and the Port plans to place large woody debris upstream of the project site as part of the mitigation efforts for the WVFA project.

- *Upland Cottonwood Stands* – Several upland stands of black cottonwood are present throughout the immediate project vicinity. These are small stands dominated almost exclusively by black cottonwood and Oregon ash, typically with limited understory vegetation. These stands are frequently located near wetland and aquatic habitats and, as such, likely provide higher quality habitat than the upland cottonwood stands at the project site. The stands near wetland and aquatic habitats provide refuge and foraging habitat for migratory songbirds and small mammals, perching and nesting habitat for raptors, and cover and foraging habitat for upland mammals.
- *Agricultural Lands* – The Port's Parcel 3, located east and northeast of the Terminal 5 site, is leased for agricultural activities. Parcel 3, an approximately 517-acre parcel, is used mostly for row crops and pasture for horses and cattle. A few remnant sloughs, oriented roughly parallel to the Columbia River, are present in the eastern portion of the parcel, and the northernmost of these sloughs is hydrologically connected to the Parcel 2 wetland mitigation site. A cottonwood-dominated riparian forest borders the river, inland from a sandy beach and levee. Several emergent wetlands have been delineated on this parcel. These lands provide significant foraging habitat for geese and sandhill cranes as well as for other migratory birds and for a variety of small mammal species.

Project Shipping Prism – There are no terrestrial vegetation or terrestrial habitat resources present in the Project Shipping Prism.

Special Status Plant Species

This section evaluates the potential for special status plant species to occur within the project study area. Special-status species are defined for purposes of this report as those identified for protection under federal or state laws. They are listed under the federal Endangered Species Act of 1973 (ESA); plant species identified as endangered, threatened or sensitive by the Washington Natural Heritage Program (WNHP); and species identified as PHS, species of concern, or species of greatest conservation need (SGCN) by WDFW.

At the federal level, a listing of species of concern is for advisory and management purposes only, as there may be insufficient information to support listing. The category of threatened is applied to plants that are likely to become endangered within the near future if factors contributing to their population decline or habitat degradation or loss continue. Plants listed as federally threatened or endangered are protected under the ESA, which is administered by the USFWS.

State-listed threatened or endangered plant species are not protected by state legislation or regulation, but are listed as threatened or endangered to assist with agency management and decision-making. Although the WNHP places a management priority on the preservation of high-quality native plant communities, no such communities exist on the property.

A review of the WNHP database did not identify any documented occurrences of any special status plant species within the township/range/sections in which the project site is located (WNHP 2013a). No special status plant species have been documented at the project site and it does not provide suitable habitat for any special status plant species. The project vicinity does provide several higher-functioning wetland, riparian, and aquatic habitats as well as upland and riparian forested habitats that may provide potentially suitable habitat for one or more special status plant species, but plants within these habitats would be unaffected by the proposed project.

Table 3.4-1 summarizes the special status plant species known to, or with the potential to, occur at the project site or within the vicinity based on an evaluation of the presence or absence of species-appropriate habitat at the project site and vicinity scales.

Although a number of protected species plants have the potential to occur in the vicinity of the project, project site conditions do not provide any suitable habitat for any of the species listed.

Table 3.4-1. Special Status Plant Species and Their Potential to Occur within the Project Site or Vicinity

Species	Federal	State	Potential for Occurrence	
	ESA Listing Status[1]	State Listing Status[2]	Project Site	Project Vicinity
Oregon Bolandra (*Bolandra oregana*)	None	SC	Low – no suitable habitat on site	Low – riparian species requiring deep shade
Dense Sedge (*Carex densa*)	None	ST	Low – no suitable habitat on site	Low – peripheral species of intertidal marshlands
Golden Paintbrush (*Castilleja levisecta*)	FT	SE	Low – no suitable habitat on site	Low – rare species of open grasslands in Puget trough on glacial outwash
Tall Bugbane (*Cimicifuga elata*)	FSC	SS	Low – no suitable habitat on site	Low – understory species of lowland forests
Few-Flowered Collinsia (*Collinsia sparsiflora* var. *brucea*)	None	SS	Low – no suitable habitat on site	Low - thin soils over basalt on a variety of slopes in Columbia Gorge.
Clackamas Corydalis (*Corydalis aquae-gelidae*)	FSC	SS	Low – no suitable habitat on site	Low – mid-elevation riparian species of hemlock and fir forests.
Oregon Coyote-Thistle (*Eryngium petiolatum*)	None	ST	Low – no suitable habitat on site	Moderate – rare species of wet prairies and low ground
Western Wahoo (*Euonymus occidentalis*)	None	ST	Low – no suitable habitat on site	Low – shaded forest understory species
Western Sweetvetch (*Hedysarum occidentale*)	None	ST	Low – no suitable habitat on site	Low – high elevation species
Water Howellia (Howellia aquatilis)	FT	ST	Low – no suitable habitat on site	Moderate – aquatic species of small vernal ponds
Nuttall's Quillwort (Isoetes nuttallii)	None	SS	Low – no suitable habitat on site	Low – Terrestrial species of wet ground, seeps, and in mud near vernal pools.
Smooth Goldfields (*Lasthenia glaberrima*)	None	SE	Low – no suitable habitat on site	Moderate – rare species of wet stream banks and vernal pools.
Torrey's Peavine (*Lathyrus torreyi*)	FSC	FT	Low – no suitable habitat on site	Low – open areas within Douglas fir dominated sites
Bradshaw's Lomatium (*Lomatium bradshawi*i)	FE	SE	Low – no suitable habitat on site	Moderate – wet, seasonally flooded prairies and grasslands near creeks and small rivers.
Branching Montia (*Montia diffusa*)	Non	SS	Low – no suitable habitat on site	Low – moist Douglas-fir forests
California Broomrape (*Orobanche californica ssp. grayana*)	None	X	Low – no suitable habitat on site	Low – Thought to be extirpated from WA.

Species	Federal	State	Potential for Occurrence	
	ESA Listing Status[1]	State Listing Status[2]	Project Site	Project Vicinity
Western Yellow Oxalis (*Oxalis suksdorfii*)	None	ST	Low – no suitable habitat on site	Low - meadows and moist woods, rare in Clark County
Western False Dragonhead (*Physostegia parviflora*)	None	SS	Low – no suitable habitat on site	Low – wet to mesic prairies, damp thickets, and banks of streams and ponds
Wheeler's Bluegrass (*Poa nervosa*)	None	SS	Low – no suitable habitat on site	Low - rock outcrops, cliff crevices, and occasionally in talus
Great Polemonium (*Polemonium carneum*)	None	ST	Low – no suitable habitat on site	Low - woody thickets, open and moist forests, prairie edges, roadsides, fence lines
Idaho Gooseberry (*Ribes oxyacanthoides* ssp. *irriguum*)	None	ST	Low – no suitable habitat on site	Low – streams and canyons in eastern Washington.
Soft-leaved willow (*Salix sessilifolia*)	None	SS	Low – no suitable habitat on site	Moderate – Variety of lowland riparian habitats
Hairy-Stemmed Checkermallow (*Sidalcea hirtipes*)	None	ST	Low – no suitable habitat on site	Moderate – prairie fragments along fencerows and openings along drainages
Western Ladies Tresses (*Spiranthes porrifolia*)	None	SS	Low – no suitable habitat on site	Moderate – Wet meadows, along streams, in bogs, and on seeps. Have previously been found on the Port's Parcel 3
Hall's Aster (*Symphyotrichum hallii*)	None	ST	Low – no suitable habitat on site	Moderate – dry to moist prairies in valleys and plains.
Small-Flowered Trillium (*Trillium parviflorum*)	None	SS	Low – no suitable habitat on site	Moderate – moist forested habitats dominated by hardwoods
California Compassplant (*Wyethia angustifolia*)	None	SS	Low – no suitable habitat on site	Moderate – grasslands, meadows, and other open habitats

1. ESA Classifications: FE = federal endangered; FT = federal threatened low – no suitable habitat on site; FSC = species of concern; FP = federal proposed; FC = federal candidate.
2. State Status: SE = state endangered; ST = State threatened; SS = State Sensitive; X = possibly extinct or extirpated;
Source: WNHP 2012

3.4.2.2 Impacts

Construction

The primary effect to terrestrial habitat and vegetation at the project site will be the direct, permanent removal of vegetation during construction of the terrestrial components of the project. There is very little terrestrial vegetation or wildlife habitat present at the project site. Most of the site has been filled, paved, and/or capped in association with previous development and cleanup activities. What little natural vegetation is present is small and isolated, and/or significantly disturbed from its natural condition. As such, construction of the proposed project will have little direct impact to terrestrial vegetation and wildlife habitat.

Construction of the upland portion of the project will occur almost exclusively within the unvegetated industrial habitat type. This vegetation type provides little or no wildlife habitat function, and direct permanent impacts to this vegetation will not result in any impacts to vegetation or habitat resources.

Approximately 42,000 square feet of ruderal upland grass/forb habitat will be permanently impacted by construction in Area 200 related to the office building and Area 500 related to portions of the pipeline. These areas provide very little habitat function because of their isolated and disturbed nature. Impacts to ruderal upland grass/forb habitat will not result in any significant impacts to vegetation or habitat resources.

Construction of portions of the pipeline will result in direct permanent impact to approximately 6,300 square feet of a small, isolated upland cottonwood stand north of the Jail Work Center. This stand contains approximately 273 trees, 171 of which are permitted for removal from 1.1 acres of the stand for the construction of the proposed construction of a CPU substation adjacent to that location (BergerABAM, 2012). These areas are primarily grass and weedy herbaceous vegetation, with approximately 25 cottonwood and pine trees. These trees provide only moderate habitat function because of their isolated nature and previously approved development.

While the proposed pipeline will pass through a portion of the riparian area, this will occur primarily in an unvegetated portion of the riparian area. Construction of the pipeline will result in the removal of approximately 4,250 square feet of ruderal upland grass/forb habitat near the marine terminal in Area 400, although no high quality vegetation will be removed and riparian function will not be affected. Vegetation within the riparian area consists primarily of small-diameter black cottonwood (*Populus trichocarpa*) and willows (*Salix* spp.), and non-native false indigo bush (*Amorpha fruticosa*), and Himalayan blackberry (*Rubus armeniacus*). No riparian trees or vegetation will be removed, and no impacts to bank margin habitat are anticipated.

The proposed project would not result in any significant temporary impacts to vegetation or habitat resources.

Construction of the proposed project would not result in any direct or indirect impacts to vegetation or terrestrial habitat resources at either the project vicinity scale, nor within the shipping prism. Construction-related impacts to vegetation will be limited to the direct, permanent impacts to on-site vegetation associated with project construction. In general, construction of the proposed project will have only minor effects to terrestrial vegetation and wildlife habitat.

Operation

Terrestrial vegetation and wildlife habitats will not be affected significantly by any potential water quality impacts associated with operation of the proposed project. Terrestrial habitats that would remain at the project site post-construction could potentially be affected by an increased potential for spills or leaks. A spill to surface water would not be likely to affect terrestrial vegetation or wildlife habitats.

At the project vicinity and project shipping prism scales, terrestrial habitat and vegetation resources are unlikely to be affected by the proposed project. These terrestrial resources would not be directly or indirectly affected by any aspect of operations.

3.4.2.3 Mitigation Measures

The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to terrestrial habitats and vegetation.

Direct Habitat Modification

The proposed project has been designed to avoid and/or minimize impacts to biological resources to the greatest extent possible. The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided.

Ground disturbance and vegetation removal will be limited to the amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained. The project will install urban landscaping including trees and shrubs in Areas 200 and 300. These landscaped areas will provide wildlife habitat typical in an urban environment.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification effects associated with the project.

Operational Water Quality Impacts

Terrestrial habitats at the project site could potentially be affected by an increased potential for spills or leaks.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

These impact minimization measures and BMPs fully mitigate for the operational water quality effects associated with the project.

3.4.3 Fish

3.4.3.1 Existing Conditions

Baseline Habitat Conditions

In general, the environmental baseline conditions for fish habitat within the reach of the Columbia River that flows through the project site are typical of those associated with an urbanized and industrial reach of the Columbia River. At the watershed scale, the natural fluvial processes of the river have been altered dramatically. The main channel of the river is maintained as a navigation channel for deep draft shipping traffic, limiting the potential for any dynamic migration of the river thalweg. In addition, dam construction and streambank armoring throughout the watershed have limited floodplain connectivity and greatly reduced the quantity and quality of available backwater and off-channel habitats.

Project Site – At the project site scale, the entire streambank has been armored with riprap, and the entire portion of the site that is above OHWM has been isolated from the historic floodplain. A narrow band of vegetation, primarily small-diameter black cottonwood, willows, and non-native false indigo bush and Himalayan blackberry, is established in and immediately above the riprapped slope. Above this vegetated habitat, there is a narrow band of ruderal grass/forb habitat. The low quality and quantity of riparian habitat at the site provides very little aquatic habitat function.

Water quality conditions at the site are generally appropriate for aquatic life. While this reach of the Columbia River within the action area is not identified on the Ecology 2008 303(d) list for elevated water temperatures (Ecology 2008), data published by the USGS in 2012 indicate that summer water temperatures downstream of Bonneville Dam routinely exceed 70°F (Tanner et al. 2012). These temperatures are higher than the water quality criterion for temperature than would likely apply in the project area. The reach of the lower Columbia River in the vicinity of the project site also has several areas listed on the 2008 Ecology 303(d) list for chemical- and nutrient-related contamination (Ecology 2008).

Project Vicinity – At the project vicinity scale, in-stream habitat complexity is limited, and there is no overhanging vegetation. As part of the WVFA project, some large woody debris will be installed along the shoreline of Terminal 4 just upriver from the project site. Sediments at the project site are predominantly fine-grained, which is the natural condition for the lower reaches of a large river. No substrate present is adequate for salmonid spawning. Below the riprapped streambank, there is an area of gradual transition to deep water that provides some shallow water nearshore habitat, which many juvenile species of fish prefer. However, the lack of any riparian vegetative cover and limited in-stream structural diversity limits the function of this nearshore habitat.

Project Shipping Prism – At the scale of the project's shipping prism, the Lower Columbia River and adjacent marine habitats provide high quality habitat for all life stages of Pacific salmon and other anadromous fish, as well as for other freshwater and marine species.

In general, the reach of the Columbia River that is within the project site, vicinity, and shipping prism, provides aquatic habitat conditions suitable as a migratory corridor for several species of native Columbia River fish including several native salmonids, trout, sturgeon, lamprey, minnows, and eulachon. Several non-native fish species are also present throughout the Lower

Columbia River. Several of these non-native species are present in numbers that may affect native fish populations.

Special Status Fish Species

The portion of the Columbia River that is within the project site, vicinity, and shipping prism represents documented and/or potentially suitable habitat for several special-status fish species, including species and critical habitats listed or proposed for listing under the federal ESA (NMFS 2013, USFWS 2013), Washington state-listed species, and WDFW priority species and SGCN (WDFW 2008). In addition, the Columbia River has been designated critical habitat for 13 ESU/DPS of Columbia River salmon, steelhead, and bull trout, and has been proposed for designation for Lower Columbia River coho salmon.

Information regarding the documented or potential presence of special status fish species was obtained from species lists maintained by USFWS (USFWS 2013) and NMFS (NMFS 2013) and data from WDFW's two on-line databases, PHS on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b).

The biological resources report (Appendix H.1) lists the special status fish species known to, or with the potential to, occur at the project site, within the vicinity, and/or within the project's shipping prism. The report discusses each species' life history, listing status, and potential to occur within the project site or vicinity based on an evaluation of the presence or absence of appropriate habitat for it at the project site and vicinity scales. Table 3.4-2 summarizes this information.

3.4.3.2 Impacts

Construction

Construction of the in-water and overwater portions of the proposed dock improvements has the potential to directly and permanently affect fish habitat at the project site through direct modification of aquatic habitats associated with the new pile footprints and a new overwater structure. Fish habitat both at the project site and within the project vicinity also could be temporarily affected by the potential for temporarily reduced water quality conditions during construction and the generation of temporarily elevated levels of underwater and terrestrial noise during pile installation. At the scale of the shipping prism, fish and fish habitat would not be directly or indirectly affected by project construction.

Table 3.4-2. Special-status Fish Species and Their Potential to Occur within the Project Area

Species	ESU/DPS[1]	Federal		State			Potential for Occurrence	
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site and Vicinity	Project Shipping Prism
Salmon and Trout								
Bull trout (*Salvelinus confluentus*)	Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
Chinook salmon (*Oncorhynchus tshawytscha*)	Lower Columbia River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Upper Willamette River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Upper Columbia River spring-run ESU	FE	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Snake River spring/ summer-run ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Snake River fall-run ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
Chum salmon (*Oncorhynchus keta*)	Columbia River ESU	FT	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
Coho salmon (Oncorhynchus kisutch)	Lower Columbia River ESU	FT	Proposed	SC	1 ,2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
Sockeye salmon (Oncorhynchus nerka)	Snake River ESU	FE	Designated	SC	1, 2, 3	N	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.

Species	ESU/DPS[1]	Federal		State			Potential for Occurrence	
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site and Vicinity	Project Shipping Prism
Steelhead (Oncorhynchus mykiss)	Lower Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Upper Willamette River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Middle Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Upper Columbia River DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
	Snake River Basin DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
Coastal Resident/Sea-run Cutthroat Trout (*Oncorhynchus clarkii clarkii*)	Southwest Washington ESU	FSC	N/A	None	3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat
Pink salmon (*Oncorhynchus gorbuscha*)	N/A	None	N/A	None	2, 3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat
Sturgeon								
Green Sturgeon (*Acipenser medirostris*)	Southern DPS	FT	Designated	None	1, 2, 3	Y	Columbia River is documented migratory corridor and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.
White sturgeon (*Acipenser transmontanus*)	N/A	None	N/A	None	2, 3	N	Columbia River is documented migratory corridor	Columbia River and adjacent marine waters are documented habitat
Lamprey								
Pacific Lamprey (*Lampetra tridentata*)	N/A	FSC	N/A	None	3	Y	Columbia River is documented habitat for all life stages	Columbia River and adjacent marine waters are documented habitat
River Lamprey	N/A	FSC	N/A	SC	1	Y	Columbia River is documented habitat for all life stages	Columbia River and adjacent marine waters are documented habitat

Species	ESU/DPS[1]	Federal		State			Potential for Occurrence	
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site and Vicinity	Project Shipping Prism
Minnow								
Leopard Dace (*Rhinichthys falcatus*)	N/A	None	N/A	SC	1	Y	Historic observations in mainstem Columbia River. May provide suitable habitat.	Historic observations in mainstem Columbia River. May provide suitable habitat.
Smelt								
Pacific Eulachon (*Thaleichthys pacificus*)	Southern DPS	FT	Designated	SC	1, 2, 3	Y	Columbia River is documented habitat and designated critical habitat.	Columbia River and adjacent marine waters are documented habitat and designated critical habitat.

1 ESU = Evolutionarily Significant Unit; DPS = Distinct Population Segment

2 ESA Classifications: FE = federal endangered; FT = federal threatened; FSC = species of concern; FP = federal proposed; FC = federal candidate.

3 Washington Species of Concern Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

4 WDFW PHS Listing Criteria: Criterion 1 = State-listed and Candidate Species; Criterion 2 = Vulnerable Aggregations; Criterion 3 = Species of Recreational, Commercial, or Tribal Importance.

5 SGCN – As defined in WDFW's Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005).

Direct Habitat Modification – The project will not result in any net increase in permanent impacts below the OHWM of the Columbia River (Appendix H.2 JARPA). Removal of existing overwater structures and piles will offset the additional overwater coverage and pile placement associated with the project. Approximately 395 square feet of new benthic habitat impacts will be associated with the installation of seventy-six 24- and 36-inch steel piles for the mooring dolphins and walkways, but this impact will be offset by the proposed removal of 56 steel piles restoring 92 square feet of benthic habitat at the project site and the removal of timber piles at (approximately 220) at the Port's Terminal 2 area restoring approximately 305 square feet of benthic habitat.

In addition to permanent piles, temporary piles are expected to be used during construction to support the guides that will position and align the permanent piles and for the concrete formwork. It is estimated that up to approximately 40 temporary piles may be required. These temporary piles will be 18- to 24-inch-diameter open-ended steel pipe or H-piles and will be installed with a vibratory hammer. The temporary piles will result in approximately 126 square feet of temporary impact to benthic habitat. These piles will only be placed for short period of time (on the order of hours or days) and any temporary loss of productivity will be minor and the area is expected to rapidly recolonize following removal.

Additionally, the project will result in a net reduction of approximately 295 square feet of solid overwater coverage and a net increase of approximately 785 square feet of grated overwater coverage associated with walkways. The removal of overwater coverage in excess of the amount placed by 295 square feet and the location of this removal in shallow water compensate for the small increase in grated structures.

The aquatic portion of the project site provides habitat for a number of native fish species, including the 14 special status species identified in section 3.4-2. Nearshore habitats in particular (those less than approximately 20 feet deep) provide suitable migratory and foraging habitat for juvenile salmonids and trout, lamprey, minnows, eulachon, and other native fish species. Deep-water habitats provide these functions to a lesser degree, along with suitable migratory and foraging habitat for sturgeon.

The project will not result in an increase in impacts to benthic habitat or overwater coverage and therefore impacts to fish habitat at the project site are not expected to result in any significant effect on the quality or function of the habitat. The impacts of both new benthic habitat and new overwater coverage will be offset by the removal of existing piles and overwater structure. Because the project will not result in a net increase in impact to either benthic habitat or overwater coverage, no significant impact is expected to the quality or function of habitat for special status fish species or to any designated or proposed critical habitats for them.

Temporary Water Quality Impacts – As with any construction project, there is a potential for leaks and/or spills from construction equipment. The proposed overwater work creates the potential for construction debris to enter the waterway. Equipment and storage containers associated with the proposed project also create slight potential for leaks and spills of fuel, hydraulic fluids, lubricants, and other chemicals.

The proposed project also has the potential to disturb sediments and increase turbidity temporarily at the project site during pile installation and removal activities. Increased levels of turbidity could have temporary negative impacts on aquatic habitats and, if any special-status fish species are present during the time of construction, could affect them directly.

These potential temporary water quality impacts have the potential to affect fish habitat function and special status fish species both at the project site and within the project vicinity, by reducing water quality, reducing visibility and increasing potential exposure to predators, and reducing habitat suitability for prey species. These effects would be temporary, and conditions would return to baseline conditions following completion of construction. At the scale of the project shipping prism, fish and fish habitat would not be affected by any temporary water quality impacts associated with construction, as these effects would be localized to the project vicinity.

During the in-water work period (anticipated to be October 1 to February 28), outmigrating juveniles and migrating adult salmon, steelhead, and bull trout could be present within the action area, as could migrating adult Pacific eulachon. Larval and juvenile eulachon are not expected to be present during the in-water work period. Similarly, green sturgeon will not be exposed to any direct effects of temporarily decreased water quality, as they are not expected to be present within the project vicinity during the in-water work period.

Special status salmon, steelhead, bull trout, and Pacific eulachon, if present, likely will be migrating through the project site and vicinity, and are not expected to be present for any significant period. Habitat suitability for adult and juvenile salmonids, steelhead, bull trout, and adult Pacific eulachon is limited at the site, and provides little function aside from a suitable migratory corridor. Fish are expected to move rapidly through the site and vicinity. Exposure to temporarily decreased water quality conditions, including temporarily elevated turbidity levels and/or potential debris contamination, is expected to be limited, and effects to fish habitat and special status fish species will be minor.

Designated and proposed critical habitats within the action area also may experience temporarily increased levels of turbidity during the proposed action. The geographic extent and duration of any potential short-term increases in sedimentation or turbidity are expected to be limited, and are not expected to exceed baseline sedimentation conditions measurably. Any temporarily elevated sedimentation levels will not result in any significant effect to any PCE of designated or proposed critical habitat for any species.

Temporary Construction Noise – The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels at the project site and within the project vicinity during pile driving activities.

Elevated underwater noise, particularly percussive sounds such as those generated during impact pile driving, has the potential to affect fish in several ways. The effects can range from the alteration of behavior to physical injury or mortality, depending on the intensity and characteristics of the sound, the distance and location of the fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Hastings and Popper 2005). The effects of temporarily elevated noise levels can range from mild disturbance to severe auditory damage or death.

The project will require the installation of approximately 76, 24- and 36-inch-diameter steel pipe piles below the OHWM of the Columbia River. Pile driving will be completed using a vibratory hammer to drive all of the permanent structural piles to the extent practicable as well as all of the approximately 40 temporary piles. Following vibratory driving to refusal (the point at which the pile will no longer advance with the vibratory hammer), the project will use an impact hammer to drive piles to their final tip elevations. As well, an impact hammer will be needed to proof the structural piles. Proofing is the process of striking piles with an impact hammer to verify their

load-bearing capacity. As part of impact minimization, a vibratory hammer will be used to remove approximately 56 piles from below the OHWM of the river at the marine terminal area and an additional 220 timber piles from the Port's Terminal 2. Pile removal is not expected to generate levels of underwater noise that will result in significant effects to fish habitat or species.

The zone of influence for underwater noise has been determined using the practical spreading loss model, currently recognized by both USFWS and NMFS as the best method to determine underwater noise attenuation rates, assumes a 4.5-decibel (dB) reduction per doubling of distance (WSDOT 2013). The baseline underwater noise level in the portion of the Columbia River that is within the action area is conservatively assumed to be approximately 120 dB_{RMS}[13] (WSDOT 2012), although actual background underwater noise levels may be higher, given the amount of industrial shipping traffic. The impact pile installation of 24- and 36-inch diameter piles (with a bubble curtain providing 5 dB of noise attenuation) has the potential to generate temporary underwater noise levels of approximately 202 dB_{PEAK}, 189 dB_{RMS}, and 173 dB_{SEL} (CALTRANS 2009). To obtain pile capacity, it is anticipated that each pile will require approximately 1,000 blows with an impact hammer. An installation rate of 4 to 6 piles per day is estimated. At a maximum, the total number of blows per day will be approximately 6,000 requiring a total of up to 160 minutes of impact driving, spread out over each day. At a maximum installation rate of 6 piles per day, it is anticipated that 13 working days would be required to install 76 piles below the OHWM of the Columbia River. If pile installation is slower, fewer strikes per day can be struck, and additional days of pile driving may be required. A worst-case estimate is that installing all of the in-water piles to tip elevation could require up to 25 to 30 days of in-water work during the in-water work window.

NMFS has established 206 dB_{PEAK} as an underwater noise injury threshold for fish of all sizes. The noise attenuation analysis indicates that peak underwater noise levels could exceed this injury threshold within approximately 30 feet of each pile being driven. Any fish present within approximately 30 feet of the pile being driven could be injured; therefore, the suitability of fish habitat within the immediate vicinity of the pile driving activities will be significantly degraded while pile driving is being conducted. Fish in the vicinity will be expected to avoid the area temporarily during pile driving activity.

Additionally, the noise attenuation analysis indicates that the worst-case estimate of up to 6,000 strikes per day that may be necessary to drive piles to final elevation will result in exceedances of the cumulative underwater noise injury thresholds for fish greater than 2 grams (187 dB_{RMS}) and for fish less than 2 grams (183 dB_{RMS}) within approximately 1,119 feet of pile driving activity, respectively. Given the nature and quality of the habitat, however, most fish are expected to be moving through the action area; their exposure to the sound from all 6,000 strikes per day is not expected.

During the in-water work period, it is possible that native fish, including adults and/or juveniles of several ESU/DPS of salmon, steelhead, bull trout, and Pacific eulachon, could be present within the portion of the project site and vicinity where underwater noise could be temporarily elevated. Although run timing within the river is different for each ESU/DPS, it is possible that

[13] RMS=root mean square

some individuals could be present in the vicinity, and could be exposed to temporarily elevated underwater noise levels resulting from pile installation.

Special status fish present within the portion of the project site where injury thresholds could be exceeded could be adversely affected, but this is unlikely. Special status fish species that could be present during the in-water work period will be expected to avoid the area within approximately 30 feet of the pile, and therefore will not be exposed to levels of peak underwater noise that would result in injury. Similarly, special status fish species are expected to be moving through the project site and vicinity, and therefore will not be exposed to the maximum 6,000 strikes per day. For this reason, special status fish species will not be exposed to cumulative underwater noise levels that could result in adverse effects.

While the underwater noise is temporarily elevated, fish may avoid the area temporarily, but this is unlikely to affect feeding and/or migratory activities significantly. Any elevated underwater noise levels associated with the proposed project will be temporary and will have no effect on any PCE of designated or proposed critical habitat.

Operation

The operation of the proposed project could permanently and indirectly affect fish habitat and special status fish species through operational water quality impacts, including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and through an increased potential for catastrophic accidents such as a spill to surface water. The operation of the Facility also could result in effects associated with the increase in shipping traffic that will occur in conjunction with the proposed project.

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as an inadvertent crude oil release to surface water.

The project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity as described in section 2.11 of this application. The entire Facility is located on 41.5 acres, and the proposed construction will result in approximately 38.2 acres of impervious surface. Treatment for stormwater will include enhanced treatment at Area 300 (Storage) and basic treatment at other areas of the Facility, with discharge to existing stormwater systems at Terminal 4 and Terminal 5. The proposed facilities will provide both water quality and water quantity treatment and will be designed to handle the 6-month, 24-hour event as estimated using Ecology's Western Washington Continuous Simulation Hydrology Model (Ecology's hydrology model).

The operation of the Facility also has the potential to increase the risk of catastrophic accidents, such as an inadvertent release of crude oil to the environment. While the likelihood of such an event is exceedingly low, the possibility must be addressed. According to projected volumes, the proposed project will result in approximately 140 shipping trips annually in 2016 (first full year of operations) up to 365 shipping trips per year at full buildout. Spills could occur at the project site or while docking or filling, or in transit downstream on the Columbia River or in marine waters.

The project site and vicinity provide documented habitat for the adult and juvenile forms of several special status populations of salmon, steelhead, and bull trout as well as for Pacific eulachon, green sturgeon, Pacific and river lamprey, and leopard dace. While run timing differs by species and population, these populations may be present within the project site and/or vicinity at various times during the year. Since operational impacts will not be restricted to an in-water work window, each species and its habitat have the potential to be affected by water quality impacts associated with the operation of the Facility.

Habitat suitability for native fish (including special status species) is limited at the site. The project site and vicinity primarily provide habitat as a migratory corridor. For this reason, fish are expected to move rapidly through the vicinity.

Accidental leaks or spills of fuel or other chemicals into surface- or groundwater at the project site have the potential to reduce fish habitat suitability, which also could affect special status fish species. However, the project has implemented several impact minimization measures and BMPs to reduce the potential for any spills or release of materials to occur, and to minimize the extent of any impacts resulting from any accidental spill or release.

Proposed stormwater treatment for new impervious surface at the site will minimize the potential for any adverse effects associated with stormwater. The proposed stormwater treatment will result in an improved water quality condition within the project site in the long term, and will not result in any adverse effects to fish habitat or to special status fish species.

A release to surface water has the potential to result in significant adverse effects to fish habitat and for special status fish species and their designated or proposed critical habitats. However, the likelihood of a spill is extremely low, and the proposed BMPs and safety and security measures (see sections 2.10, 2.11, 2.19, and Appendix B.2) will manage the risk of impacts to fish species and habitats effectively.

Impacts to fish habitat and to special status fish species and their designated or proposed critical habitats from water quality impacts associated with operation of the Facility are expected to be minor.

Shipping – The operation of the Facility will result in ships transiting the Columbia River within the project site, vicinity, and shipping prism. It is estimated that the proposed Facility will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full buildout. Marine traffic on the Columbia River has the potential to result in impacts to biological resources through increases in the potential for fish stranding and shoreline erosion associated with propeller wash, and through the introduction of exotic species.

- *Wake Stranding* – Recent studies conducted on the Lower Columbia River suggest that, under certain conditions, deep-draft vessels can produce wakes that can strand juvenile fish (Pearson et al. 2006, Entrix 2008, FERC 2008). Stranding can occur when a fish becomes caught in a vessel's wake and is deposited on shore by the wave the wake generates. Stranding typically results in mortality unless another wave carries the fish back into the water. The most recent and comprehensive study on wake strandings on the Lower Columbia River (Pearson et al. 2006) suggests that the specific mechanisms of stranding are still not completely understood. Fish stranding is thought to depend on interlinked factors that include river surface elevation, beach slope, wake characteristics, and species-specific biological factors (FERC 2008). Given these factors, it is not possible to predict accurately the extent to

which increased shipping traffic may increase the potential for fish stranding. However, it is safe to assume that the proposed project, over the course of its design life, will likely result in the stranding of some fish, including special status fish species. Juvenile fish, and species that are not strong swimmers, will be most susceptible to increased stranding.

- *Bank Erosion* – Propeller wash from ships in transit, as well as wakes breaking on shore, could cause increased erosion along unarmored sections of the shoreline. Erosion can re-suspend eroded material within the water column, increasing turbidity, which can affect habitat suitability for fish and other aquatic organisms. This could result in degradation of habitat suitability for fish habitat and special status fish species.
- *Exotic Species* – Ships in transit could import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Introduced species can often out-compete native species, and have the potential to alter natural habitats significantly. Once an aggressive exotic species is introduced, it may be nearly impossible to eradicate it. However, the BMPs that will be in place for the proposed operation of the terminal including hull maintenance and ballast water practices (section 3.4.4.3) will greatly minimize the potential for any transport of these species. For these reasons, the proposed project is unlikely to result in a significant risk of the increased transport of exotic and/or invasive species.

3.4.3.3 Mitigation Measures

The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to fish and fish habitat. These are described below. Additional measures are also listed in Appendix H.1.

Direct Habitat Modification

The project will result in no net new direct, permanent impacts to fish habitat. The dock configuration has been designed to require the minimum amount of new piling and overwater structure necessary, and has reduced the quantity of direct permanent habitat impacts to the amount practicable. The proposed removal of piles and existing overwater coverage has further minimized the extent of impacts. The no net increase in direct, permanent impacts to fish habitat at the project site is expected to result in no significant effects on the quality or function of fish habitat within the project site, project vicinity, or project shipping prism.

The impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Natural currents and flow patterns in the Lower Columbia River routinely disturb sediments. Flow volumes and currents are affected by precipitation as well as upstream water management at dams. High volume flow events can result in hydraulic forces that re-suspend benthic

sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed project is not anticipated to measurably exceed levels caused by these normal periodic increases. Additionally, the volume of flow will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

In addition, all pile installation will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between October 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with the project.

Temporary Construction Noise

The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect fish and fish habitat quality. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish.

In addition, all pile installation will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, particularly to ESA-listed salmonids and Pacific eulachon. While there is no time when ESA-listed fish are absent from the project vicinity, the window between October 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

These impact minimization measures and BMPs fully mitigate for the temporary construction noise impacts associated with the project.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to fish and fish habitat through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. The Facility will discharge to existing Columbia River outfalls through existing manmade conveyance pipelines, and is categorically exempt from the flow control provisions of the Ecology stormwater manual. According to Appendix I-E of the manual, the Columbia River is listed as a flow control-exempt water body.

As described in section 2.11 of this application, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. Stormwater from the storage area will be treated to enhanced water quality standards and discharged to the existing Terminal 4 stormwater system. Stormwater from areas 200, 500, and 600 and the rail improvements will be treated to basic levels and discharged to the existing Terminal 5

stormwater system. Stormwater from Area 400 will be treated to an enhanced treatment level and conveyed to existing infiltration swales located immediately north of the site. Stormwater treatment facilities will be sized to accommodate the 6-month, 24-hour event as estimated using Ecology's hydrology model. The proposed stormwater treatment will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and will ensure that fish and fish habitat are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed BMPs and safety and security measures will minimize the risk of impacts to biological resources.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

Shipping

The proposed project will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full buildout. Oceangoing vessel traffic on the Columbia River has the potential to result in impacts to fish and fish habitat through increases in the potential for fish stranding, increased potential for shoreline erosion associated with propeller wash, and through the introduction of exotic species.

The risk of adverse effects to fish and fish habitat from increased bank erosion is low. Streambanks at the site are well armored, and not particularly sensitive to erosion, so these habitats likely will not be affected. Elsewhere in the project vicinity and shipping prism, there are unarmored banks, which could potentially be susceptible to increased erosion from prop wash. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to fish and fish habitat.

Operators of commercial vessels have a significant economic interest in maintaining underwater body hull platings in a clean condition. Fouled bottom platings result in increased fuel costs and can reduce the vessel's maximum transit speed. To prevent fouling and higher costs, operators preserve and maintain the hulls of their ships aggressively (FERC 2008), greatly reducing the risk of the transport of exotic species. Additionally, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar guidelines. These practices include requirements for ballast water exchange, to rinse anchors and anchor chains during retrieval to remove organisms and sediments at their place of origin, to regularly remove fouling organisms from the hull, piping, and tanks, and to dispose of any removed substances in accordance with local, state, and federal regulations.

These impact minimization measures and BMPs mitigate for the increased shipping-related impacts associated with the project.

3.4.4 Wildlife

3.4.4.1 Existing Conditions

The general suitability of wildlife habitat within the project site and vicinity was examined based on the vegetation and habitat assessment described in section 3.4.2 because habitat suitability for wildlife species typically is closely associated with vegetation and species composition. This information is presented in section 3.4.2, as well as in the biological resources report prepared for this project (Appendix H.1).

Special Status Wildlife Species

This section evaluates the potential for special status wildlife species to occur within the project study area. Information regarding the potential presence of special status wildlife species was obtained from the USFWS web site (USFWS 2013) and the NMFS web site (NMFS 2013) on June 27, 2013. Additional information came from data from WDFW's two on-line databases, Priority Habitat and Species (PHS) on the Web (WDFW 2013a) and Salmonscape (WDFW 2013b), as well as from the 2008 PHS list (WDFW 2008).

The biological resources report prepared for this project (Appendix H.1) lists the special status wildlife species known to, or with the potential to, occur at the project site or within the vicinity. The report also discusses each species' life history, listing status, and potential to occur within the project site or vicinity based on an evaluation of the presence or absence of appropriate habitat for each species at the project site and vicinity scales. This information is summarized in Table 3.4-3.

No special status wildlife species have been documented at the project site and it provides only low to moderate habitat suitability for special status wildlife species. Based on the presence of potentially suitable habitat, several special status wildlife species have been documented or have the potential to occur in the project vicinity. As described in section 3.4.2, the project vicinity provides several relatively high quality wetland, riparian, and aquatic habitats, several of which are documented as habitat for one or more species of special status wildlife species.

Table 3.4-3. Special Status Wildlife Species and Their Potential to Occur within the Project Site or Vicinity

Species	ESU/ DPS[1]	Federal		State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site	Project Vicinity	Shipping Prism
Birds									
Bald Eagle (*Haliaeetus leucocephalus*)	N/A	None	N/A	SS	1	Y	Moderate – low quality foraging habitat in riparian zone.	High – Documented nesting occurrences in Columbia River riparian forested habitats.	High – Foraging habitat throughout Lower Columbia River.
Aleutian Canada Goose (*Branta canadensis leucopareia*)	N/A	FSC	N/A	None	None	N	Low – No suitable habitat on-site.	Moderate – Potentially suitable migratory habitat in wetlands adjacent to Vancouver Lake and agricultural lands on Parcel 3.	Moderate – potentially suitable habitat throughout Lower Columbia River
Cavity Nesting Ducks (several species)	N/A	None	N/A	None	3	N	Low – No suitable habitat on-site.	High – Documented breeding areas and suitable habitat for breeding for several species in vicinity of Buckmire Slough.	Moderate – potentially suitable habitat throughout Lower Columbia River
Common Loon (*Gavia immer*)	N/A	None	N/A	SS	1, 2	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences and potentially suitable habitat at Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.
Great Blue Heron (*Ardea herodias*)	N/A	None	N/A	None	2	Y	Low – No suitable habitat on-site.	High – Documented breeding occurrences and rookeries near Vancouver Lake and Buckmire Slough.	Moderate – potentially suitable habitat throughout Lower Columbia River
Lewis' Woodpecker *(Melanerpes lewis)*	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Low – Potentially suitable habitat throughout lowlands, but not documented extensively in Clark County.	Low – Not in Columbia River mainstem or marine waters.

Species	ESU/ DPS[1]	Federal		State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site	Project Vicinity	Shipping Prism
Olive-Sided Flycatcher (*Contopus cooperi)*	N/A	FSC	N/A	None	N/A	N	Low – No suitable habitat on-site.	Low – There is no mature coniferous forest habitat present within the project vicinity	Low – Not in Columbia River mainstem or marine waters.
Pileated Woodpecker (*Dryocopus pileatus*)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – Riparian cottonwood forests provide potentially suitable foraging habitat.	Low – Not in Columbia River mainstem or marine waters.
Peregrine Falcon (*Falco peregrinus*)	N/A	FSC	N/A	SS	1	Y	Moderate – low quality foraging habitat present.	Moderate – One or more historic documented nesting occurrences in vicinity.	Low – Not in Columbia River mainstem or marine waters.
Purple Martin (*Progne subis*)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	High – Documented nesting habitat and regular concentrations near Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.
Sandhill Crane (*Grus canadensis*)	N/A	None	N/A	SE	1	Y	Low – No suitable habitat on-site.	High – Documented regular concentrations throughout Vancouver Lake Lowlands, particularly on agricultural lands at Parcel 3.	Low – Not in Columbia River mainstem or marine waters.
Shorebird Concentrations (Several species)	N/A	None	N/A	None	2	N	Moderate – riparian and aquatic zone provides opportunities for foraging.	High – Regular concentrations of shorebirds documented on Vancouver Lake	High – potentially suitable habitat throughout Lower Columbia River and marine waters
Slender-Billed White-Breasted Nuthatch (*Sitta carolinensis aculeata*)	N/A	FSC	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences near Vancouver Lake.	Low – Not in Columbia River mainstem or marine waters.

Species	ESU/ DPS[1]	Federal		State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site	Project Vicinity	Shipping Prism
Streaked Horned Lark (*Eremophila alpestris strigata*)	N/A	FP	Not designated	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Documented presence on dredge material placement sites and barren lands throughout Lower Columbia River.	Documented presence on dredge material placement sites and barren lands throughout Lower Columbia River.
Marbled Murrelet (*Brachyramphus marmoratus*)	N/A	FT	Designated	ST	1, 2	Y	Low – No suitable habitat.	Low – No suitable habitat.	High – Marine habitats represent foraging habitat
Short-Tailed Albatross (*Phoebastria albatrus*)	N/A	FE	Not Designated	SC	1	Y	Low – No suitable habitat.	Low – No suitable habitat.	Moderate – Marine waters represent foraging habitat, but species is rare
Western Snowy Plover (*Charadrius nivosus nivosus)*	N/A	FT	Designated	SE	1	Y	Low – No suitable habitat.	Low – No suitable habitat.	Moderate – Marine waters and intertidal and estuarine areas are documented habitat
Vaux's Swift (*Chaetura vauxi*)	N/A	None	N/A	SC	1	Y	Low – No suitable habitat on-site.	Low – Limited presence of large snags for nesting in vicinity	Low – Not in Columbia River mainstem or marine waters.
Waterfowl Concentrations (several species)	N/A	None	N/A	None	3	N	Moderate – riparian and aquatic zone provides opportunities for foraging.	High – Documented concentrations throughout Vancouver Lake Lowlands .	High – potentially suitable habitat throughout Lower Columbia River and marine waters
Mammals									
Steller Sea Lion (*Eumatopius jubatus*)	Eastern DPS	FT	Designated	ST	1, 2	Y	Moderate – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River is a documented migratory/foraging corridor.	High – Columbia River and adjacent marine habitats are documented habitat.

Species	ESU/ DPS[1]	Federal		State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site	Project Vicinity	Shipping Prism
Whales (Several species)	Varies	Varies	Varies	Varies	Varies	Varies	Low – No habitat	Low – No habitat	High – Marine waters off coast provide documented habitat
Non-ESA-Listed Marine Mammals	N/A	None	N/A	Varies	Varies	Varies	Moderate – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River is a documented migratory/foraging corridor.	High – Columbia River and adjacent marine habitats are documented habitat.
Columbian White-Tailed Deer (*Odocoileus virginianus leucurus*)	N/A	FE	Not Designated	SE	1	Y	Low – No habitat	Low – No habitat	Moderate – Islands in the Lower Columbia River represent suitable habitat.
Gray-Tailed Vole (*Microtus canicaudus*)	N/A	None	N/A	SC	1, 2	Y	Moderate – Ruderal grass/forb habitat may provide limited habitat.	Moderate – Agricultural lands, pastures, and fields provide suitable habitat.	Low – Not in Columbia River mainstem or marine waters.
Pacific Townsend's Big-Eared Bat (*Corynorhinus townsendii townsendii*)	N/A	FSC	N/A	SC	1, 2	Y	Low – No suitable habitat on-site.	Moderate – potentially suitable foraging habitat throughout Vancouver lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.
Myotis Bats (*Myotis evotis* and *Myotis volans*)	N/A	FSC	N/A	None	N/A	N	Low – No suitable habitat on-site	Moderate – potentially suitable foraging habitat throughout Vancouver lowlands, but limiting roosting habitat.	Low – Not in Columbia River mainstem or marine waters.
Invertebrates									
California Floater (*Anodonta californiensis*)	N/A	FSC	N/A	SC	1, 2	Y	Low – No suitable habitat on-site.	Moderate – One or more documented occurrences and potentially suitable habitat in Vancouver Lake.	

Species	ESU/ DPS[1]	Federal		State			Potential for Occurrence		
		ESA Listing Status	Critical Habitat	State Listing Status[3]	PHS Listing Criterion[4]	SGCN (Y/N)[5]	Project Site	Project Vicinity	Shipping Prism
Amphibians									
Oregon Spotted Frog (*Rana pretiosa*)	N/A	FC	N/A	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Suitable aquatic habitat in vicinity of Vancouver Lake and adjacent wetlands, but no documented occurrences.	Low – Not in Columbia River mainstem or marine waters.
Western Toad (*Bufo boreas*)	N/A	FSC	N/A	SC	1	Y	Low – No suitable habitat on-site.	Moderate – Potentially suitable habitat throughout Vancouver lowlands, but no recently documented occurrences.	Low – Not in Columbia River mainstem or marine waters.
Reptiles									
Pacific Pond Turtle (*Actinemys marmorata*)	N/A	FSC	N/A	SE	1	Y	Low – No suitable habitat on-site.	Moderate – Suitable habitat throughout Vancouver Lake Lowlands, but no documented occurrences.	Low – Not in Columbia River mainstem or marine waters.
Sea Turtles (Various species)	Varies	Varies	Varies	Varies	Varies	Varie s	Low – No suitable habitat on-site.	Low – No suitable habitat on-site.	High – Marine waters represent documented habitat.

1 ESU = evolutionarily significant unit; DPS = distinct population segment

2 ESA Classifications: FE = federal endangered; FT = federal threatened; FSC = species of concern; FP = federal proposed; FC = federal candidate.

3 Washington State Species of Concern Classifications: SE = state endangered; ST = state threatened; SS = state sensitive; SC = state candidate.

4 WDFW PHS Listing Criteria: Criterion 1 = state-listed and candidate species; Criterion 2 = vulnerable aggregations; Criterion 3 = species of recreational, commercial, or tribal importance.

5 SGCN – As defined in WDFW's Comprehensive Wildlife Conservation Strategy (CWCS) (WDFW 2005).

3.4.4.2 Impacts

Construction

As discussed in sections 3.4.2.2 and 3.4.3.2, construction of the proposed project will have only minor effects to terrestrial habitat and vegetation at the project site. The only construction-related impacts will be any direct impacts to habitat and vegetation associated with the terrestrial components of the project. Vegetation and habitat within these portions of the project site will be permanently removed.

Direct Habitat Modification – Impacts associated with direct habitat modification are described in sections 3.4.2.2 and 3.4.3.2.

The project site provides potentially suitable, relatively low quality, foraging habitat for raptors such as bald eagles and peregrine falcons. Bald eagles have been documented extensively in the project vicinity, and it is likely that they use riparian habitats throughout the project vicinity as foraging habitats. Peregrine falcons have not been documented foraging at the project site, but they may occur in the vicinity. If present, peregrine falcons could forage in upland and riparian habitats at the site. The ruderal grass/forb habitats at the site provide potentially suitable, relatively low quality habitat for gray-tailed vole. The limited quality and quantity of available terrestrial habitat for these species, and the highly industrial nature of the surroundings, likely greatly limit the extent of habitat function. As described in section 3.4.2.2 above, direct impacts consisting of removal of approximately 46,250 square feet of ruderal grass-forb and approximately 6,300 square feet of upland cottonwood stands are expected to result in only minor potential impacts to bald eagle, peregrine falcon, and gray-tailed vole.

The aquatic portion of the site represents suitable foraging and resting habitat for shorebirds and wintering waterfowl, which are WDFW priority species. As stated in section 3.4.3.2, the project will not result in any net increase in permanent impacts to the aquatic portion of the project, and is therefore not expected to result in any measurable or significant impact to shorebird or waterfowl habitat suitability.

The aquatic portion of the project site also represents potentially suitable habitat for Steller sea lion. If present, they are expected to be passing through in deep water habitats outside the immediate project site. They are not known or expected to use habitats near the existing dock, and are therefore unlikely to be affected by the relatively small amount of direct habitat impacts associated with new pile footprints or new overwater coverage.

Temporary Water Quality Impacts – As with any construction project, there is a potential for leaks and/or spills from construction equipment. The proposed overwater work creates the potential for construction debris to enter the waterway. Equipment and storage containers associated with the proposed project also create the potential for leaks and spills of fuel, hydraulic fluids, lubricants, and other chemicals.

The proposed project also has the potential to disturb sediments and increase turbidity temporarily at the project site during pile installation and removal activities. These impacts would not affect terrestrial wildlife species or habitats at the site, but could affect wildlife species that use aquatic habitats. Increased levels of turbidity could have temporary negative impacts on aquatic habitats and, if any wildlife species are present in the project vicinity during construction, could affect them directly.

The aquatic portion of the project site represents suitable foraging and nesting habitat for shorebirds and wintering waterfowl. The aquatic portion of the project site also represents potentially suitable foraging habitat for Steller sea lion.

The accidental release of construction debris or leaks or spills of fuel or other chemicals into the waters of the project site has the potential to reduce habitat suitability for shorebirds and waterfowl as well as for Steller sea lion.

Similarly, temporarily elevated levels of turbidity that could result during pile-driving and removal activities also have the potential to reduce habitat suitability for these species by reducing visibility and habitat suitability for prey species. However, any temporary elevation of turbidity is expected be short term, and to not exceed the turbidity levels generated by natural events such as high volume flow events.

Impacts to special status wildlife species from temporary water quality impacts are expected to be minor.

Temporary Construction Noise – The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels during pile driving activities.

Terrestrial construction noise and noise from other human activity can result in a variety of effects to wildlife species, including displacement from occupied habitats, interference with hearing ability in songbirds and mating and alarm calls in amphibians and ground squirrels, and disruption of raptor foraging activities (Madsen 1985; Van der Zande et al. 1980; Fyfe and Olendorff 1976).

Terrestrial noise levels will be elevated within the vicinity of the project site during impact pile driving, but these sound levels will be expected to decrease to ambient conditions within a relatively short distance from the immediate project site.

Peak terrestrial noise generated during impact pile installation has been estimated at a maximum of approximately 110 A-weighted decibels (dBA), measured at 50 feet (FTA 2006). Baseline and construction-related noise levels were inferred using an industry-standard technique recommended by WSDOT (WSDOT 2013). This guidance includes information regarding noise levels associated with typical construction procedures from the City of Boston's noise assessment methodology (Thalheimer 2000) and noise attenuation data from the Federal Transit Administration's construction noise methodology (FTA 2006).

Peak terrestrial noise generated during impact pile installation has been estimated to be approximately 110 decibels (dBA), measured at 50 feet (FTA 2006). As stated above, the baseline noise levels associated with the action area are relatively high, and this terrestrial noise attenuation analysis assumes baseline noise levels similar to those associated with a high density urban area (78 dBA measured at 50 feet). Hard site conditions were assumed for noise attenuation purposes because the surrounding landscape is largely unvegetated, so the linear attenuation rate was estimated to be approximately -6 dBA per doubling of distance. At this rate, terrestrial noise from impact pile driving is expected to attenuate to ambient conditions between approximately 1,600 and 3,200 feet from the location of project activities.

Most of the terrestrial habitat within approximately 3,200 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the immediate project site are of limited quality and quantity. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity. Terrestrial habitats at the project site represent

low-quality foraging habitat for bald eagle, peregrine falcon, and other raptor species. These species may avoid habitats near the pile driving activity temporarily, but the foraging habitat in the vicinity is sufficient so that a significant adverse effect to any species is not anticipated.

Temporarily elevated terrestrial noise levels could extend beyond the project site onto portions of the CRWMB and associated wetlands and forested habitats on the Shillapoo NWR south of Vancouver Lake. In addition to being used extensively by a variety of waterfowl, raptors, migratory birds, small mammals, amphibians, and reptiles, these habitats provide potentially suitable habitat for a number of special status wildlife species. There is potential for these species to be present in these habitats during construction and they could be exposed to elevated terrestrial noise levels. Terrestrial noise from pile driving will have attenuated significantly by the time it reaches these habitats. The noise levels may potentially be of sufficient intensity to generate a behavioral response, but will not be expected to elicit avoidance or other behaviors that could result in adverse effects to any wildlife species such as missed feeding opportunities, nest abandonment, or increased susceptibility to predation that could result in adverse effects to any special status wildlife species.

In addition, the aquatic portion of the action area is suitable foraging and resting habitat for several species of shorebirds and waterfowl and foraging habitat for Steller sea lion. Shorebirds and waterfowl will avoid the area in the immediate vicinity of pile driving activity temporarily, but the foraging and resting habitat in the vicinity is sufficient, and this is not expected to represent a significant adverse effect.

Elevated underwater noise can also affect aquatic wildlife species, particularly marine mammals. The range of effects can range from mild disturbance to severe auditory damage. Direct mortality in marine mammals has not been observed as a result of elevated underwater noise levels. The project's marine mammal monitoring plan will reduce the potential for significant impacts to marine mammals, which in any event are not expected to occur within the action area during the in-water work period.

Operation

The operation of the proposed project could affect wildlife habitat and special status wildlife species through operational water quality impacts, including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery and a potential for catastrophic accidents such as a spill to surface water. Lighting associated with the project could lead to direct and/or indirect impacts to wildlife species because it may affect the nocturnal behavior of animals within the project vicinity, including bird and bat species. Increased shipping traffic also could result in effects associated with the operation of the Facility.

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery and a potential for spills to surface waters during transportation of product by vessel.

As discussed in section 2.11, the project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity. The project will provide both water quality and water quantity treatment.

Terrestrial habitats could be affected by an increased potential for spills or leaks. Accidental leaks or spills of fuel or other chemicals into surface- or groundwater at the project site have the potential to reduce habitat suitability for shorebirds and waterfowl as well as marine mammals.

Spills occurring at time of vessel loading will have the potential to affect wildlife species adversely as well as shorebirds, waterfowl, and marine mammals, as these species occupy aquatic habitats at the project site and within the vicinity. A spill while in transit in the project's shipping prism also has the potential to affect a number of special status species, depending on the location of the spill.

Impacts to special status wildlife species from water quality impacts related to normal operation of the Facility are expected to be minor.

Shipping – The operation of the Facility will result in ships transiting the Columbia River within the project site, vicinity, and shipping prism. It is estimated that the proposed Facility will result in approximately 140 ship transits per year in 2016 (first full year of operations) up to 365 ship transits per year at full buildout. Marine traffic on the Columbia River has the potential to result in impacts to wildlife through increases in the potential for shoreline erosion associated with propeller wash, through the introduction of exotic species, and (for certain species) through increased potential for direct mortality through ship strikes.

- *Bank Erosion* – Propeller wash from ships in transit, as well as wakes breaking on shore, could cause increased erosion along unarmored sections of shoreline. Erosion can re-suspend eroded material within the water column, increasing turbidity, which can affect habitat suitability for fish and other aquatic organisms. While most of the streambanks in the project vicinity are armored, and thus less susceptible to erosion, unarmored beaches could be susceptible to erosion from prop wash.
  Wildlife habitat and special status wildlife species within the project site, vicinity, and shipping prism may be affected by an increased potential for bank erosion that will result from increased ship traffic. Streambanks at the project site are well armored and not particularly sensitive to erosion, so these habitats will not likely be affected. Elsewhere in the project vicinity and shipping prism there are unarmored banks that could potentially be susceptible to increased erosion from prop wash. This could result in temporary degradation of wildlife habitat suitability and could affect special status wildlife species.
- *Exotic Species* – Ships in transit could potentially import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Introduced species often can out-compete native species and have the potential to alter natural habitats by competing with native species.
- *Ship Strikes* – The 140 vessel transits per year in 2016 up to 365 ship transits per year at full buildout on the Lower Columbia River, as well as in marine waters during transit, has the potential to result in collisions of ships with species that include sea turtles, marine mammals, and cetaceans. Although sea turtles and cetaceans will not occur in the immediate vicinity of the project site or its vicinity, they could be affected in marine waters by vessels transiting to/from the Columbia River.

3.4.4.3 Mitigation Measures

The project will implement an array of impact minimization measures and BMPs to minimize the potential for construction and operational impacts to wildlife species.

Direct Habitat Modification

The upland facilities associated with the project have been located on developed portions of an existing industrial site, which in its current state provides very little habitat function and very little native vegetation. By siting the project in a developed location, impacts to native terrestrial habitats and native species of vegetation, including special status species, have been avoided. Ground disturbance and vegetation removal will be limited to the minimum amount necessary to construct the project, and construction fencing will be used to protect existing vegetation to be retained.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction including increased potential for spills, and a potential for temporarily elevated levels of turbidity during construction. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Natural currents and flow patterns in the Lower Columbia River routinely disturb sediments. Flow volumes and currents are affected by precipitation as well as upstream water management at dams. High volume flow events can result in hydraulic forces that re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed project is not anticipated to measurably exceed levels caused by these normal periodic increases. Additionally, the volume of flow will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

In addition, all pile installation will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with the project.

Temporary Construction Noise

Terrestrial noise levels will be elevated within the vicinity of the project site during impact pile driving, but these sound levels will be expected to decrease to ambient conditions within a relatively short distance from the immediate project site. Most of the terrestrial habitat within approximately 3,200 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the immediate project site are of limited quality and quantity. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity.

The proposed project has the potential to result in elevated underwater noise during construction which can temporarily affect marine mammals and the quality of their habitat. The project has

been designed to minimize the likelihood of any impacts resulting from underwater noise during pile installation activities. The project will implement a bubble curtain or similarly effective noise attenuation device during all impact pile installation. These devices, when installed and operated properly, typically provide at least 5 dB of noise attenuation (Caltrans 2009). This will result the intensity of underwater noise, and will limit the potential for adverse effects to marine mammals.

In addition, all pile installation will be conducted within the approved in-water work period for the project (anticipated to be October 1 to February 28). This work window has been established to minimize potential impacts to native fish species, but also avoids the peak migration timing for marine mammals in the Lower Columbia River. Marine mammals are not expected to occur within the action area during the in-water work period.

These impact minimization measures and BMPs fully mitigate for the temporary construction noise impacts associated with the project.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to wildlife through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters. However, the terrestrial habitats at the site provide very little functional habitat, and the impact minimization measures and BMPs that will be implemented will effectively reduce the potential for any adverse effects to the quantity or quality of terrestrial habitats as a result of operation.

As described in section 2.11, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. The proposed stormwater treatment will provide treatment to a level that is consistent with existing treatment at the site, which will ensure that aquatic wildlife are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of crude oil should an accident occur. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic release of crude oil is very low, and the proposed BMPs and safety and security measures will manage the risk of impacts to biological resources effectively.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

3.4.5 Federal Approvals

Federal approvals anticipated for the project are identified in section 2.23. As noted a permit under Section 10 of the Rivers and Harbors Act will be required for proposed work below the

OHWM of the Columbia River. Issuance of Section 10 permit will require compliance with the ESA, NEPA and NHPA. A permit or review under the MMPA may also be required. Submittal of the required application materials to the USACE had not occurred at the time of submittal of the Application for Site Certification but is anticipated to occur shortly thereafter. Contacts with federal agencies are identified in section 1.6.

Section 3.5 – Wetlands

WAC 463-60-333
Natural environment - Wetlands.

The application shall include a report for wetlands prepared by a qualified professional wetland scientist. For purposes of this section, the term "project site" refers to the site for which site certification is being requested, and the location of any associated facilities or their right of way corridors if applicable. The report shall include, but not be limited to, the following information:

(1) Assessment of existing wetlands present and their quality. The assessment of the presence and quality of existing wetlands shall include:

(a) A wetland delineation performed by a qualified professional according to the Washington State Wetlands Delineation and Identification Manual, 1997, and associated data sheets, site maps with data plots and delineated wetlands areas, photographs, and topographic and aerial site maps.

(b) A description of wetland categories found on the site according to the Washington state wetland rating system found in Western Washington, Ecology Publication # 93-74 and Eastern Washington, Ecology Publication 391-58, or as revised by the department of ecology.

(c) A discussion of water sources supplying wetlands and documentation of hydrologic regime encountered.

(d) A function assessment report prepared according to the Washington State Wetland Function Assessment Method to assess wetlands functions for those wetland types covered by the method, and including a description of type and degree of wetland functions that are provided.

(2) Identification of energy facility impacts. The application shall include a detailed discussion of temporary, permanent, direct and indirect impacts on wetlands, their functions and values, and associated water quality and hydrologic regime during construction, operation and decommissioning of the energy facility. The discussion of impacts shall also include impacts to wetlands due to proposed mitigation measures.

(3) Wetlands mitigation plan. The application shall include a detailed discussion of mitigation measures, including avoidance, minimization of impacts, and mitigation

through compensation or preservation and restoration of existing wetlands, proposed to compensate for the direct and indirect impacts that have been identified. The mitigation plan shall be prepared consistent with the Department of Ecology Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals, 1994, as revised. The application shall also include, but not be limited to:

(a) A discussion of how standard buffer widths have been incorporated into the mitigation proposal. Variances from standard buffer widths must be supported with professional analyses demonstrating that smaller or averaged buffer widths protect the wetland functions and values based on site-specific characteristics;

(b) A demonstration of how enhancement, restoration or compensatory mitigation actions will achieve equivalent or greater hydrologic and biological functions at the impact site, and whether any existing wetland functions would be reduced by the mitigation measures; (c) A discussion of how standard mitigation ratios have been incorporated into the mitigation proposal. Variances from standard mitigation ratios must be supported with professional analyses demonstrating that equivalent or greater hydrologic and biological functions will be achieved; (d) A demonstration that the mitigation actions are being conducted in an appropriate location, and that consideration was given in order of preference to: On-site opportunities; opportunities within the same subbasin or watershed assessment unit; opportunities within the same Water Resources Inventory Area (WRIA); opportunities in another WRIA; (e) A discussion of the timing and schedule for implementation of the mitigation plan; (f) A discussion of ongoing management practices that will protect wetlands, including proposed monitoring and maintenance programs; (g) Mitigation plans should give priority to proven mitigation methods. Experimental mitigation techniques and mitigation banking may be considered by the council on a case-by-case basis. Proposals for experimental mitigation techniques and mitigation banking must be supported with analyses demonstrating that compensation will meet or exceed requirements giving consideration to the uncertainty of experimental techniques, and that banking credits meet all applicable state requirements.

(4) Federal approvals. The application shall list any federal approvals required for wetlands impacts and mitigation, status of such approvals, and federal agency contacts responsible for review.

(04-23-003, recodified as § 463-60-333, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-333, filed 10/11/04, effective 11/11/04.)

Section 3.5 Wetlands

The purpose of this section is to document the wetland resources that could be affected by the construction, operation, decommissioning, or abandonment of the proposed project. A biological resources report, which provides additional detail about wetlands in the vicinity of the proposed project site, is included as an appendix to this application (Appendix H.1).

Figure 3.4-1 is an overview of the biological resources in the study area and of the important habitat areas and features that are referred to in this section. Since there are no wetlands present at the project site, this analysis did not include detailed wetland mapping.

3.5.1 Study Area

The wetlands assessment examined the project study area, defined as all of the areas that could be affected directly or indirectly by the proposed project, and was conducted at three scales. Most of the analysis is focused at the project site scale, as this is the scale at which wetland impacts would be most likely to occur, if wetlands were present on the site. The project site is limited to the areas within the proposed physical footprint of the project.

The project vicinity includes parcels immediately adjacent to the proposed project site as well as biologically important features within approximately 1 mile of it. Examples of features included within the project vicinity BAPE include the wetland complexes associated with Vancouver Lake and the Shillapoo NWR, the CRWMB, the Port's Parcel 1A and Parcel 2 wetland mitigation sites, and wetland habitats on Port Parcel 3. Wetlands present within the project vicinity would not be directly impacted by the proposed project, but could be indirectly affected by potential impacts related to water quality.

The analysis included a third scale – the project's shipping prism, defined as the area in which effects associated with increased shipping could occur. This BAPE includes the entirety of the Lower Columbia River downstream of the site, as well as marine habitat off the coasts of Washington, Oregon, and California, out to the extent of the Exclusive Economic Zone (EEZ), a distance of 200 miles offshore. The shipping prism includes only the Lower Columbia River and adjacent marine waters. There are numerous backwater and side channel wetland habitats present on the Lower Columbia River.

3.5.2 Methodology

Project scientists coordinated with regulatory agency biologists, conducted a review of existing literature and reference material, and carried out field investigations at the project site.

Information regarding the potential presence of wetlands at the project site included reviews of NWI data (USFWS 1989), soils data (NRCS 2013), and recent and historic permitting documentation.

Biologists from BergerABAM conducted site visits on May 28 and June 27, 2013 to delineate the OHWM of the Columbia River at the project site, conduct a riparian habitat assessment and tree inventory, and assess the wetland and terrestrial site conditions present throughout the project site.

3.5.3 Existing Conditions

Project Site

The NWI map for Vancouver, Washington USGS Quadrangle (USFWS 1989) indicates the presence of numerous wetlands within the project vicinity, including five wetland polygons on the portion of the project site that encompasses Parcel 1A (Figure 3.4-1).

Wetland types mapped on Parcel 1A include:

- PEMA – Palustrine Emergent Temporarily Flooded
- PEMC – Palustrine Emergent Seasonally Flooded
- PFOA – Palustrine Forested Temporarily Flooded
- PFOC – Palustrine Forested Seasonally Flooded

It is important to note that NWI mapping is a coarse-scale mapping tool, and does not always reflect the presence or absence of wetland features at a given site. The NWI identifies much of Port Parcel 1A as having wetland characteristics, but wetland delineations conducted on the parcel prior to its initial development in 1996 documented significantly less wetland than identified by the NWI (The JD White Company 1993).

Nine wetlands, totaling approximately 16 acres in size, were present on Parcel 1A prior to development of that parcel (The JD White Company 1993), but these wetlands were all filled through permitted actions. Development on Parcel 1A was initiated in 1996. USACE permit number 96-1850 authorized impacts to 9.92 acres of emergent wetlands on the parcel. Wetland impacts associated with this development activity were mitigated through the establishment of the Port's Parcel 2 wetland mitigation site. A small forested wetland at the extreme eastern property boundary of Parcel 1A was enlarged and enhanced into the existing Parcel 1A wetland mitigation site.

In 2012, the Port applied for and received permission to fill a 1.76-acre isolated emergent wetland in the northeast corner of Parcel 1A, which was hydrologically and functionally isolated and provided little function and was filled in 2012.

The NWI also identified two isolated wetlands located north of the Jail Work Center. The boundaries of these wetlands were delineated in 2006 and 2007 in association with the Port's WVFA project (The JD White Company 2007). These wetlands were filled as part of that project in 2007. Impacts were permitted under a USACE nationwide permit (NWP-2007-721) and an Ecology administrative order (AO # 6902), and mitigation was accomplished through the purchase of credits in the CRWMB.

No other wetlands are present within the project site. Field investigations conducted on May 28 and June 26, 2013 included a visual reconnaissance to document the presence of any potential wetlands. The OHWM of the Columbia River within the vicinity of the dock was also delineated during the May 28, 2013 site visit. All portions of the project site above the OHWM are either impervious, paved, or gravel-covered surfaces, or are upland ruderal grass/forb habitats that are clearly dominated by upland vegetation and have neither the potential to accumulate or detain surface water or precipitation nor any visible hydrologic features that indicate the potential presence of wetlands. It has been determined, therefore, that there are no wetlands present on the project site.

Project Vicinity – Within the greater project vicinity, there are numerous wetlands, including several relatively high-quality wetland complexes. The NWI map (USFWS 1989) identifies a large complex of emergent, scrub-shrub, and forested wetlands north of the project site associated with the south end of Vancouver Lake; emergent and forested wetlands on Port Parcel 2; emergent wetlands to the east and south of Parcel 1A; and emergent wetlands to the west of Port Parcel 5, extending onto Parcel 3 (Figure 3.4-1).

Mapped wetland types include the following:

- PEMA – Palustrine Emergent Temporarily Flooded
- PEMC – Palustrine Emergent Seasonally Flooded
- PEMF – Palustrine Emergent Semi-permanently Flooded
- PEMR – Palustrine Emergent Seasonal – Tidal
- PEMT – Palustrine Emergent Semi-permanent – Tidal
- PFOA – Palustrine Forested Temporarily Flooded
- PSSA – Palustrine Scrub-shrub Temporarily Flooded
- PSSC – Palustrine Scrub-shrub Seasonally Flooded
- PSSR – Palustrine Scrub-shrub Seasonal – Tidal
- PSS/EMC – Palustrine Scrub-shrub/Emergent Seasonally Flooded
- PUBH – Palustrine Unconsolidated Bottom Permanently Flooded

As with the project site mapping, the NWI mapping within the project vicinity is accurate only at a coarse scale. Extensive wetland delineations associated with various project proposals and wetland mitigation activities have been conducted throughout the project vicinity, and these defined the actual boundaries of many of the wetlands within the project vicinity more accurately.

There are two wetland mitigation sites present in the vicinity of the project site. The Parcel 1A wetland mitigation site, located immediately east of Parcel 1A, was established in 1994 under USACE permit number 94-00061. This approximately 7.9-acre wetland is a depressional, palustrine forested wetland (PFO), vegetated with mature black cottonwood trees and a variety of native shrubs and herbaceous species.

The Parcel 2 wetland mitigation site is an approximately 16.4-acre mitigation site, situated on an approximately 31.3-acre parcel north of the existing Terminal 5 site. The mitigation site was established in 2000, under USACE permit number 96-1850, for wetland impacts associated with the initial development of Parcel 1A. The mitigation site received final approval from the USACE in 2007. The site is currently a mosaic of forested, scrub-shrub, and emergent vegetation.

The most significant complex of wetlands in the project vicinity is associated with the southern end of Vancouver Lake. These wetlands are a mosaic of emergent, scrub-shrub, and forested wetlands that are hydrologically connected to Vancouver Lake and, by extension, the Columbia River. These wetlands provide high quality seasonally inundated, tidally influenced, and permanently flooded habitats that most closely resemble the original hydrologic and wetland habitat functions of the Vancouver Lake Lowlands. An approximately 154-acre portion of this wetland complex, located on portions of Port Parcels 6 and 7, has been established as the CRWMB.

There are several emergent wetlands west and northwest of the project site as well. The NWI identifies emergent wetlands on property west of the Terminal 5 property, and on Port parcels 3, 4, and 5. A wetland delineation conducted on parcels 3, 4, and 5 in 2001 identified approximately 148 acres of wetland on these parcels (The JD White Company, Inc. 2001). The delineation concluded that, because of their limited vegetative structural diversity, these wetlands provide primarily water quality functions but also provide some wildlife habitat function.

Project Shipping Prism – The shipping prism includes only the Lower Columbia River and adjacent marine waters. While there are numerous backwater and side channel wetland habitats present on the Lower Columbia River, a detailed analysis of the quantity and/or quality of these wetlands is beyond the scope of this document

3.5.4 Impacts

3.5.4.1 Construction

Impacts associated with the construction of the proposed upland facilities and in-water improvements have the potential to result in effects associated with direct permanent and temporary modification of terrestrial and aquatic habitats as well as through the potential for temporarily reduced water quality conditions during construction, and through the generation of temporarily elevated levels of underwater and terrestrial noise during pile installation.

None of these impacts are expected to result in any measurable or significant temporary or permanent wetland impacts at the project site, project vicinity, or project shipping prism scales. There are no wetlands present on the project site, and the project will not result in any direct permanent or temporary wetland fills. At the scale of the project vicinity, there is a chance that off-site wetlands would be indirectly permanently and/or temporarily affected by construction or operational water quality impacts. Wetlands within the shipping prism would not be affected by construction-related water quality impacts. Wetland function will not be affected by temporarily elevated noise levels during construction.

3.5.4.2 Operation

Impacts to wetlands associated with operation of the proposed Facility would also be minor in extent. Wetlands could be affected by impacts associated with operational water quality, including an increased potential for spills or leaks associated with on-site equipment and machinery, and an increased potential for catastrophic accidents such as a spill to surface waters. However, none of these poses a significant risk to the quantity or quality of wetland habitats.

There are no wetlands on the project site that would be affected by water quality-related impacts associated with operation of the Facility.

At the scale of the project vicinity, wetlands within the project vicinity have the potential to be affected by impacts associated with construction and operational water quality. Accidental leaks or spills of fuel or other chemicals into groundwater at the project site have the potential to reduce habitat function of wetlands in the vicinity. Increased stormwater associated with new impervious surface also has the potential to indirectly affect wetlands within the project vicinity.

Within the shipping prism, wetlands also have the potential to be affected by impacts associated with construction and operational water quality, and could also potentially be affected by the potential for increased shipping traffic. Wetlands within the shipping prism could be indirectly affected through increased potential for accidental leaks or spills, effects associated with

increased stormwater, through the introduction of exotic aquatic plant or animal species, and through the potential for catastrophic events such as a spill to surface waters.

3.5.5 Mitigation Measures

The proposed project has been designed to avoid and/or minimize impacts to wetlands to the greatest extent possible. The project will implement several impact minimization measures and BMPs during construction to further reduce or mitigate the potential for impacts to wetlands.

Direct Habitat Effects

The upland facilities associated with the project have been located on developed portions of an existing industrial site, and no wetlands are present at the site. By siting the project in a developed location, the project has completely avoided the need to directly impact wetlands.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Temporary Water Quality Impacts

The project has the potential to result in temporary water quality impacts during construction which could affect off-site wetlands within the project vicinity or shipping prism. Construction at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with the project.

Operational Water Quality Impacts

The proposed project has the potential to result in indirect effects to wetlands through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site and spills or leaks associated with on-site equipment and machinery, and a potential for catastrophic accidents such as spills to surface waters.

As described in section 2.11, the project has the potential to increase stormwater runoff at the site, which could affect water quality and quantity. The proposed stormwater treatment will provide treatment to a level that is consistent with existing treatment at the site, which will ensure that off-site wetlands are not adversely affected by operational stormwater.

Operations at the site will be governed by an SPCC plan (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. These include inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Transport ships are constructed with double hulls to minimize the potential for the release of cargo in the event of a spill. In addition, international convention requires that a SOPEP govern the operation of each ship. All ships also will be required to comply with state spill prevention

and contingency plans. The likelihood of a catastrophic spill is very low, and the proposed BMPs and safety and security measures will manage the risk of impacts to wetlands effectively.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

3.5.6 Federal Approvals

Because no wetlands will be impacted by the Facility, no federal approvals will be necessary related to wetlands.

Section 3.6 – Energy and Natural Resources

WAC 463-60-342
Natural environment – Energy and natural resources.

(1) Amount required/rate of use/efficiency. The application shall describe the rate of use and efficiency of consumption of energy and natural resources during both construction and operation of the proposed facility.

(2) Source/availability. The application shall describe the sources of supply, locations of use, types, amounts, and availability of energy or resources to be used or consumed during construction and operation of the facility.

(3) Nonrenewable resources. The application shall describe all nonrenewable resources that will be used, made inaccessible or unusable by construction and operation of the facility.

(4) Conservation and renewable resources. The application shall describe conservation measures and/or renewable resources which will or could be used during construction and operation of the facility.

(5) Scenic resources. The application shall describe any scenic resources which may be affected by the facility or discharges from the facility.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-342, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-342, filed 11/6/92, effective 12/7/92.)

Section 3.6 Energy and Natural Resources

The Facility will consume limited amounts of energy and natural resources during construction. During operation, the Facility will not consume resources directly for the generation of electricity or for the production of a material product, but will consume resources indirectly to support the receipt, conveyance, and storage of crude oil.

3.6.1 Energy and Natural Resources Required

3.6.1.1 Construction

The Facility will be constructed of manufactured materials that require energy to produce. Energy resources also will be consumed transporting these materials to the site. Further, energy sources will be used to operate onsite construction equipment. The Facility's direct energy consumption during construction will be predominantly in the forms of electricity and fuel as follows.

- Electricity: Construction will consume electricity to provide temporary construction site lighting and heat buildings, and to power tools and equipment.
- Fuel: Gasoline and diesel will be used to fuel portable generators, construction vehicles, and other construction equipment while welding gases will be used for the field erection and construction of structures, storage tanks, piping systems, transfer pipelines and rail.

Construction of the Facility will consume materials in the approximate following amounts:

- Steel: Approximately 18,500 tons of steel will be consumed to construct ground improvements (piling), building structures, and siding and roofing, storage tanks, piping, operations access structures (catwalks and gangways), rail loops, and dock improvements.
- Gravel: Approximately 9,800 cubic yards of gravel will be consumed to produce concrete and for ground surface stabilization post-construction.
- Concrete: Approximately 85,000 cubic yards of concrete will be consumed to construct piping trenches, containment basins, building foundations, equipment pads, and storage tank foundations.
- Rail Ballast: Approximately 17,500 cubic yards of rail ballast will be required for the construction of two rail loops.
- Berm construction materials: Approximately 227,000 cubic yards of materials will be needed for berm construction. To the extent possible, the ground materials and soils excavated to construct the trenches in the unloading building and elsewhere at the site are proposed to be used to construct the containment berm that will surround the storage area. As noted in section 4.1.3, not all the materials excavated from the site may be suited for use as part of berm construction.
- Tank area containment liner: Approximately 100,000 square yards of HDPE impervious liner will be placed underneath the tank storage area.
- Asphalt: Approximately 50,000 cubic yards of asphalt will be required to construct new hard surfaces planned throughout the Facility, including hard surfaces between rail tracks in the

unloading building and additional hard surfaces required for parking and ground stabilization in the remainder of the Facility.

- Water: Water use at the site during construction will primarily consist of general water use for construction activities, including dust suppression and the pre-commissioning testing of piping, transfer pipelines, and storage tanks to identify leaks. General construction activities are anticipated to use 20,000 gallons per day. Testing and commissioning of the pipelines, tanks and water lines will require additional water for pipeline flushing and hydrostatic testing. Testing and commissioning the transfer pipelines and storage tanks will be sequenced to reuse as much testing water as possible on site. Assuming no water reuse, testing and commissioning would require a total of 98.4 million gallons of water. With reuse, a total of 20 million gallons of water is expected to be required for testing and commissioning.
- Paints, adhesives, and solvents will be used for protective coatings and finishes. Lubricating oils, greases, and hydraulic fuels will be used in the maintenance of construction equipment.

3.6.1.2 Operation

Once constructed and commissioned, the Facility will use energy for day-to-day operations as follows.

- Natural Gas: Approximately 1,419,286 MMBtu/year or 1,419 million cubic feet per year will be used when the Facility is operating at full capacity. Natural gas will be used to power the boilers that will provide steam to heat crude oil during unloading of rail cars and storage in the storage tanks, as well as in the dock safety skid and MVCU to ensure safe and appropriate operating conditions while marine vessels are being loaded.
- Fuel: Gasoline and diesel will be used to fuel maintenance vehicles and fuel-powered maintenance equipment, low sulfur diesel will be used for emergency firing and testing of fire pumps.
- Electricity: Electricity will be used to heat and light indoor spaces and for outdoor lighting and to power facility equipment and control systems.

The Facility will consume water and incidental operations materials as follows.

- Process water will be consumed at an average of 78,900 gallons per day to operate the boiler plants, for miscellaneous part/equipment wash, and as cooling water for the fire suppression pumps (see section 2.6.4).
- Potable water will be consumed at an average of 8,500 gallons per day (see section 2.6.5).
- Incidental operations materials such as paints, adhesives, and solvents will be used to maintain protective coatings and finishes. Lubricating oils, greases, and hydraulic fuels will be used to maintain equipment.

3.6.2 Sources

3.6.2.1 Sources during Construction

Construction materials will be sourced locally, regionally, and nationally. Procurement will occur prior to construction. Pending the identification of actual suppliers, the Applicant anticipates that:

- Steel will be purchased both within and beyond the Pacific Northwest region;
- Gravel, concrete, rail ballast, berm construction materials, and asphalt will be sourced locally from vendors in the vicinity of the Facility;
- Water will be purchased from the City;
- Gasoline and diesel fuel will be purchased from local and regional distributors;
- Electricity will be provided by and purchased from CPU; and
- Incidental construction materials and lubricating oils, greases, and hydraulic fuels will be sourced locally and/or regionally.

3.6.2.2 Sources during Operation

For the most part, resources and materials used during operation will be sourced locally and regionally; however, certain materials required to maintain specialized equipment may need to be sourced nationally. Procurement will occur prior to and during operations. Pending the identification of actual suppliers, the Applicant anticipates that:

- Process and potable water will be purchased from the City; small amounts of bottled potable water will be purchased locally for use in Area 400.
- Gasoline and diesel fuel will be purchased from local and regional distributors; and Electricity will be provided by and purchased from CPU.

3.6.3 Nonrenewable Resources

A wide variety of natural resources will be used to construct and operate the Facility. While some materials are non-renewable in their original state or at their original source, there are many opportunities for the materials to be re-used or recycled, as follows.

- Although the steel used to construct the Facility may have been originally produced from iron ore, a non-renewable resource, upon decommissioning of the Facility, scrap steel can be sold and recycled.
- Concrete, gravel, berm materials, and rail ballast will come from quarry pits; however, upon decommissioning of the Facility, some of these materials may be re-used at other construction sites.
- Asphalt is produced from non-renewable resources, which can be recycled.
- A certain percentage of the water used to construct and operate the Facility will be lost to evaporation; however, the water discharged to the City WWTP will be treated and ultimately discharged to the Columbia River where it will be re-integrated into natural processes.
- The fuel and natural gas used to construct and operate the Facility will be sourced from non-renewable sources.
- Electricity consumed at the Facility will be sourced from the regional generation mix of renewable and non-renewable resources.
- Incidental construction and operation materials (paints, greases, etc.) are for the most part sourced from non-renewable origins, but many can be recycled after their use.

Within the local and regional economies, the materials needed to construct and operate the Facility are readily available. The amount of electricity consumed during construction and

operations will not affect other users or locally available energy supplies. No natural resources or energy supplies will be made inaccessible or unusable by construction and operation of the Facility.

3.6.4 Conservation Measures and Renewable Resources

During construction, conservation measures will include construction waste recycling when possible and the coordination of carpooling between construction workers to reduce vehicle emissions. The use of water for hydrostatic testing will be minimized to the extent possible.

Operations BMPs will be developed that include conservation measures for nonrenewable resources such as water, fuel, and electricity. These BMPs may include the following conservation measures when cost effective:

- Installation of high efficiency electrical fixtures, appliances, and light bulbs in the support/administrative building;
- Installation of LED light bulbs throughout the Facility;
- Using low-water flush toilets in the support/administrative building;
- Coordinating carpooling among operations workers;
- Recycling waste office paper and aluminum; and
- Sending used oils, lubricants, and greases to facilities where they can be recycled when possible.
- Using vehicles that comply with current fuel consumption and emission standards.

3.6.5 Scenic Resources

A scenic resource can generally be defined as a unique combination of visual elements yielding exceptionally high aesthetic values. However, this project site and its surroundings are typified by industrial facilities such as large industrial buildings, large expanses of impervious surfacing, utility and railroad corridors, fencing, and open storage. The site is generally flat, and is located at the Port on the north bank of the Columbia River, west of downtown Vancouver, and south of NW Lower River Road (SR 501). The adjacent natural areas include deciduous riparian vegetation, open grassland, and natural and modified shoreline conditions.

The site and its surroundings have been highly modified from their original natural state by riverbank stabilization, imported fill, and the development of heavy industrial land uses and transportation corridors. The stormwater and mitigation sites operated by the Port adjacent to the project site offer some vegetation; however, these limited sites are generally disconnected, both visually and physically, from the surrounding landscape. The dominant natural features of the area are the Columbia River, Vancouver Lake, and the Vancouver Lake Lowlands.

The Columbia River is directly south of the site. The Port of Portland owns the western end of Hayden Island on the south shore of the Columbia River across the river from the Port. The views northeast of the site are dominated by low-density residential development located on the bluff east of the site. Within the project limits, past and current industrial activities have modified the character of the landscape greatly. SR 501, industrial uses, and overhead utility lines separate the project area visually and physically from the adjacent natural features.

The visual quality of the project area is consistent with the manmade conditions within the Port.

Tesoro Savage
Vancouver Energy Distribution Terminal

PART 4 BUILT ENVIRONMENT

Section 4.1 – Environmental Health

WAC 463-60-352
Built environment – Environmental health.

(1) Noise. The application shall (a) describe and quantify the background noise environment that would be affected by the energy facility; (b) identify and quantify the impact of noise emissions resulting from construction and operation; (c) identify local, state, and federal environmental noise impact guidelines; (d) describe the mitigation measures to be implemented to satisfy WAC 463-62-030; and (e) describe the means the applicant proposes to employ to assure continued compliance with WAC 463-62-030.

(2) Risk of fire or explosion. The application shall describe any potential for fire or explosion during construction, operation, standby or nonuse, dismantling, or restoration of the facility and what measures will be made to mitigate any risk of fire or explosion.

(3) Releases or potential releases to the environment affecting public health, such as toxic or hazardous materials. The application shall describe any potential for release of toxic or hazardous materials to the environment and shall identify plans for complying with the federal Resource Conservation and Recovery Act and the state Dangerous waste regulations (Chapter 173-303 WAC). The application shall describe the treatment or disposition of all solid or semisolid construction and operation wastes including spent fuel, ash, sludge, and bottoms, and show compliance with applicable state and local solid waste regulations.

(4) Safety standards compliance. The application shall identify all federal, state, and local health and safety standards which would normally be applicable to the construction and operation of a project of this nature and shall describe methods of compliance therewith.

(5) Radiation levels. For facilities which propose to release any radioactive materials, the application shall set forth information relating to radioactivity. Such information shall include background radiation levels of appropriate receptor media pertinent to the site. The application shall also describe the proposed radioactive waste treatment process, the anticipated release of radionuclides, their expected distribution and retention in the environment, the pathways which may become sources of radiation exposure, and projected resulting radiation doses to human populations. Other sources of radiation which may be associated with the project shall be described in all applications.

(6) Emergency plans. The application shall describe emergency plans which will be required to assure the public safety and environmental protection on and off the site in the event of a natural disaster or other major incident relating to or affecting the project as well as identifying the specific responsibilities that will be assumed by the applicant.

Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-352, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-352, filed 11/6/92, effective 12/7/92.)

Section 4.1 Environmental Health

4.1.1 Noise

EFSEC rules mandate that the energy facilities it permits must comply with the Washington noise standards and also must assess the potential for impacts from low frequency noise. Washington noise standards identify overall A-weighted sound level limits but do not directly address low frequency noise or potential increases over existing ambient sound levels. Therefore, other noise impact guidelines used in the noise impact analysis include published guidelines regarding low frequency noise.

The noise impact analysis determined that sound levels emitted from the Facility will comply with Washington A-weighted noise limits. In the assessment of impacts from low frequency noise, predicted C-weighted sound levels are at or lower than guidelines suggested to protect against low frequency vibrations and rattles.

4.1.1.1 Affected Environment

Introduction to Noise Technology

The human ear responds to a very wide range of sound intensities. The decibel scale (dB) used to describe sound is a logarithmic rating system which accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dB. Therefore, a 70-dB sound level will sound about twice as loud as a 60-dB sound level. People generally cannot detect differences of 1 dB. In ideal laboratory situations, differences of 2 or 3 dB can be detected by people, but such a change probably would not be noticed in a typical outdoor environment. A 5-dB change would probably be clearly perceived by most people under normal listening conditions.

As mentioned above, the decibel scale used to describe noise is logarithmic. On this scale, a doubling of sound-generating activity (i.e., a doubling of the sound energy) causes a 3-dB increase in average sound produced by that source, not a doubling of the loudness of the sound (which requires a 10-dB increase). For example, if traffic along a road is causing a 60-dB sound level at a nearby location, a doubling of the number of vehicles on this same road would cause the sound level at this same location to increase to 63 dB. Such an increase might not be discernible in a complex acoustical environment.

When addressing the effects of noise on people, it is necessary to consider the frequency response of the human ear, or those frequencies that people hear best. Sound measuring instruments are therefore often designed to “weight” sounds based on the way people hear. The frequency weighting most often used to evaluate environmental noise is A weighting because it best reflects how humans perceive sound. Measurements from instruments using this system are reported in “A-weighted decibels,” or dBA. Unless specified otherwise, noise levels are reported in A-weighted decibels.

Low frequency noise is characterized by noise levels at frequencies less than about 100 hertz (Hz). Noise at those frequencies can be annoying to some people even at relatively low levels. Some jurisdictions assess low frequency noise by limiting unweighted sound levels in the octave bands below 100 Hz, typically in the 31.5 and 63 Hz bands. Other jurisdictions assess low frequency noise by an alternative frequency weighting system, C-weighting, which does not

reduce the level of low frequency noise as much as the A-weighting system and is better at describing loud, low frequency sounds. Although low frequency sound is less audible to humans, C-weighting is often used to assess potential annoyance from structural rattling due to low frequency noise. Measurements from instruments using this system are reported in "C weighted decibels" or dBC.

Distance from the source, the frequency of the sound, the absorbency of the intervening ground, obstructions, and duration of the noise-producing event all affect the transmission and perception of noise. The degree of the effect on perception also depends on who is listening (individual physiological and psychological factors) and on existing sound levels (background noise). Typical noise levels of familiar noise sources and activities are presented in Table 4.1-1.

Table 4.1-1. Common Sound Levels/Sources and Subjective Human Responses

Thresholds/Noise Sources	Noise Level (dBA)	Subjective Evaluations	Possible Effects on Humans
Human Threshold of Pain Carrier jet takeoff (50 ft)	140	Deafening	Continuous exposure to levels above 70 can cause hearing loss in majority of population
Siren (100 ft) Loud rock band	130		
Jet takeoff (200 ft) Auto horn (3 ft)	120		
Chain saw Noisy snowmobile	110		
Lawn mower (3 ft) Noisy motorcycle (50 feet)	100	Very Loud	
Heavy truck (50 feet)	90		
Pneumatic drill (50 feet) Busy urban street, daytime	80	Loud	
Normal automobile at 50 mph Vacuum cleaner (3 ft)	70		Speech Interference
Large air conditioning unit (20 feet) Conversation (3 feet)	60	Moderate	
Quiet residential area Light auto traffic (100 ft)	50		Sleep Interference
Library Quiet home	40	Faint	
Soft whisper	30		
Slight rustling of leaves	20		
Broadcasting Studio	10	Very Faint	
Threshold of Human Hearing	0		

Note that both the subjective evaluations and the physiological responses are continuous without true threshold boundaries. Consequently, there are overlaps among categories of response that depend on the sensitivity of the noise receivers.

Noise Standards

This evaluation includes noise criteria established by EFSEC, the State of Washington, and the City of Vancouver (City).

EFSEC – Energy facilities seeking permits from EFSEC are subject to section 463-60-352 of the WAC (WAC 463-60-352). The code states that applications should:

- Describe and quantify the background noise environment that would be affected by the energy facility
- Identify and quantify the impact of noise emissions resulting from construction and operation of the energy facility, using appropriate state-of-the-art modeling techniques, and including impacts resulting from low frequency noise
- Identify local, state, and federal environmental noise impact guidelines
- Describe the mitigation measures to be implemented to satisfy WAC 463-62-030
- Describe the means the Applicant proposes to employ to assure continued compliance with WAC 463-62-030

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, the Noise Control Act of 1974 as implemented in the requirements in 173-60 WAC. These requirements are described below.

Washington State Standards – EFSEC rules mandate that the Applicant comply with the noise standards established in WAC 173-60, which establishes the maximum noise levels permissible in identified environments pursuant to Chapter 70.107 of the RCW. The state noise limits are based on the environmental designation for noise abatement (EDNA) of the noise source and the receiving properties. EDNAs are designated by class; Class A generally corresponds to residential areas or areas where people sleep, Class B EDNAs to retail and commercial areas, and Class C EDNAs to industrial and agricultural areas. The class of a property is typically determined by its predominant land use. The noise limits for each land use classification are presented in Table 4.1-2.

Table 4.1-2. Washington Maximum Permissible Sound Levels (dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A[1] (Residential)	Class B (Commercial)	Class C (Industrial)
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

[1]Sound limits shall be reduced by 10 dBA between the hours of 10 p.m. and 7 a.m. at Class A EDNAs
Source: WAC Chapter 173-60

The noise limits presented in Table 4.1-2 can be exceeded for certain periods of time: 5 dBA for no more than 15 minutes in any hour, 10 dBA for no more than 5 minutes of any hour, or 15 dBA for no more than 1.5 minutes of any hour. Sometimes these exceptions are described in terms of the percentage of time a certain level is exceeded. For example, L25 represents a statistical sound level that is exceeded 25 percent of the time, or 15 minutes in an hour. Similarly, L8.33 and L2.5 are the sound levels that are exceeded 8.33 and 2.5 percent of the time, or 5 and 1.5 minutes in an hour, respectively. At no time can the allowable sound level be exceeded by more than 15 dBA, represented by the Lmax.

The Facility would be considered a Class C noise source. In practice, a Class C noise source may not generate a sound level (L_{25}) exceeding 70 dBA at nearby Class C EDNAs (i.e., industrial properties) during daytime and nighttime hours. At the nearest Class A EDNAs, noise generated

by the Facility would be limited to 60 dBA during daytime hours (7 AM to 10 PM) and 50 dBA during nighttime hours. Because the proposed Facility could operate 24 hours per day, it must be designed to meet the 50 dBA nighttime limit at any Class A EDNAs.

WAC 173-60-050 identifies several sources of noise that are exempt from the noise limits displayed in Table 4.1-2. These include the following:

- Traffic on public roads
- Sounds from surface carriers engaged in interstate commerce by railroad
- Sounds from temporary construction activities between 7 AM and 10 PM

City of Vancouver Noise Standards – Chapter 20.935 of the Vancouver Municipal Code (VMC 20.935) identifies performance standards for proposed land uses and development activities, including standards for noise. Section 20.935.030(A) applies the noise limits and exemptions established by WAC 173-60, as identified in the previous section. In addition to the WAC noise limits and exemptions, the City restricts construction activities, including construction staging, to between 7 AM and 8 PM, 7 days a week.

Federal Noise Standards – There are no federal regulations that establish noise limits on the sound emanating from the proposed Facility as it affects surrounding properties.

Low Frequency Noise Guidelines – Energy facilities seeking permits from EFSEC are required to identify potential low frequency noise impacts in their permit applications (WAC 463-60-352). But Washington does not apply specific regulatory limits on low frequency noise nor provide any basis for assessing impacts from such noise. Therefore, to provide a means for considering potential noise impacts from low frequency noise, an appropriate noise guideline was determined based on the review of several sources that consider this issue. ANSI Standard B133.8 Gas Turbine Installation Sound Emissions indicates that a 75 to 80 C-weighted decibels or dBC (C-weighting as defined in this section) sound level should be used as an upper limit to prevent structural vibrations and rattling. Several other documents and studies have indicated that 70 dBC is a more appropriate minimum threshold to prevent rattles and vibrations from low frequency noise.[14, 15, 16] The analysis reported here therefore applied the more conservative noise level of 70 dBC as a guideline to protect against impacts from low frequency noise.

Existing Sound Levels

The existing noise environment has been previously characterized by sound level measurements (SLMs) taken on nearby parcels for various other projects. These sound levels were taken with Type I sound level meters over periods ranging from several days to a week. The measured sound levels are summarized in Table 4.1-3 and the locations are briefly described below and displayed in Figure 4.1-1.

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[14] Environmental Sound Survey and Noise Impact Assessment – Dairy Hills Wind Farm Project, Perry, NY. Hessler Associates, Inc. May 3, 2006.

[15] Aesthetic and Noise Control Regulations. Rule 802d of the Colorado Oil and Gas Conservation Commission, (COGCC).

[16] *PARTNER - Low Frequency Noise Study*, April 6, 2007. Prepared by Kathleen K. Hodgdon, Anthony A. Atchley, and Robert J. Bernhard.

- *SLM1* – Sound level measurements were taken over a 48-hour period in October 2005 in the Fruit Valley residential area northeast of the proposed Facility.
- *SLM2* - Noise monitoring was conducted at the Jail Work Center over several periods for different projects. A 72-hour measurement was taken between March 31 and April 3, 2009. Additional measurements for a different project were taken at the Jail Work Center during four 5-day periods between July and October 2012. Some of the measured levels in 2012 included noise from construction of the NW Gateway Avenue Overcrossing.
- *SLM3* – Sound level measurements were captured over four 5-day periods between July and October 2012 at the western property boundary of the Terminal 5 site. This measurement location represents the Tidewater office building. This location is identified as SLM3 in Figure 4.1-1.

Table 4.1-3. Range of Measured Sound Levels in Project Vicinity (dBA)

SLM Location	Date	Source	Daytime Leqs	Nighttime Leqs	Ldn
SLM1 – Fruit Valley Residential Area	October 2005	1	49-65	42-65	58
SLM2 – Jail Work Center	March-April 2009	1	55-68	50-61	64
	July - October 2012	2	53-74	39-64	61-68
SLM3 – West Side of T5	July - October 2012	2	46-76	40-72	56-71

Sources:

(1) West Vancouver Freight Access Project, Schedules 2 through 4, Port of Vancouver; Noise and Vibration Discipline Report; July 2009; ICF Jones & Stokes.

(2) BHP-Billiton POV Terminal 5 Environmental Monitoring; July through October 2012; ENVIRON International Corporation.

4.1.1.2 Environmental Noise Impacts

Construction

During the construction phase of the project, noise from construction activities could add to the noise environment in the immediate vicinity of the site. The nearest sensitive use to construction of the proposed Facility is the eastern housing unit of the Jail Work Center, which is just over 400 feet from the proposed pipeline from the storage tank area to the ship loading dock. The nearest residences are approximately 3,000 feet from the proposed tank holding area. The Tidewater office building is just over 100 feet from the nearest proposed rail line associated with the Facility. Typical sound levels associated with construction activities at these distances are displayed in Table 4.1-4.

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Figure 4.1-1. Background Noise Measurement Location and Receptors

Table 4.1-4. Typical Construction Equipment Noise

Activity	Range of Hourly Leqs (dBA)		
	At 100 Feet	At 400 Feet	At 3,000 Feet
Clearing	77	65	47
Grading	70-82	58-70	40-52
Paving	67-82	55-70	37-52
Erecting	67-78	55-66	37-48
Types of Equipment	**Range of Noise Levels (dBA)**		
	At 100 Feet	**At 400 Feet**	**At 3,000 Feet**
Bulldozer	71-90	59-78	41-60
Dump Truck	76-88	64-76	46-58
Scraper	7487	62-75	44-57
Paver	80-82	68-70	50-52
Generator	65-76	53-64	35-46
Compressor	68-75	56-63	38-45

Source: EPA, 1971

As shown in Table 4.1-4, the estimated hourly L_{eqs} at the nearest residences (more than 3,000 feet) are below the noise level limit of 60 dBA that would apply to long-term operational noise. In addition, the calculated construction sound levels at the housing units of the Jail Work Center (the nearest sensitive receivers to the site at approximately 400 feet from the nearest construction area) would fall within the existing range of measured hourly L_{eqs}.

Per WAC 463-62-030, EFSEC requires that energy facilities meet the noise standards established in 173-60 WAC. WAC 173-60-050 exempts construction noise from any limits on noise levels between 7 AM and 10 PM but places no additional constraints on construction activities. Section 20.935.030(4) of the Vancouver Municipal Code restricts outdoor construction activity to between 7 AM and 8 PM, seven days a week. Although the VMC standard is superseded by the State standard for an EFSEC-permitted facility, the Applicant will, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4). If outdoor construction is required beyond the hours of 7 AM to 8 PM, the Applicant will consult with the City of Vancouver, will notify EFSEC in advance, and will not conduct the work until EFSEC has reviewed and approved the planned activities.

Restriction of construction to daytime hours, the temporary nature of construction noise, the distances between the residential uses and most of the construction areas, and the presence of existing noise at nearby sensitive receivers would serve to minimize potential noise impacts from construction activities.

Operation

Noise Sources – The Facility would generate noise from a number of sources associated with petroleum product rail unloading, storage, ship loading, and transport. Some of these sources are relatively quiet, and these quieter sources would not be audible when the louder equipment is operating. Therefore, this evaluation focused on the loudest noise sources associated with the Facility, including pumps, compressors, blowers, and the MVCU. Equipment that would be located inside buildings (i.e., the boilers and the rail unloading pumps) is not expected to

substantially contribute to the overall Facility noise and was not included in the analysis (see Table 4.1-5).

Table 4.1-6 summarizes the A-weighted sound pressure levels associated with the dominant noise sources examined in this assessment. The Sound Power Level (SWL) and octave band data are provided in Table 4.1-7.

Table 4.1-5. Summary of Major Facility Noise Sources

Source	Data Source	No. of Units	Approximate Sound Pressure Level at 100 ft (dBA)
Rail Unloading (Area 200)			
Compressor	1	1	72
Transformer	1	3	54
Storage (Area 300)			
Pumps	2	1	64
Transformer	1	1	54
Marine Terminal (Area 400)			
Marine Vapor Combustion Unit	3	8	67
Vapor Blower Skid	1	3	59
Dock Safety Unit	1	1	59
Train Sources			
Locomotives (10 mph)	4	3	54 (Hourly L_{eq})
Rail Cars (10 mph)	4	7000 feet	52 (Hourly L_{eq})

Sources:

(1) Based on equipment sound levels from previous ENVIRON noise analyses
(2) Based on a sound level of similar petroleum product off-loading pumps
(3) Based on a sound level of 85 dBA identified by the manufacturer. ENVIRON applied the sound level at three feet from the base of the stack and at the upper rim of the stack.
(4) CadnaA v4.1. DataKustik GmbH. FRA/FTA module.

Note: Please note that engineering and equipment selection has not been finalized and that the above equipment sound levels are speculative. They are used in this analysis to represent a reasonable estimate of overall future sound levels from the proposed Facility.

CadnaA Noise Model – Noise anticipated to be generated by operation of the Facility was evaluated at nearby receivers using the CadnaA noise model. CadnaA is a computer program that calculates sound levels after considering the noise reductions or enhancements caused by distance, topography, ground surfaces (including water), atmospheric absorption, and meteorological conditions in compliance with ISO-9613-2:1996. The modeling includes the following steps: (1) characterizing the noise sources, (2) creating three-dimensional (3-D) maps of the site and vicinity to enable the model to evaluate effects of distance and topography on noise attenuation, and (3) assigning the equipment sound levels to appropriate locations on the site. CadnaA then constructs topographic cross sections to calculate sound levels in the vicinity of a project site.

In addition to using the ISO 9613 procedures in CadnaA for on-site equipment, ENVIRON used the Federal Railroad Administration (FRA)/Federal Transit Administration (FTA) module available in CadnaA for modeling noise due to moving trains. This module computes train noise

using the source levels and methods outlined by the FRA. The trains were specified to consist of three locomotives and be approximately 7,000 feet in length. The train was specified to travel 10 mph while on the site, although it is expected that trains would generally travel slower than 10 mph, and the resulting rail-related noise would be lower than modeled.

For the modeling effort, ENVIRON used numerous modeling "receptor" locations representing the off-site uses nearest the project site. The modeling receptors considered in the noise modeling are depicted in Figure 4.1-1 and described in more detail below.

- R1 – The southwest corner of the Jail Work Center representing the western housing unit, which is nearest the rail line. The housing units of the Work Center are considered Class A EDNAs when applying the WAC noise limits.
- R2 – The southeast corner of the Jail Work Center representing the eastern housing unit, which is nearest the pipeline and marine terminal. The housing unit is considered a Class A EDNA.
- R3 – The Tidewater Office Building near the northwest corner of the site. The office building is considered a Class B receiving property (e.g., commercial).
- R4 – The CPU facility north of the site. This is a Class C (Industrial) receiving property.
- R5 – The nearest residential structure northwest of the site, a Class A receiving property.
- R6 and R7 – Residences in the Fruit Valley residential community northeast of the site, both considered Class A receiving properties.

Predicted A-weighted Sound Levels at Nearby Receiving Properties –Modeled A-weighted sound levels with the equipment above are presented below.

Table 4.1-6. Modeled A-Weighted Sound Levels (Hourly Leq, dBA)

Receptor	MVCU Option 1		WAC Noise Limit[1, 2, 3]
	Without Train Arrival	With Train Arrival	
R1 – SW Jail Work Center	47	50	60/50
R2 – SE Jail Work Center	50	51	60/50
R3 – Tidewater	39	58	65
R4 – CPU	45	59	70
R5 – NW Residence	33	39	60/50
R6 – Fruit Valley Residence	37	37	60/50
R7 – Fruit Valley Residence	36	36	60/50

[1] The noise limits do not apply to rail noise and are only applicable to the No Train scenarios. Noise from surface carriers engaged in interstate commerce by railroad is exempt from the WAC noise limits (WAC 173-60-050).
[2] The noise limits for Class A receivers (e.g., residences and housing facilities) are displayed as Day/Night where Day refers to the hours between 7 AM and 10 PM and Night refers to the hours between 10 PM and 7 AM. Because the Facility could operate 24-hours a day, the more restrictive nighttime noise limit would apply.
[3] The WAC noise limit shown in the table uses the hourly L25 noise descriptor. The primary noise sources from the site would emit fairly continuous noise, and the modeled hourly Leq would essentially be the same as the hourly L25. Because it is not a continuous noise source, the modeled hourly Leq of railroad-related noise may differ from the hourly L25. However, railroad noise is exempt from the WAC noise limits, so comparisons of the "With Train" scenario sound levels to the WAC noise limits are unnecessary.

Table 4.1-7. Equipment Octave Band Sound Levels

Equipment	Sound Power Levels (Octave Bands (Hz))									Total Sound Power Level		
	31.5	63	125	250	500	1000	2000	4000	8000	Linear	A-Wght	C-Wght
Rail Unloading (Area 200)												
Compressor	72	72	71	69	69	71	75	74	70	81	80	81
Transformer	95	95	95	97	95	87	80	73	66	103	95	102
Storage (Area 300)												
Pumps	51	65	81	89	95	100	100	96	83	104	105	104
Transformer	95	95	95	97	95	87	80	73	66	103	95	102
Marine Terminal (Area 400)												
MVCU	117	117	116	117	107	102	95	91	90	123	111	122
Vapor Blower Skid	106	106	105	106	96	91	84	80	79	112	100	111

As shown in Table 4.1-6, the modeled sound levels would comply with the most restrictive nighttime noise limits at the nearest off-site receivers to the Facility. Furthermore, the modeled sound levels at the nearest residences to the site are well below even the nighttime noise limit. During those hours that include a train arrival, the modeled sound levels at most locations would continue to be below the State noise limits (although the limits do not apply to noise emitted by the railroad). The exception is at R2, representing the eastern housing unit at the Jail Work Center, where the modeled level is 1-dBA higher than the nighttime noise limit. This falls within the range of error of the noise model.

Predicted C-weighted Sound Levels at Nearby Receiving Properties – The Facility is still in preliminary design, and final equipment has yet to be determined. Therefore, accurate estimates of low frequency noise associated with the major on-site equipment are not yet available. However, frequency data of similar sources were used to estimate potential low frequency sound levels and overall C-weighted sound levels in order to assess the potential impacts from low frequency noise. The primary source of low frequency noise is anticipated to be the MVCU.

The predicted C-weighted sound levels using our presumed frequency data are presented in Table 4.1-8.

Table 4.1-8. Modeled C-Weighted Sound Levels[1]

Receptor	Modeled Level	Guideline/Limit
R1 – SW Jail Work Center	60	70
R2 – SE Jail Work Center	62	70
R3 – Tidewater	51	70
R4 – CPU	57	70
R5 – NW Residence	46	70
R6 – Fruit Valley Residence	49	70
R7 - Fruit Valley Residence	49	70

[1] The modeled C-weighted sound levels do not include train noise. The FRA noise prediction method used by CadnaA does not include frequency data for the train sources.

As seen in Table 4.1-88, the estimated C-weighted sound levels are less than 70 dBC from the Facility, which would protect against undue impacts from low frequency noise.

4.1.1.3 Mitigation Measures

Construction

Construction would occur only during daytime hours to reduce the potential for noise impacts from this activity. Construction noise is exempt from the Washington noise limits during daytime hours.

The Applicant will, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4), i.e., between 7 AM and 8 PM. If outdoor construction is required outside of these hours, the Applicant will consult with the City, will notify EFSEC in advance, and will not conduct the work until EFSEC has reviewed and approved the planned activities.

Operation
Modeled sound levels of the Facility would comply with the applicable Washington State noise limits. Therefore, no operational noise mitigation is proposed.

4.1.2 Risk of Fire or Explosion

This section addresses for the risk of fire or explosion during the construction, operation, standby and/or nonuse, dismantling and/or restoration of the Facility and what measures will be implemented to mitigate risk of fire or explosion.

4.1.2.1 Construction

The risk of fire or explosion during the construction of the Facility is generally related to the storage and use of flammable materials, including petroleum products such as vehicle fuel, solvents, cleaners, and welding gases. The proposed Facility is located in a developed industrial zone; the majority of the areas proposed for the project are devoid of vegetation thereby limiting the potential for fire propagation due to combustible vegetation. During the first phases of construction, patches of existing vegetation where project facilities are proposed will be graded and the vegetation removed, thereby reducing fire risk. With proper storage of these materials on site and proper material handling and work practices, the risk of fire during construction is very low. The Applicant will conduct construction activities and provide firefighting and response equipment in compliance with WAC 296-155 Part D, NFPA 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations) and NFPA 5000 (Building Construction and Safety Code).

As discussed in Section 4.1.4 below, Washington State chose to run its own workplace safety and health program, under the Washington Industrial Safety and Health Act (WISHA). WISHA safety standards are as stringent as or more stringent than applicable federal Occupational Health and Safety Administration (OSHA) codified in 29 CFR 1926; WISHA standards are implemented through WAC 296.

The Applicant will consult with the Port, City fire officials, and other emergency responders to ensure their response is coordinated with the Applicant's provisions for construction site fire control, existing firefighting facilities, and capabilities at the site (i.e., fire hydrants). Fire prevention and control will include, but not be limited to:

- Ensuring that appropriate firefighting equipment (i.e., extinguishers) is staged in the construction areas, either in fixed locations or on mobile construction vehicles as appropriate.
- Ensuring that highly flammable materials are identified, stored, and handled in accordance with applicable fire prevention and safety regulations.
- Managing combustible wastes to prevent fires.
- Implementing appropriate work procedures so that fires are prevented (e.g. hot work and welding).
- Limiting smoking to approved areas.
- Providing fire safety training to all construction personnel, including the identification of ignitions sources, the initiation of fire alarms, the use of established egress routes and locations, worker gathering locations, and procedures for notification of emergency responders.
- Providing first responders with maps that identify primary and secondary site access locations in the event of a fire.

The construction management lead will develop and implement a construction fire prevention and response plan addressing the procedures for fire prevention and response. The fire prevention plan will be a component of the Facility construction site safety plan and will address:

- A list of the major construction workplace fire hazards and their proper handling and storage procedures, potential ignition sources (such as welding, smoking, and others) and their control procedures, and the type of fire protection equipment or systems that can control a fire involving them;
- Names or regular job titles of those construction site personnel responsible for maintenance of equipment and systems installed to prevent or control construction related ignitions or fires; and
- Names or regular job titles of those personnel responsible for control of fuel source hazards at the construction site.

The construction fire prevention and response plan will be submitted to EFSEC for review and approval prior to the beginning of construction activities.

4.1.2.2 Operations

Flammability Characteristics of Crude Oil

As noted in the introduction in section 2.10.1.2, the Applicant proposes to handle light and heavy crude oils with an API gravity ranging from 10 to 45.

Across this spectrum crude oils contain a variable mixture of light and heavy hydrocarbons. Light crude oils contain a higher proportion of lower molecular weight ("light") hydrocarbons, resulting in an overall higher vapor pressure, i.e., they vaporize more easily at ambient temperature and pressure. Heavier crude oils contain a smaller proportion of light hydrocarbons, resulting in lower vapor pressures – i.e., they vaporize less easily at ambient temperature and pressure. As described below, the vapor pressure of crude oils is an important factor in their flammability.

NFPA standard 704 (NFPA 704), *Standard System for the Identification of the Hazards of Materials for Emergency Response*, establishes a standard system for evaluating the flammability rating of materials. NFPA 704 establishes five Degrees of Flammability Hazards, ranging from Degree of Hazard "0" – materials that will not burn under normal conditions, to Degree of Hazard "4" - materials that will burn readily under normal conditions. Table 4.1-9 presents the specific definition of the NFPA 704 Degrees of Flammability Hazards.

Table 4.1-9. NFPA 704 Table 6.2 Degrees of Flammability Hazards

Degree of Hazard	Definition
0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
1	Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur.
2	Materials that must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Under normal conditions, these materials would not form hazardous atmospheres with air, but under high ambient

Degree of Hazard	Definition
	temperatures or under moderate heating they could release vapor in sufficient quantities to produce hazardous atmospheres with air. Materials in this degree also include finely divided suspended solids that do not require heating before ignition can occur.
3	Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.
4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or are readily dispersed in air and burn readily.

The Degree of Hazard is based on a material's "boiling point" and "flashpoint." The boiling point is the temperature at which a liquid begins to vaporize. For the purposes of NFPA 704, the boiling point is the temperature at which the vapor pressure of a liquid equals the surrounding atmospheric pressure. The flashpoint of a material is the minimum temperature at which a liquid or a solid emits vapor sufficient to form an ignitable mixture with air near the surface of the liquid or solid. The NFPA adopts standard test measures for determining boiling points and flashpoints. Generally speaking, materials with a high flashpoint will only emit ignitable vapors at higher temperatures. Materials with low flashpoints will emit ignitable vapors at lower temperatures.

Based on this standard Degree of Hazard, crude oils fall into NFPA 704 degrees 3 and 4. Heavier crude oils are more likely to fall into degrees 2 and 3 and will require the application of heat to produce ignitable vapors. Lighter crude oils are more likely to fall into degrees 3 and 4 and can be ignited at most ambient temperatures. Regardless of the degree, the presence of three conditions is necessary to cause a material to ignite: (1) the presence of combustible components (the fuel); (2) the presence of an oxidizing chemical in the correct proportions to the combustible components (e.g., air), and (3) the presence of an ignition source. Without all three of these components, a material will not burn. For example, in order for a hydrocarbon/air mixture to ignite, the hydrocarbon-to-air ratio has to be 1 to 6 percent (for example, 1 percent fuel and 99 percent air). This ratio varies depending on the specific hydrocarbons that are present. Avoiding the generation of vapors, minimizing exposure to oxygen, and avoiding sources of ignition allows safe handling of crude oil under typical industrial conditions. However, should these conditions not be avoided, ignition of the vapors emitted by crude oil can cause a fire, whereby the vapors are combusted; however, in the absence of the presence of these ignitable vapors, liquid crude oil will not ignite even in the presence of air, under ambient pressures and temperatures.

As noted above, the vapors emitted from crude oils can ignite when mixed with air in the appropriate proportions, and when an ignition source is present. "Flashbacks" and "boilovers" are two extreme, but very rare under typical handling conditions, types of events related to vapor ignition that can be erroneously construed as explosions. Flashbacks and boilovers can occur during the inappropriate handling of many types of materials that can produce ignitable or expandable vapors, not just crude oils. A flashback can occur when a large amount of an ignitable vapor/oxidizing mixture is suddenly ignited. Because of the large amount of fuel present in gaseous form, the combustion of the fuel occurs very quickly over a large area,

causing a flashback. Boilovers are caused by an entirely different set of circumstances. Three key elements must be present for boilover to occur in its severest form: an open top tank fire (due to ignited hydrocarbon vapors on the surface of the crude oil); a water layer in the tank (present from water being sprayed into the surface of oil to abate the ignited vapors), and the development of a high temperature, relatively dense hot zone in the stored product – usually the surface layer of crude oil under the ignited vapors that has been heated to a very hot temperature. When the hot zone of product falls through the fuel and hits the water base at the bottom of, or elsewhere in the tank, the water boils, turns to steam and pushes up through the fuel above. The result is an eruption of tank contents that can boil over the tank walls, and spread beyond the tank. As described further below, the Facility will be carefully designed to avoid the potential for both flashbacks and boilovers.

Although crude oil does not generally have the characteristics of a reactive or explosive material, one of its components, hydrogen sulfide (H_2S), when emitted in large enough concentrations, can explode. Hydrogen sulfide is a highly flammable, explosive gas. The explosive range of hydrogen sulfide in air is 4.5 to 45.5 percent. This range is much higher than the personal exposure limit (PEL) (see section 4.1.4).

Potential for Fire and Explosions at the Facility

Fire and explosion hazards at the Facility may result from the presence of combustible gases and liquids and ignition sources during rail unloading and vessel loading activities, releases of flammable liquids and gases, and maintenance activities involving combustible or ignitable materials or equipment that is handling or has handled such materials. Possible ignition sources include sparks associated with the buildup of static electricity, lightning, and open flames. Static electricity may be generated by crude oil moving in contact with other materials, including pipes, transfer pipelines, and storage tanks during crude oil conveyance. Water mist and steam generated during maintenance related tank and equipment cleaning can also become electrically charged, in particular with the presence of chemical cleaning agents. Finally improper hot-work practices, or smoking outside of approved areas could also cause fires.

Mechanical explosions result when a sealed or partially sealed container bursts under internal pressure. Under some conditions, crude oil being stored under anomalous conditions could produce vapors, that when constrained to a certain volume under high pressure could cause the failure of the storage system. Chemical explosions may occur if H_2S is released in sufficient quantities.

Fire Prevention and Suppression

Fire prevention actions during operations will be directed towards Facility design to avoid conditions that could lead to a fire, and implementing appropriate practices to safely handle and work in the vicinity of flammable materials.

Fire suppression actions during operations will be directed towards integrating fire suppression systems into the design of the Facility, and developing and implementing a fire response plan.

The Facility will be designed and operated according to federal, state, and local standards for the prevention of fire and explosion hazards, including provisions for distances between tanks in the Facility and between the crude oil-handling facilities and adjacent buildings. Examples of other risk-based management approaches that can be implemented include:

- Implementing safety procedures for unloading of crude oil from rail cars and loading to vessels, including using fail-safe control valves and emergency shutdown equipment.
- Protecting against potential ignition sources and lightning by (1) proper grounding to avoid static electricity buildup and formal procedures for the use and maintenance of grounding connections; (2) using intrinsically safe electrical installations and non-sparking tools; and (3) implementing permit systems and formal procedures for conducting any hot work during maintenance activities, including proper tank cleaning and venting.
- Reducing emissions of VOCs and evaporative losses by:
- Conducting all unloading, conveyance, storage and loading operations using a closed system, where product is not exposed to the atmosphere;
- Using a double seal internal floating roof in each of the crude oil storage tanks to eliminate vapor space;
- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to a fire;
- Designing electrical equipment to WAC 296-24-95711 which addresses the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present.
- Installing a dock safety unit at the loading berth and a MVCU to minimize the risk of explosive conditions being created during the marine vessel loading operations;
- Requiring all personnel to wear Lower Explosive Limit (LEL) detectors to detect hydrocarbon concentrations that could lead to ignition conditions; requiring all personnel to wear H_2S detectors to detect H_2S concentrations that could be unsafe.
- Using environmentally friendly firefighting foam, such as Universal Gold Foam (National Foam, 1999)

Fire suppression equipment will be installed to allow control of fires should they occur. Fire suppression equipment and systems will be designed to NFPA and API requirements, the more stringent Factory Mutual Global insurance requirements, and state and local regulations, and will include automatic and engineered controls. Buildings will be fireproofed and emergency egress will be provided in accordance with applicable fire and building codes. All fire suppression systems will be designed to activate automatically and will be equipped with manual trip stations. The design of fire suppression systems for specific proposed project elements is discussed below.

Area 200 – Unloading and Office. The rail car unloading area will be served with single interlock pre-action 3 percent foam/water sprinkler systems designed to activate as necessary in five segments of the building. Design density will be 0.30 gallon per minute/4,000 square feet with a hose allowance of 500 gallons per minute. The system will include linear heat detectors, gas detectors, temperature monitors, pump monitors, automatic exterior alarm horns and strobes, manual alarm stations, automatic and manual foam release systems, and tamper-resistant systems. Fire hydrants will be located along the south side of the building at 300-foot intervals. All systems will interface with the rail car unloading building control room.

The office and support buildings will be equipped with extinguishers.

Area 300 – Storage. The storage tank area will be served by six foam water sprinkler zones, one per storage tank. Each foam water sprinkler zone will be designed to discharge into the inside of the storage tank it protects. The system will include linear heat detectors and warning horns and strobes, as well as manual alarm and foam release stations. A fire water loop will be provided with hydrants and monitors spaced at a maximum of 300 feet and configured so that each tank can be reached by two hose streams. Each tank will be protected by a fixed 3-percent foam/water suppression system on the seal area surface. All systems will interface with the tank area control room. The east boiler building in Area 300 will be served by adjacent hydrants. Smoke detectors, automatic and manual alarms, and hand held fire extinguishers, will be located as appropriate inside and outside the boiler building as required by local fire code. Based on the construction type and occupancy classification sprinkler systems are not necessary for fire control in the east boiler building.

Area 400 – Marine Terminal. Two elevated fire monitors will be installed at the marine loading dock, with hydrants connected to the existing on-site water supply. This system is primarily for fires on the berth, but can be used to assist in the event of a vessel fire.

The vessels berthing at the Marine Terminal are required to have on-board systems as well as contracts with commercial marine firefighting companies to respond in the event of a shipboard fire (see Appendix B.1).

Area 500 - Transfer Pipelines. The pipeline area will be served by existing and new (as constructed to serve specific Facility areas) hydrants in the vicinity of the pipeline alignment.

Area 600 – West Boiler. The boiler building and area will be served by adjacent hydrants. Smoke detectors, automatic and manual alarms, and hand held fire extinguishers, will be located as appropriate inside and outside the boiler building as required by local fire code. Based on the construction type and occupancy classification sprinkler systems are not necessary for fire control in the Area 600 boiler building.

Rail Infrastructure. The location of rail infrastructure improvements will be served by existing and new (as constructed to serve specific Facility areas) hydrants in the vicinity of the rail loop alignment.

The Applicant will consult with the Port, City fire officials, and public fire and emergency responders to develop an Operations Fire Prevention and Control program coordinated with existing local response capabilities. The Applicant will consult with local responders to identify gaps in existing firefighting equipment, and will provide training opportunities at the nationally recognized Tesoro firefighting school at Texas A&M University. These measures will be documented in the Operations Site Safety Plan or other plans related to Facility operations as appropriate to the activity being addressed (e.g., the inadvertent release or contingency plans associated with Marine Terminal loading activities, as required to comply with applicable state and federal regulations). The fire prevention plan will be developed in compliance with WAC 296-24-567, and will address the following requirements:

- The fire prevention plan will be in writing.
- The fire prevention plan will include:
  - A list of the major workplace fire hazards and their proper handling and storage procedures, potential ignition sources (such as welding, smoking and others) and their

control procedures, and the type of fire protection equipment or systems which can control a fire involving them;
  - Names or regular job titles of those personnel responsible for maintenance of equipment and systems installed to prevent or control ignitions or fires; and
  - Names or regular job titles of those personnel responsible for control of fuel source hazards.
  - Accumulations of flammable and combustible waste materials and residues will be controlled so that they do not contribute to a fire emergency. The housekeeping procedures will be included in the written fire prevention plan.
- Training will include:
  - Informing employees of the fire hazards of the materials and processes to which they are exposed.
  - Reviewing with each employee upon initial assignment those parts of the fire prevention plan which the employee must know to protect the employee in the event of an emergency.
- Keeping the written plan in the workplace and making it available for employee review.
- Regularly and properly maintaining, according to established procedures, equipment and systems installed on heat producing equipment to prevent accidental ignition of combustible materials. The maintenance procedures will be included in the written fire prevention plan.

Explosion Prevention

As noted above, two sources of explosions could potentially occur at the Facility – mechanical explosions due to overpressure conditions, and explosions due to the release of H2S. In addition to the fire prevention and suppression elements listed above, Facility design and operating procedures will include, but not be limited to, the following explosion prevention elements:

- The storage tanks will be operated at atmospheric pressure, and will be equipped with internal pressure relief devices to vent gases should an overpressure situation arise;
- Internal pressure relieving systems will be incorporated throughout the Facility, including the transfer pipelines, marine terminal loading equipment, and rail cars;
- Installing pressure, flow and temperature sensors to ensure all storage and conveyance activities are conducted within appropriate parameters, and to quickly identify any abnormal situations that could potentially lead to an explosion;
- Including expansion loops in the design of the transfer pipelines to ensure the pipelines can expand and contract to accommodate changes in ambient temperature;
- Equipping personnel with H_2S detectors which will trigger alarms at levels well below the explosive concentrations of H_2S gases emitted.

4.1.2.3 Stand-by and Non-use

The Applicant anticipates that the Facility will operate continuously. However should there be a period during which the Facility is not operating at full capacity and some portion of the Facility is not in use, the Applicant will ensure that the temporarily shut down equipment is maintained in a fashion to prevent conditions that could result in a fire, consistent with the measures described above. Regardless, all fire detection and suppression systems would continue to be operated and maintained as though the entire Facility was in operation.

4.1.2.4 Dismantling and Restoration

Decommissioning of the Facility is discussed in section 2.3.7. The Applicant anticipates that fire and explosion prevention measures similar to those implemented during construction would be implemented during decommissioning and site restoration. Prior to beginning decommissioning the Applicant will submit a detailed facility decommissioning plan, and such plan would address fire and explosion prevention measures.

4.1.3 Releases or Potential Releases to the Environment Affecting Public Health

This section addresses the treatment or disposition of all solid or semisolid construction and operation wastes including spent fuel, ash, sludge, and bottoms, and show compliance with applicable state and local solid waste and how these wastes will be handled in compliance with applicable state and local regulations. The Facility is being proposed at a location where industrial and solid wastes from the construction and operation of a former aluminum smelter were stored in waste piles and consolidated in landfills on site over the years; an overview of the restrictive covenants in place at this location is therefore also provided.

4.1.3.1 Site History

Terminal 5 is the former location of the Alcoa/Evergreen Aluminum smelter, which operated until 2000. Industrial and solid wastes from the construction and operation of the aluminum smelter were stored in waste piles and consolidated in landfills onsite over the years. Hazardous contaminants in these wastes include petroleum hydrocarbons, polychlorinated biphenyls (PCBs), cyanide, fluoride, trichloroethylene (TCE), low-level organic chemicals, and metals. Prior to the Port's purchase of the properties in 2009, Alcoa and Evergreen completed site remediation and facility decommissioning under Consent Decree No. 09-2-00247-2 and Enforcement Order 4931 with Ecology. Efforts included removing structures and foundations to a depth of approximately 4 feet and the site soil and sediment with concentrations of chemicals of concern above the cleanup levels established by the consent decree.

Five locations within the boundary of the proposed Facility are subject to the Ecology consent decree and the environmental restrictive covenants discussed below. Portions of the Facility, including the rail unloading building and additional rail lines, may be located in these areas.

Consent Decree No. 09-2-00247-2

Consent Decree No. 09-2-00247-2 for the Alcoa Inc. site was entered into on January 30, 2009, and an amended Consent Decree on July 2011. It included the areas of the site that are listed below.

- **Vanexco/Rod Mill Site –** The 1995 consent decree (95-2-03268-4) for the Vanexco/Rod Mill building called for the building foundation (floor slabs) and building roof to serve as a cap to address PCB contamination beneath the building. Ecology approved an amendment in the 2009 consent decree (superseding the 1995 consent decree) to allow the removal of the building, providing that surface materials placed above the foundation are sloped to provide drainage away from the area. The site is located in Area 200 and is the location of the administrative and support buildings and the rail unloading building that are included in the proposed project.
- **Spent Pot Liner (SPL) Storage Area –** The 1992 consent decree (92-2-00783-9) for the SPL storage area called for covering it with either a polyvinyl chloride (PVC) or high density

polyethylene (HDPE) membrane or a 2-foot-thick clay cover with a hydraulic conductivity of no more than 1x10 6 cm/sec. The 1992 consent decree further required that the SPL cap be maintained. The 1992 consent decree was dismissed on January 30, 2009 and no longer has effect; however, the operation and maintenance activities, including institutional controls and cover maintenance, originally contained in the 1992 consent decree are now contained in the 2009 consent decree and continue to apply to the site.

- Consent decree 09-2-00247-2 (discussed in additional detail below) also notes Ecology's certification that all the terms of the construction portion of the 1992 consent decree had been completed on May 3, 1992. Prior to 2009, the SPL area was covered with an HDPE liner to meet this consent decree requirement.
- In April 2010, with Ecology approval, as part of its WVFA project, the Port placed an asphalt cap over the HDPE liner that had previously covered the area of contaminated soil. The cap consisted of a layer of asphalt overlain by an asphalt-impregnated geotextile (a combination of non-woven polypropylene fabric and asphalt cement tack coat) and geomembrane overlain by a second layer of asphalt. The fabric and tack coat combination form an asphalt membrane interlayer within the pavement section. This cap remains in complete form today.
- **North/North 2 Cap –** On March 26, 2009, former landowner Alcoa Inc. entered into an environmental restrictive covenant in favor of Ecology pursuant to its consent decree with Ecology effective January 30, 2009 restricting activity in the North and North 2 (NN2) landfills. This restrictive covenant was necessary because of the residual concentration of contaminants on the properties that exceeded cleanup levels for soil and/or groundwater established in the MTCA under WAC 173-340-720 and 740. These are presently covered by a 1-foot layer of clean sand. Per the restrictive covenant, these materials may be reused on site with Ecology's permission.
- **Shoreline Restrictive Covenant –** On March 26, 2009, Alcoa Inc., the former landowner, entered into an environmental restrictive covenant in favor of Ecology pursuant to its consent decree with Ecology effective January 30, 2009 restricting activity in the shoreline area. This restrictive covenant was necessary because of the residual concentration of contaminants on the properties that exceeded cleanup levels for soil established in the MTCA under WAC 173-340-720 and 740.
- **Ingot Plant Cap –** On December 31, 2008, former landowner Evergreen Aluminum LLC entered into a restrictive covenant with Ecology restricting activity in the ingot plant cap area. The covenant was necessary because the residual concentration of PCBs exceeds unrestricted use levels under WAC 173-340-740. A 1-foot layer of soil constitutes the cap.

Environmental Restrictive Covenant

The environmental restrictive covenant entered pursuant to Consent Decree No. 09-2-00247-2 established multiple conditions for the development of the site and addresses the East Landfill, SPL storage area, shoreline area, and the North/NN2 landfills. The sections are summarized below.

- **Section1** requires that the site be used solely for industrial purposes (per RCW 70.105D.020[23]) and allowed under City of Vancouver zoning regulations (VMC Title 20). The reference to the RCW is outdated and the current definition of Industrial Properties is located at RCW 70.105D.020(14); it reads as follows:

  'Industrial properties' means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or

manufacturing of materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials, that are either:

(a) Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW; or

(b) For counties not planning under chapter 36.70A RCW and the cities within them, zoned for industrial use and adjacent to properties currently used or designated for industrial purposes.

The Facility consists of a marine terminal and is consistent with the definition from RCW 70.105D.020(14). As noted in section 2.23, the area of the project is zoned Heavy Industrial and the Facility is an allowed use in the zoning district.

- **Section 2** requires that any activity that may result in release or exposure to the environment of the contaminated soil within the restricted areas (noted above) or create new exposure pathway is prohibited without approval from Ecology. Examples of activity that require Ecology approval include drilling, digging, placement of objects, or the use of any equipment that deforms or stresses the surface beyond its load-bearing capacity as well as piercing the surface with a rod, spike, or similar item or bulldozing or earthwork. Activities similar to these will be performed in each of the restricted areas noted above and, pursuant to the covenant, will require approval from Ecology. It is anticipated that this approval will be considered as part of the site certification agreement through EFSEC.
- **Section 3** prohibits the use of groundwater for consumption or other beneficial purposes but allows construction dewatering. A waste determination is required for any water that is extracted during dewatering activities and water must be handled, stored, and managed according to applicable laws and regulations. Wells or groundwater extraction are specifically prohibited in the vicinity of the East Landfill. As noted in Section 2.6, water for domestic, industrial, and fire protection uses will come from existing municipal sources and no groundwater extraction is proposed for beneficial purposes. Excavations for utilities or building foundations may encounter groundwater and dewatering may be necessary.
- **Section 4** specifically prohibits activity on the property that may interfere with the integrity of the remedial action and the continued protection of the human health and the environment.
- **Section 5** requires Ecology approval for activities that may result in the release, exposure of, or creation of a new exposure pathway for hazardous substances that remain on the property
- **Section 6** requires written notification to Ecology for any proposed conveyance of title, easement, lease, or other interest in the property.
- **Section 7** requires the owner to restrict the use of the property and notify lessees of the restrictive covenant.
- **Section 8** requires Ecology approval for uses that may be inconsistent with the covenant.
- **Section 9** allows Ecology to enter the property and inspect records.
- **Section 10** defines a process to eliminate the covenant.

Environmental Restrictive Covenant (Enforcement Order No. 4931)

The environmental restrictive covenant entered into on December 31, 2008 for Evergreen established multiple conditions for the development of the former Evergreen site and addresses the ingot plant cap area. The sections are summarized below.

- **Section 1** requires that the site be used solely for industrial purposes (per RCW 70.105D.020[14]) as allowed under the Clark County Unified Development Code and that the existing cap may not be altered, modified, or removed without prior written approval from Ecology. It also states that any activity, that may result in release or exposure to the environment of the contaminated soil within the restricted areas or that creates a new exposure pathway, is prohibited without prior written approval from Ecology. Examples of activity that require Ecology approval include drilling, digging, placement of objects, or use of any equipment which deforms or stresses the surface beyond its load bearing capacity as well as piercing the surface with a rod, spike or similar item or bulldozing or earthwork.
- **Section 2** specifically prohibits activity on the property that may interfere with the integrity of the remedial action and continued protection of the human health and the environment.
- **Section 3** prohibits activity that may result in the release or exposure to the environment of a hazardous substance remaining on the Ingot Plant Capped Area as part of the Remedial Action or create a new exposure pathway is prohibited without prior written approval from Ecology.
- **Section 4** requires written notification to Ecology for any proposed conveyance of title, easement, lease or other interest in the property.
- **Section 5** requires the owner to restrict use of the property and notify lessees of the restrictive covenant.
- **Section 6** requires Ecology approval for uses that may be inconsistent with the covenant.
- **Section 7** allows Ecology to enter the property and inspect records.
- **Section 8** defines a process to eliminate the covenant.

4.1.3.2 Construction

Releases to the environment affecting public health are not anticipated during construction due to the limited types and relatively small quantities of hazardous materials that will be used during construction. Measures to prevent and contain any inadvertent release of hazardous materials will be provided as described in section 2.10 Spill Prevention and Control.

During construction of the Facility, solid construction debris, such as scrap metal, cable, wire, wood pallets, plastic packaging materials, and cardboard, will be removed by licensed disposal operators and disposed at local landfills licensed to accept such waste. Should any hazardous waste be generated, it will be collected, handled, stored and disposed of in accordance with applicable federal, state, and local regulations.

As noted in section 4.1.3.1, areas of the site and/or adjacent to the site are restricted for use because of the presence of subsurface soil and/or groundwater contamination from previous historic uses. Disturbance of those areas will be avoided to the extent practical. However, construction is necessary in each of the restricted areas. Construction will comply with the site-specific restrictive covenants, consent decrees, and MTCA and Dangerous Waste Regulations.

- **Vanexco/Rod Mill –** Contaminants in this area consist of PCB-impacted soils (Anchor 2008), Monitoring indicated that groundwater is not affected by the PCB-impacted soils (Consent Decree No. 09-2-00247-2). The building foundations and floor slabs were left in place to form a cap over the contaminated soils as required by the consent decree (95-2-03268-4) and surface materials above the foundation are sloped to provide drainage away from the area or that the foundation is replaced with an impervious layer and stormwater control facilities are located above the layer.

The Facility includes the construction of parking facilities and a portion of the rail unloading area within the Vanexco/Rod Mill restricted covenant area (see Figure 2.3-5). The parking facilities will not require deep excavations that penetrate the cap and will serve as an additional impervious layer to prevent precipitation from reaching the PCB-contaminated soils. Approximately 250 lineal feet of the northern edge of the rail unloading area is located above the cap. The building will require excavation for concrete foundations or driving piles within the cap area. The cap materials and excavated materials from beneath the cap will be segregated, characterized, and properly disposed of based on the characterization. Any material exceeding Ecology soil cleanup levels for unrestricted use (that cannot be used on site) must be disposed of at a Subtitle D landfill in accordance with WAC 173-350. After construction of the foundation or pile driving, the cap will be restored with appropriate materials to form an impervious surface and restore the integrity of the cap.

- **Spent Pot Liner (SPL) Storage Area –** Contaminants in this area consist of residual affected soils containing cyanide and fluoride beneath a cap (Anchor 2008). The cap consists of a layer of asphalt overlain by an asphalt-impregnated geotextile (a combination of non-woven polypropylene fabric and asphalt cement tack coat) and geomembrane overlain by a second layer of asphalt. The fabric and tack coat combination form an asphalt membrane interlayer within the pavement section.
  The Facility will construct two additional rail loops within the SPL Storage Area. However, no excavation into the caps or the contaminated materials they cover will be necessary for the construction and no approval is required from Ecology.
- **North/NN2 Cap –** The North/NN2 cap covers former landfill areas that were remediated by disposing of materials off site and in the East Landfill and the resulting excavation was used to dispose of PCB-contaminated dredge materials from the cleanup of shoreline areas on the site. These materials are presently covered by a 1-foot layer of clean sand. Per the restrictive covenant, these materials may be reused on site with Ecology's permission.
  The Facility will construct two additional rail loops within the North/NN2 cap. However, no excavation into the caps or the contaminated materials they cover will be necessary for construction and no approval is required from Ecology.
- **Shoreline Restrictive Covenant Area** – The shoreline restrictive covenant area was remediated by removing soil and materials. Residual levels of contamination may remain and there is no cap or other surface material specifically placed in the area (Anchor 2009).
  The Facility will construct two additional rail loops within the area. Work will include manhole relocations that require excavation up to 20 feet below ground surface. These will be installed by cutting a trench, installing the manhole and pipe, and backfilling with soil and compacting. Utility relocations will be installed by cutting a trench, placing the conduits, and backfilling with soil and compacting. Excavation and grading on the north side of the shoreline berm will take place to allow the removal and relocation of the Terminal 5 access driveway and loop tracks. This construction will require approval from Ecology under the covenant.
- **Ingot Plant Cap –** The ingot plant cap covers residual affected soils containing PCBs. The cap consists of a 1-foot layer of clean soil.

The Facility will construct two additional rail loops within the ingot plant cap. However, no excavation into the cap or the contaminated materials it covers will be necessary for the construction and no approval is required from Ecology.

The following construction methods are anticipated based on construction within the restrictive covenant areas:

- Measures to prevent releases will be included in a contaminated media management plan and construction specifications. For all work, the contractor will be required to follow a work plan, a health and safety plan, a stockpiling plan, and a decontamination plan.
- Areas that are disturbed or removed as part of final construction will be covered with at least 1 foot of clean soil fill to prevent a future direct contact hazard. Where asphalt (road) is laid, it will substitute for 1 foot of clean fill to prevent a future direction contact hazard.
- Soils that are excavated will either be:
  - Direct loaded or stockpiled, sampled and analyzed for polynuclear aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons, and disposed of off site, or
  - Reused on site in accordance with applicable regulations.
- Standard dust control measures such as spraying exposed soil surfaces with water will be employed during construction to prevent the release of airborne particulates.
- Equipment employed in the shoreline restrictive covenant area will be decontaminated at a location to be specified in the contractor's decontamination plan.

Excavation in other areas of the site is not expected to encounter soils with contaminant concentrations greater than industrial cleanup levels and can be reused on site. Excess excavated soils that will not be used onsite will be direct loaded or stockpiled, sampled and analyzed for PAHs and total petroleum hydrocarbons, and disposed of offsite in an appropriate location based on the results of the analysis.

At Terminal 5, groundwater has been shown to be contaminated throughout the site (Ecology 2008). Dewatering may be necessary during excavations for building foundations, utilities, and pipelines. Groundwater that is pumped out of the excavations will be stored, characterized, and treated in accordance with state and federal regulations prior to disposal. The water may be treated onsite and disposed of via the City's sanitary sewer system (if appropriate), or removed by a licensed commercial waste disposal facility for off-site treatment and disposal. If not exceeding state water quality levels, dewatering water will be managed in accordance with Construction Stormwater General Permit requirements.

4.1.3.3 Operations

Wastes Resulting from Normal Operations

The following solid waste streams are anticipated to be generated during normal operation of the facility:

- Oily and non-oily waste and rags resulting from cleaning of facility components;
- Oily sludge recovered from the bottom of the storage tanks when these are cleaned on a 10-year interval according to API standards;
- Domestic garbage and packing materials (cardboard, paper, plastic).

There are no wastes generated as a by-product from handling of crude oil at the Facility. The Applicant will identify the appropriate designation of the wastes produced, and if they designate as hazardous waste, they will be collected, handled, stored and disposed of in accordance with applicable federal, state, and local regulations. Solid wastes (i.e. non-hazardous) will be collected and recycled or disposed of at a licensed waste handling facility.

Wastes Resulting from Handling of Inadvertent Releases

Section 2.10 and Appendices B.2 and C describe the comprehensive spill prevention activities the Applicant will implement at the Facility during the operational phase. However, should an inadvertent release occur, the Applicant will be responsible for spill control and collection, and disposal of the resulting wastes.

Prior to beginning operations, as part of its SPCCP and Spill Contingency Plan, the Applicant will identify a process for dealing with wastes resulting from cleaning up inadvertent releases. This process will address the types of waste materials likely to be collected, the means for their characterization to determine if they are designated as solid waste or dangerous waste, and potential methods of disposal based on the waste type and its designation. Designation procedures and waste management requirements are contained in Dangerous Waste Regulations (Chapter 173-303 WAC). The Dangerous Waste Regulations also apply to other wastes and are more stringent than Federal Hazardous Waste Regulations (40 CFR, Parts 261 to 279).

Based on the types of waste identified, the Applicant will consult with spill contractors, chemical testing laboratories, and Ecology for advice on designating wastes as dangerous or solid. Testing of actual waste during a spill response activity may be required to determine whether such mixtures are designated as dangerous waste. If recovered, oily liquids and other materials contaminated by oil not designated as dangerous waste, will be classified as solid waste and subject to RCW 70.95. For example, recovered oily liquids and other materials contaminated by oil that are not designated as dangerous waste may be recycled, burned, or blended for fuel. Recovered oily liquids may be managed as “off specification fuels” under the exemption in the dangerous waste rules, as long as it is used as fuel. Recovered oily liquids and other materials contaminated by oil that cannot be recycled, burned, or blended for fuel are considered solid waste and subject to designation.

Oily waste may be designated as dangerous waste (dangerous waste or extremely hazardous waste) depending on characteristics, such as ignitability, corrosivity, reactivity, toxicity, and persistence.

Wastes may be designated as dangerous waste because they are:

- Listed (appear on lists for discarded chemical products or from specified industrial processes) or characterized as “dangerous waste” in the absence of knowledge of waste origination.
- Ignitable (flash point <140 degrees F);
- Corrosive (pH £ 2.0 or ³ 12.5) ;
- Reactive (explosive, self-igniting, reactive with water);
- Toxic (specific standards and test methods apply, i.e. Toxicity Characteristic Leaching Procedure (TCLP) and DW bioassay; and
- Persistent (specific standards and test methods apply).
- If a waste is classified as a dangerous waste, the Applicant will ensure safe management procedures to collect, handle, and dispose of the waste, including, but not limited to:

- the waste is placed in proper tanks or stored in closed compatible drums,
- has appropriate labels and markings,
- is transported by authorized haulers,
- is shipped using a Hazardous Waste Manifest,
- is delivered to an authorized recycler or permitted treatment, storage or disposal facility

4.1.4 Safety Standards Compliance

The implementation of a safety program for the facility will be based on compliance with state and federal regulations, as well as the implementation of industry standards. The following discussion identifies the primary safety regulations applicable to the activities conducted at the facility, and provides an overview of the numerous industry standards that the Applicant will implement in the design, construction and operation of the facility.

4.1.4.1 Washington State Safety and Health Standards

The U.S. Congress created the Occupational Safety and Health Administration (OSHA) in 1971 to develop and enforce workplace safety and health rules throughout the country. States may choose to enact and implement their own safety and health programs as long as they are at least as effective as OSHA. In 1973, the Washington State Legislature passed the Washington Industrial Safety and Health Act or WISHA (RCW 49.17), wherein the state chose to develop its own workplace safety and health program, which is implemented through WAC 296. In Washington, OSHA continues to cover workplaces with federal employees, nonfederal employees working on federal reservations and military bases, employees working on floating worksites (floating dry docks, fishing boats, construction barges), and employees working for tribal employers on tribal lands. The Facility will not have any such workplaces and is therefore entirely subject to WISHA.

The Facility will include multiple elements that will be subject to a host of health and safety standards. The following discussion identifies the most likely applicable chapters of WAC 296 and specific sections within them that address particular activities unique to the facility, such as rail operations, handling of crude oil, and longshore, stevedore, and waterfront-related operations. However, the Applicant recognizes that other standards will also apply, and intends to work with agencies during project review to refine and ensure compliance will all potentially applicable regulatory requirements. Many of the requirements of WAC 296 that apply to the Facility will overlap, with the more stringent requirements of a section prevailing over another. In developing the safety program for the construction, operation and decommissioning phases of the Facility the Applicant will review the entirety of WAC 296 and determine the scope of applicability of each chapter to the activities that are proposed to occur at the Facility.

WAC 296-24, General Safety and Health Standards

These regulations establish standards for the design and operation of specific equipment that may be installed and operated at the Facility, including the handling of rolling railroad cars and design standards for electrical systems.

- WAC 296-24-21501: Use of Mechanical Equipment
- WAC 296-24-21509: Clearance limits
- WAC 296-24-21511: Rolling railroad cars requirements; Under normal operating conditions, the unit trains will be moved by locomotive, which is exempted under this regulation;

However, the regulation requires the employment of a clearly audible warning system when cars are being moved by car pullers or locomotives, and when the person responsible for the moving does not have assurance that the area is clear and that it is safe to move the car or cars

- WAC 296-24-21513: Guarding requirements
- WAC 296-24-235 through 296-24-23533: Overhead and gantry cranes requirements.
- WAC 296-24-237: Construction, operation, and maintenance standards for chain and electric hoists
- WAC 296-24-238: Air hoists requirements
- WAC 296-24-240 through 296-24-24019: Crawler cranes, locomotive cranes, wheel mounted cranes or other variations used for construction or operation
- WAC 296-24-245 through 296-24-24519: These regulations apply "to guy, stiffleg, basket, breast, gin pole, Chicago boom and A-frame derricks of the stationary type, capable of handling loads at variable reaches and powered by hoists through systems of rope reeving, used to perform lifting hook work, single or multiple line bucket work, grab, grapple, and magnet work."
- WAC 296-24-294 through 296-24-29431: These regulations apply if rigging is used in the construction or operation of the project
- WAC 296-24-295 through 296-24-295-29505: Compressed gases general requirements
- WAC 296-24-33013: This section provides the standards for a bulk plant, which is defined as "that portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, or container, including tank storage requirements under WAC 296-24-33005 and piping, valves, and fitting requirements under WAC 296-24-33007."
- WAC 296-24-56525: Automatic sprinkler system requirements
- WAC 296-24-56527: Fire alarm signaling systems
- WAC 296-24-567 and WAC 296-24-56701: Employee emergency plans and fire prevention plans, as required by particular WISHA standards
- WAC 296-24-592 through 296-24-62911: These regulations govern the standards for fire suppression equipment depending on what type is used
- WAC 296-24-73501 through 296-24-73511: Requirements for walking-working surfaces
- WAC 296-24-75003 through 296-24-75011: Requirements for guarding floor and wall openings and holes
- WAC 296-24-76503 through 296-24-76555: Requirements for fixed industrial stairs
- WAC 296-24-85501: Requirements for dockboards
- WAC 296-24-92002 through 296-24-92011: Inspection requirements of compressed gas cylinders
- WAC 296-93003: General requirements for safety release devices for compressed gas cylinders
- WAC 296-24-93503: General requirements for safety relief devices for cargo and portable tanks storing compressed gas cylinders
- WAC 296-24-95701 through 296-24-95713: Design safety standards for electrical systems, especially WAC 296-24-95711 which covers the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors,

liquids, gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present
- WAC 296-24-960 through 296-24-985: Electrical safety-related work practices.

WAC 296-56, Safety Standards -- Longshore, Stevedore and Waterfront-Related Operations

This chapter sets out the specific safety standards for the waterfront-related operations at the facility. The following list is a summary of provisions anticipated to apply to the waterfront activities conducted at the facility:

- WAC 296-56-60006: Personnel requirements
- WAC 296-56-60007: Housekeeping requirements
- WAC 296-56-60009: Accident prevention program
- WAC 296-56-60010: Emergency action plans
- WAC 296-56-60011 through 296-56-60047: Waterfront operations requirements
- WAC 296-56-60049 through 296-56-60053: Requirements for hazardous cargo, hazardous materials, and hazardous atmospheres and substances. It is necessary to first determine whether crude oil is a hazardous cargo, material, substance, or atmosphere which is defined in WAC 56-60005
- WAC 296-56-60071 through 296-56-60099: Cargo handling gear and equipment requirements
- WAC 296-56-60109 through 296-56-60133: Personal protection requirements
- WAC 296-56-60209: Requirements for fixed ladders
- WAC 296-56-60211: Requirements for portable ladders
- WAC 296-56-60213: Requirements for Jacob's ladders
- WAC 296-56-60215: Requirements for fixed stairways
- WAC 296-56-60217: Requirements for spiral stairways
- WAC 296-56-60219: Requirements for employee exits
- WAC 296-56-60221: Illumination requirements
- WAC 296-56-60223: Requirement for passage between levels and across openings
- WAC 296-56-60225: Requirements for guarding temporary hazards
- WAC 296-56-60229: Sanitation requirements
- WAC 296-56-60231: Signs and marking requirements
- WAC 296-56-60233: Machine guarding requirements for related terminal operations and equipment
- WAC 296-56-60235: Welding, cutting and heating (hot work) requirements
- WAC 296-56-60237: Requirements for spray painting connected with maintenance of structures, equipment, and gear at the marine terminal and of transient equipment serviced at the terminal. It does not apply “to overall painting of terminal structures under construction, major repair or rebuilding of terminal structures, or portable spraying apparatus not used regularly in the same location.”
- WAC 296-56-60239: Requirements for working with compressed air
- WAC 296-56-60241: Requirements for compressed air receivers and equipment used for operations such as cleaning, drilling, hoisting, and chipping. It does not apply to equipment used to convey materials or in transportation applications such as railways, vehicles, or cranes

- WAC 296-56-60243: Fuel handling and storage requirements
- WAC 296-56-60245: Battery charging and changing requirements
- WAC 296-56-60247: Prohibited operations
- WAC 296-56-60249: Petroleum dock requirements

WAC 296-62, Occupational Health Standards

This chapter provides the general occupational health standards related to the handling of toxic and hazardous substances, if such standards are present during construction or operation of the Facility:

- WAC 296-62-055 through 296-62-05520: Requirement to retain Department of Transportation Labeling
- WAC 296-62-060: Control requirements for hazardous conditions in addition to those specified in this chapter
- Parts F through L: Specific control requirements for certain toxic and hazardous substances

WAC 296-155, Safety Standards for Construction Work

This chapter provides the safety standards for construction of the Facility and addresses:

- General safety and health provisions
- Occupational health and environmental control and hazard communication
- Personal protective and life-saving equipment, and fall protection requirements for construction
- Fire protection and prevention
- Signaling and flaggers
- Storage, use, and disposal
- Rigging requirements for material handling
- Tools—hand and power
- Welding and cutting
- Electrical
- Stairways and scaffolds
- Cranes, rigging, and personnel lifting
- Motor vehicles, mechanized equipment, and marine operations
- Excavation, trenching, and shoring
- Concrete, concrete forms, shoring, and masonry construction
- Steel erection
- Underground construction
- Miscellaneous construction requirements
- Demolition
- Power distribution and transmission lines
- Rollover protective structures and overhead protection

WAC 296-800, Safety and Health Core Rules

This chapter is applicable to the non-waterfront-related operations, and regulates:

- WAC 296-800-110 through 296-800-11045: Employer responsibilities for a safe workplace
- WAC 296-800-120 through 296-800-12005: Employee responsibilities

- WAC 296-800-130 through 296-800-13025: Safety Committees and Safety Meetings
- WAC 296-800-140 through 296-800-14025: Accident prevention program
- WAC 296-800-150 through 296-800-15040: First aid summary
- WAC 296-800-160 through 296-800-16070: Personal protective equipment
- WAC 296-800-170 through 296-800-18020: Chemical hazard communication and material safety data sheets
- WAC 296-800-190 through 296-800-19005: Safety bulletin board
- WAC 296-800-200 through 296-800-20005: WISHA poster requirement
- WAC 296-800-210 through 296-800-21005: Lighting requirements
- WAC 296-800-22005 through 296-800-22022: Housekeeping requirements
- WAC 296-800-22025 through 296-800-22030: Drainage requirements
- WAC 296-800-22035 through 296-800-22040: Storage area requirements
- WAC 296-800-230 through 296-800-23075: Sanitation and hygiene facilities and procedures
- WAC 296-800-240 through 296-800-24005: Environmental tobacco smoke in the office
- WAC 296-800-250 through 296-800-25015: Stairs and stair railings
- WAC 296-800-260 through 296-800-26010: Floor openings, floor holes, and open-sided floors
- WAC 296-800-270 through 296-800-27020: Workplace structural integrity
- WAC 296-800-280 through 296-800-28045: Basic electrical rules
- WAC 296-800-300 through 296-800-30025: Portable fire extinguishers
- WAC 296-800-310 through 296-800-31080: Exit routes and employee alarm systems
- WAC 296-800-320 through 296-800-32025: Accident reporting and investigating

WAC 296-817, Hearing loss prevention (noise)
This chapter addresses requirements applicable for hearing loss prevention in the workplace.

WAC 296-841, Airborne Contaminants
This chapter is applicable when employees are, or could be, exposed to an airborne hazard. WAC 296-841-100 lists examples of airborne contaminants that may become airborne hazards in some workplaces, including the chemicals listed in Table 3 of WAC 296-841-20025. Emissions of hydrogen sulfide (H_2S) are a hazard associated with activities involving the handling of crude oil. H_2S is a colorless gas with a rotten egg odor, but odorless at poisonous concentrations. H_2S deadens the sense of smell so that odor cannot be relied upon to warn of the continuous presence of this gas. It is also heavier than air and will tend to accumulate at the bottom of poorly ventilated spaces. Facility employees working in areas where they can be exposed to H_2S will be required to wear personal H_2S detectors, which will alert them of poetically dangerous concentrations of the gas, and allow them to evacuate problem areas. Fixed H_2S sensors will also be located in enclosed spaces, setting off evacuation alarms should safety threshold concentrations be reached in the ambient air, in the unloading buildings for example.

- WAC 296-841-20003: Employee protective measures
- WAC 296-841-20005: Requirements for exposure evaluations
- WAC 296-841-20010: Exposure controls
- WAC 296-841-20015: Respirators
- WAC 296-841-20020: Notification requirements
- WAC 296-841-20025: Permissible exposure limits

WAC 296-824, Emergency Response
This chapter is applicable if employees are, or could become, involved in responding to inadvertent releases of hazardous substances in a workplace or any other location. For example, the requirements of this chapter would apply in the event of an inadvertent release of crude oil. The chapter addresses:

- WAC 296-824-200 through 296-824-20005: Requirement for employers to anticipate and plan for emergency response operations by developing an emergency response plan
- WAC 296-824-30005: Training for employees
- WAC 296-824-400 through 296-824-40010: Medical surveillance requirements
- WAC 296-824-500 through 296-824-50030: Incident requirements
- WAC 296-824-600 through 296-824-60015: Personal protective equipment requirements
- WAC 296-824-700 through 296-824-70005: Post-emergency response requirements

WAC 296-860, Railroad clearances and walkways in private rail yards and plants
This chapter applies to all railroad clearances and walkways in rail yards and plants, including logging railroad yards, such as mill yards, maintenance yards, and sorting yards.

In addition, the Applicant commits to having every train attended upon taking control of the unit train from BNSF until the time control is released back to BNSF when the train leaves the Facility.

WAC 296-901, Globally harmonized system for hazard communication
This chapter requires all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, safety data sheets, and information and training. It applies to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

4.1.4.2 U.S. Coast Guard (USCG) 33 CFR Part 154 Subpart E – Vapor Control Systems

During ship loading, crude oil is conveyed from the transfer pipeline through high velocity loading hoses into the cargo tank of the vessel. During this loading, vapors inside the vessel tanks are displaced. Vapors displaced from vessels, ships or barges as they are filled with crude oil will consist primarily of hydrocarbons. These vapors are conditioned, as needed, with natural gas to ensure a safe concentration in excess of the upper flammable limit. All vapors, including any conditioning gases, will be collected and routed to the MVCU for safe disposal.

Subpart E, regulates the manner in which these vapors are collected, conditioned, and then disposed of to ensure the safety of the loading operation at all times.

The regulations address the following topics:

- vapor line connection
- facility requirement for vessel liquid overfull protection
- vessel pressure protection
- cargo vapor conditioning
- protection from fire
- explosion and detonation

- equipment requirements for flame and detonation arrestors
- vapor compressors, vapor blowers and vapor recovery and destruction units
- personnel training and operational requirements

The regulations require that a "certifying entity" review the plans and calculations for the MVCU, and conduct inspections and witness tests that demonstrate the facility conforms to the certified plans and specifications, meets the requirement of the applicable regulations and operates properly. Prior to beginning operations, and based upon the inspection and testing, the facility must receive a letter of adequacy from the USCG Captain of the Port (COPT) with jurisdiction over the geographical location where the facility is located.

The facility will incorporate a dock safety unit and MVCUs as described in section 2.3, in compliance with 33 CFR 154 Part E. The Applicant will seek the necessary review and approval of the dock safety unit and MVCU from the USCG prior to beginning operations of the marine vessel loading components of the Facility.

4.1.4.3 Representative Industry Codes and Standards

Numerous industry codes and standards apply to the design, construction and operation of the facility and its specific elements. The Applicant will incorporate the requirements of these codes and standards as applicable, including but not limited to the codes of the following associations:

- ACI - American Concrete Institute
- AISC - American Institute of Steel Construction
- ANSI - American National Standards Institute
- API - American Petroleum Institute
- AREMA - American Railway Engineering and Maintenance of Way Association
- ASCE - American Society of Civil Engineers
- ASME - American Society of Mechanical Engineers
- AWS - American Welding Society
- BNSF -Burlington Northern Santa Fe Railway Company
- BPVC - Boiler and Pressure Vessel Code of ASME
- FM - Factory Mutual
- FMEA - Factor Mutual Engineering Association
- IBC - International Building Code, 2012
- ICEA - Insulated Cable Engineers Association
- IEEE - Institute of Electrical and Electronic Engineers
- ISA - Instrument Society of America
- MSHA - Mine Safety and Health Administration
- NACE - National Association of Corrosion Engineers
- NEC - National Electric Code
- NEMA - National Electrical Manufacturer's Association
- NESC - National Electrical Safety Code
- NFPA - National Fire Protection Association
- NIST - National Institute of Standards and Technology
- SMACNA - Sheet Metal and Air Conditioning Contractors National Association

4.1.4.4 Methods of Compliance with Safety Standards

The Applicant will demonstrate compliance with all applicable safety standards as follows:

Project Design

The Applicant will cause the Facility to be designed in compliance with all applicable safety regulations and requirements, including applicable industry standards. Prior to beginning construction of the Facility the Applicant will submit a complete set of construction plans to EFSEC for approval. These construction plans will identify the safety regulations and industry standards that apply to the Facility, and as appropriate will specify which standards apply to specific element designs.

Project Construction

Through the construction management program described in section 2.16, the Applicant will ensure that the Facility has been constructed to the specifications of the construction drawings approved above. The Applicant will conduct pre-operational commissioning tests in accordance with industry standards and applicable regulations, including but not limited to the following:

- Hydrostatic testing of piping systems, transfer pipelines and storage tanks
- Testing and certification of the dock safety unit and MVCU in accordance with the provisions of 33 CFR 154 Subpart E
- Testing of fire and alarm systems in accordance with applicable fire and building safety codes

Project Operation

The Applicant will ensure that all safety systems inherent in the project design will be operated according to applicable industry standards and state and local regulations and codes. The Applicant will develop operations manuals to address appropriate measures for operation of facility safety systems and their ongoing maintenance. Facility systems will be tested according to industry standards and applicable state and federal regulations.

The Applicant will implement the usage of personal and facility sub area-wide Lower Explosive Limit (LEL) hydrocarbon detection systems and H_2S detection systems. Personal detection systems will notify individual employees when concentrations of hydrocarbons or H_2S exceed safe thresholds and they must evacuate their immediate work area. Similarly, sub-area-wide detectors will trigger evacuation alarms.

Safety Program

The Applicant will develop, implement and document a facility safety program to ensure compliance with state and federal requirements. The program will incorporate applicable industry design standards. Appendix D includes the Applicant's preliminary Health Safety Security and Environmental (HSSE) Execution Plan. This plan lays out a process through which the Applicant will develop and implement its facility safety program, and identifies the various safety processes and organizational and staff responsibilities, and the training that will occur as a result of the implementation of the program.

The program will include the preparation of construction and operations safety plans, which will be submitted to EFSEC prior to the beginning of facility construction and operations respectively. The plans will address the requirements of WAC 296, as described above, and the

requirements of 33 CFR 154 Part E, as well as any additional related requirements required under other applicable state and federal regulations and spill contingency planning processes described elsewhere in this Application.

4.1.5 Radiation Levels

Pursuant to WAC 463-60-115, the Applicant requests a waiver of the information required by WAC 463-30-352(5). The Facility will not handle, store or use or release any radioactive materials during operation.

The Applicant discloses that controlled use of testing equipment containing very minor amounts of radioactive materials will occur during construction of the Facility and may occur during maintenance activities associated with facility operation. This use occurs only in connection with standard testing equipment used to conduct radiographic testing of welds to ensure weld integrity.

4.1.6 Emergency Plans

4.1.6.1 Emergency Response Infrastructure

The Facility, located within an industrial zone at the Port of Vancouver, will be able to take advantage of the extensive emergency response infrastructure located in the Portland/Vancouver Metropolitan Area. Similar to the broad organization of spill response and contingency planning activities described in Appendix B.1, local, state, and federal agencies and industry cooperatives have established a framework for response for both upland and on-water emergencies.

The Vancouver Fire Department (VFD) responds to fires within the city limits, which includes most waterfront facilities. The Applicant will coordinate closely with the VFD and the Port to ensure the Applicant's emergency plans coordinate with both of these organization's needs with respect to both on-Facility-, and off-Facility-site events.

Vessels moored to piers at the Port of Vancouver are also provided fire by the VFD protection. In addition to the VFD, the Maritime Fire and Safety Association (MFSA), established in November 1983, has in place a system to ensure an adequate, timely, and well-coordinated response to shipboard fires over the entire 110-mile channel of the Lower Columbia River. MFSA established the Fire Protection Agency Advisory Council (F-PAAC) to coordinate this effort. Multiple jurisdictions are involved: two states, seven counties, fourteen cities, seven port districts, and eleven local fire agencies. These eleven agencies comprise F-PAAC. All members have agreed to work and train together, so that when an incident occurs, each fire agency will be familiar with the resources and capabilities of other fire agencies and can rely on their assistance through mutual aid agreements between all F-PAAC agencies. Vancouver has a mutual aid agreement with Portland and all other F-PAAC agencies to provide additional manpower and equipment for waterfront and vessel fires within the City.

The City recently applied for and received a grant from Federal Emergency Management Agency and the Department of Homeland Security to purchase a Type IV Regional Emergency Response Vessel, to provide emergency service delivery on the lower Columbia River waterway and its tributaries. The City has contracted for the construction of the vessel, and anticipates receipt of the vessel in mid- to late 2014. In addition to fire response, the vessel will have the ability to support multi-capability missions and carry people and equipment for:

- Hazmat Response

- Technical Rescue
- Oil Spill Support and Boom Carrying Capacity

4.1.6.2 Facility Emergency Plans

The Applicant will establish emergency response plans for the construction and operation phases of the Facility to ensure employee safety in the case of the following emergencies: on-site materials or chemicals release, flood, medical emergency, major power loss, fire, extreme weather, earthquake, volcano eruption, and security threat.

The emergency response plan will be developed based on industry standards and regulatory requirements, including but not limited to, WAC 296-24 (Employee Emergency Plans and Fire Prevention Plans), WAC 296-56 (Safety Standards --Longshore, Stevedore and Waterfront Related Operations), WAC 296-824 (Emergency Response), and 29 CFR 1910.38 (Emergency Action Plan). The emergency action plan will be in writing, and will cover the designated actions employers and employees must take to ensure employee safety from fire and other emergencies. The emergency plan will address the following elements:

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed;
- Rescue and medical duties for those employees who are to perform them.
- The preferred means of reporting fires and other emergencies; and
- Names or regular job titles of persons or departments who can be contacted for further information or explanation of duties under the plan.
- Alarm systems established in compliance with WAC 296-800-310.
- Types of evacuation to be used in emergency circumstances.
- Training and review:
  - Of a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees prior to implementation of the plan.
  - Review with each employee when the plan is initially developed, whenever the employee's responsibilities or designated actions under the plan change; and whenever the plan is changed, and
  - Review with each employee upon initial assignment those parts of the plan which the employee must know to protect himself/herself in the event of an emergency.

The Applicant will keep the plan at the workplace and make it available for employee review.

Section 4.2 – Land and Shoreline Use

WAC 463-60-362
Built environment – Land and shoreline use.

(1) The application shall identify land use plans and zoning ordinances applicable to the project site.

(2) Light and glare. The application shall describe the impact of light and glare from construction and operation and shall describe the measures to be taken in order to eliminate or lessen this impact.

(3) Aesthetics. The application shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of surrounding terrain. The presentation will show the location and design of the facilities relative to the physical features of the site in a way that will show how the installation will appear relative to its surroundings. The applicant shall describe the procedures to be utilized to restore or enhance the landscape disturbed during construction (to include temporary roads).

(4) Recreation. The application shall list all recreational sites within the area affected by construction and operation of the facility and shall then describe how each will be impacted by construction and operation.

(5) Historic and cultural preservation. The application shall coordinate with and provide a list of all historical and archaeological sites within the area affected by construction and operation of the facility to the Washington state office of archaeology and historic preservation and interested tribe(s). The application shall: (a) Provide evidence of this coordination; (b) Describe how each site will be impacted by construction and operation; and (c) Identify what mitigation will be required.

(6) Agricultural crops/animals. The application shall identify all agricultural crops and animals which could be affected by construction and/or operation of the facility and any operations, discharges, or wastes which could impact the adjoining agricultural community.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-362, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-362, filed 11/6/92, effective 12/7/92.)

Section 4.2 Land and Shoreline Use

4.2.1 Land Use

4.2.1.1 Surrounding Land Uses and Zoning

Tesoro Savage Vancouver Energy Distribution Terminal Site
The Facility is proposed for construction at the Port at three separate locations that will be linked by project elements: Terminal 5, Parcel 1A, and berths 13 and 14. (See section 2 for a more detailed description of the project elements.) This area of the Port – the project site – is zoned IH with an industrial comprehensive plan designation and is located within the City, within Clark County, Washington. The proposed Facility is located along the Columbia River at approximately Columbia River Mile (RM) 103.5.

The approximately 41.5-acre site is accessed from NW Lower River Road (SR 501). Approximately 1.5 miles east of the site, NW Lower River Road connects to the Mill Plain Extension and West Fourth Plain Boulevard. West Mill Plain and West Fourth Plain boulevards connect to I-5, SR 14, and points beyond.

Rail access is provided from the east by the Port's internal rail network. Trains will access the Port system from the BNSF and UP main lines approximately 2.25 miles east of Terminal 5. The Port is currently constructing a new access to the Port rail system as part of the WVFA project. Access for marine vessels to berths 13 and 14 is provided by the Columbia River deep draft channel. This navigation channel is maintained at a minimum 600 feet in width and 43 feet in depth. The site is approximately 103.5 river miles from the Pacific Ocean. See Figure 2.1-1 for a map of the vicinity of the site.

West Vancouver Freight Access Project - The WVFA project is a multi-phase project initiated in 2007 by the Port to move freight more efficiently not only through the Port but also along the BNSF Railway and Union Pacific Railroad mainlines that connect the Pacific Northwest to major rail hubs in the Midwestern and Southern U.S. as well as to Canada and Mexico.

The WVFA project aims to improve the capacity of the Port's rail infrastructure to meet the current and future industrial needs of Vancouver and Southwestern Washington. Currently, rail traffic into the Port travels on a single track (Hill Track) which runs east/west and crosses the north/south mainline at grade near the Port. When rail volumes are high, this intersection causes congestion and delays for Port tenants and mainline traffic. Three elements contribute to this problem of inadequate capacity and are likely to cause the situation to worsen in the future: 1) the Port's existing rail infrastructure does not allow unit trains to be assembled or handled efficiently; 2) projected economic growth will increase demands on existing and future tenants for more efficient rail operations; and 3) projected increases in traffic along the BNSF mainline corridors will increase rail congestion within the general vicinity, further reducing service.

To address these issues, the WVFA project will:

- Expand Port rail capacity and operations within the existing Port facility – in particular, those relating to unit train capacity – to enhance the rail network for future growth and development while minimizing disruption to existing Port tenants and businesses, and

- Relieve congestion, improve operational efficiencies, and ensure continued safe rail operations as rail traffic grows in and around the Port and along the existing BNSF north/south and east/west mainlines.

The elements included in the multi-phase WVFA project extend from the BNSF mainlines (beginning at the intersection of Hill Street and 7th Street, adjacent to the Albina Fuel and Lafarge companies) and terminate in a loop track at Terminal 5.

As illustrated in Figure 4.2-1, the WVFA project consists of 21 work elements which involve a variety of actions, including an expanded rail facility, roadway modifications, building removal and relocation, the improvement and development of stormwater facilities, import of clean fill, the disposal of some excavation materials, utility relocation, wetland and riparian mitigation, and right-of-way acquisition.

In particular, in order to pass beneath the Columbia River rail bridge with minimum required clearances, a pile-supported trench is being constructed along the Columbia River shoreline, effectively creating a grade-separated new entrance into the southeast side of the Port. When fully constructed, this element of the WVFA project will allow full-length unit trains to enter the Port without impeding traffic on the existing north/south BNSF rail line that carries both freight and passenger trains almost continually throughout the day. Currently, each time a train enters the Port, this line must remain clear while the train is "broken" into pieces that can be processed and staged throughout the terminal. Upon completion, the WVFA project is expected to reduce current delays in rail traffic by as much as 40 percent, thereby lowering transportation costs for the manufacturing and agricultural customers who use the Port and the regional rail infrastructure.

Table 4.2-1 lists the project elements and their completion status as of June 4, 2013. All WVFA project elements are expected to be completed by 2017.

Table 4.2-1. Status of WVFA Project Elements

Project Element	Completion Status
Grain Subdivision Phase A	Complete
Schedules 1A, 1B & 1C Rail Improvements	Complete
Utility Relocation Project	Complete
Terminal 5 Unit Train Improvements	Complete
Schedule 2 & 4 Property Acquisition	Complete & In Progress
Terminal 3 Rail Access	Complete
Grain Subdivision Phase B	Complete
Grain Track Unit Train Improvements Phase A	Complete
Malting Facility Relocation – Phase A	Complete
Schedule 2 Rail Trench In-Water Work Phase A	Complete
Terminal 5 Rail Expansion 4000A	Complete
Terminal 5 Rail Expansion SPL	Complete
Bulk Unloading Facility Utilities	In Progress
Malting Facility Relocation – Phase B	In Progress
Malting Drumhouse Demolition	In Progress
Schedule 2 Rail Trench Upland Work	In Progress
Schedule 2 Rail Trench In-Water Work Phase B	In Progress
Grade Separation Structure	In Progress

Project Element	Completion Status
BNSF C&M Commitments	In Progress
Bulk Unloading Facility	Future Improvements
Bulk Unloading Facility Continuation	Future Improvements
Bulk Facility Track Relocation	Future Improvements
Grain Track Unit Train Improvements Phase B	Future Improvements
Grain Track Unit Train Improvements Phase C	Future Improvements

Since its inception, the WVFA project has undergone comprehensive permitting and review under local, state, and federal regulations, including but not limited to:

- Reviews under SEPA by the Port;
- Reviews under NEPA by FHWA in coordination with WSDOT and by the Federal Railroad Administration (FRA);
- Review under local ordinances and development regulations by the City; and
- Review under federal regulations by the USACE, NMFS, and USFWS.

The most recent approval actions authorizing construction of the Terminal 5 rail loop occurred in 2009 and 2011, when permits were first obtained for the construction of the rail track and then subsequently revised to allow a southerly expansion of the rail loop closer to the Columbia River. A chronological list of permits authorizing construction of the Terminal 5 rail loop follows.

April 2009 – Port Supplemental Mitigated Determination of Non-Significance (MDNS) for WVFA project revisions that included the Terminal 5 rail loop

July 2009 – City post-decision review of the WVFA allowing project modifications that included the Terminal 5 rail loop

August 2009 – NEPA approval for modifications to the WVFA project, including the addition of the rail loop at Terminal 5 by WSDOT with final review and approval by FHWA

September 2011 – FRA Finding of No Significant Impact (FONSI) in response to an environmental assessment as a requirement of the Port's funding request for Railroad Rehabilitation and Improvement Financing (RRIF) funds from the FRA

September 2011 – Port issuance of a Notice of Third Supplemental MDNS for the WVFA project

November 2011 – City approval of a Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, Critical Areas Permit, and Tree Permit for the relocation of the WVFA rail tracks at Terminal 5 into shoreline jurisdiction

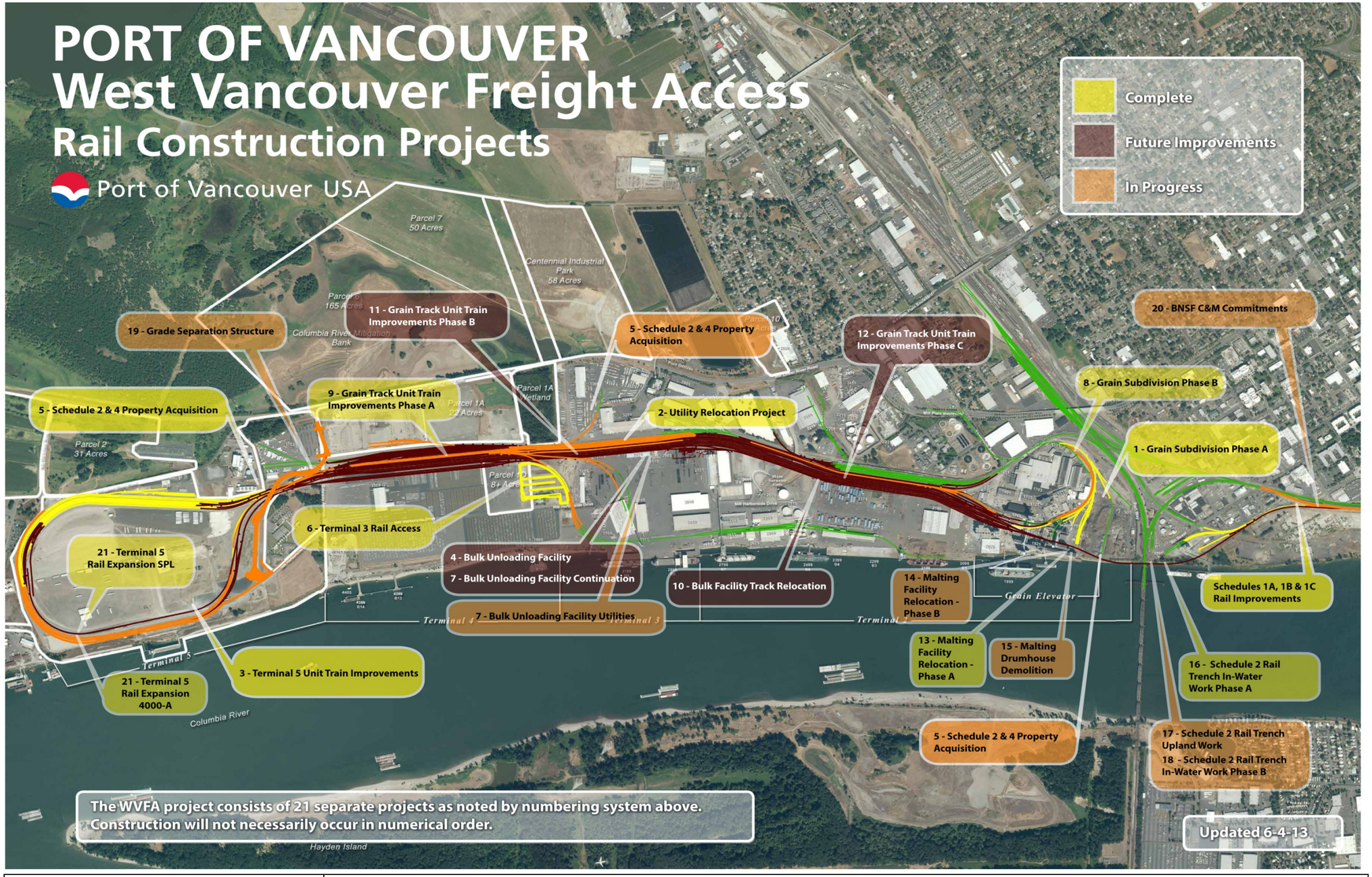

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Figure 4.2-1. WVFA Rail Construction Projects

Area 200 – is located on the Port's Terminal 5 property. Terminal 5 has been the location of intensive historic industrial uses dating back to 1940s when the site was first developed for aluminum smelting operations through the early 2000s when aluminum processing activities on the property ended. The Port purchased Terminal 5 in 2009 and, with the exception of the on-site water tower and the dock structure in the Columbia River, all structures of the defunct aluminum processing plants have been removed. The Terminal 5 site is currently developed for the outdoor storage of wind turbine components and other cargoes and contains a rail loop including multiple rail lines for Port operations. The rail on the Terminal 5 site represents the westernmost segment of the WVFA project, as described above.

In addition to the WVFA project, BHP Billiton plans to construct a potash export facility on portions of Terminal 5. The approvals received for the project in 2012 included an additional rail loop track and a 301,400-square-foot storage building and an administrative and maintenance building, fuel station, conveyors, surge bin and shiploaders, and marine berthing facilities (Vancouver Hearings Examiner 2011). Initial grading and ground improvements have been completed.

Area 300 – As part of the proposed project, crude oil storage tanks will be located on Parcel 1A on the south side of NW Lower River Road just east of Farwest Steel (3703 NW Gateway Avenue). This site was first developed by the Port for industrial use beginning in the early 2000s and is currently temporarily partially occupied by a steel scrap storage yard operated by Pacific Coast Shredding.

Area 400 – Ship or barge loading will occur at existing berths 13 and 14 on the Columbia River south of the current Subaru facility. These berths were developed by the Port in 1994 and have most recently been used as layberths.

Area 500 – The area encompasses the planned pipeline routes used for transferring crude oil between the project elements. The pipeline routes will be located primarily in existing rail and roadway corridors.

Area 600 – The structure housing the west boiler will be located on the northwest corner of Terminal 5. This area is currently a vacant gravel pad surrounded by access roads to Terminal 5. It was previously part of the former aluminum facility on Terminal 5 and was the location of an electrical transmission tower for power lines.

Rail Infrastructure – rail infrastructure improvements required to support the Facility will be constructed at Terminal 5. The Facility will construct two additional rail loops (tracks 4106 and 4107), in addition to the improvements described above for the WVFA project. Existing Terminal 5 rail associated with the WVFA will be shifted; the shifting of existing facilities will be performed by others, has been previously permitted, and is not included within this request for Site Certification. A third rail loop (track 4105) is permitted for general Port use. This track may be transferred to exclusive use by the Facility once a sustained volume of 120,000 barrels per day is received by the Facility.

Surrounding Land Uses and Zoning

Area 200 – Uses immediately surrounding Area 200 are as follows:

- North: Old Lower River Road (Port private road), Port Parcel 2 used for wetland, habitat and tree mitigation and a Bonneville Power Administration electrical substation

- East: Keyera Energy propane distribution facility (Keyera), Jail Work Center (approximately 600 feet to the east), and the CPU River Road Generating Plant (100 feet to the northeast)
- South: Cargo laydown and bulk potash handling facility (under construction)
- West: Tidewater Barge Lines and Tidewater Terminal Company (Tidewater)

The Keyera propane facility is located on an approximately 4-acre parcel consisting of rail unloading, three 80,000-gallon storage tanks, truck loading racks, and a small office building. The Jail Work Center is located on approximately 18.3 acres and has three buildings. The in-custody and work release buildings are housing units with a total of 224 beds. The kitchen and warehouse building contains food and laundry service equipment and a jail industries warehouse. The CPU River Road Generating Plant is a combined-cycle combustion natural gas turbine located on approximately 16 acres that can generate 248 megawatts of electricity.

The bulk potash handling facility will include rail unloading, a storage building, dock and shiploader and accessory structures and facilities. Initial site grading and ground improvement work has been completed for this project.

Tidewater Terminal Company occupy approximately 23 acres including an office building for the corporate headquarter for and Tidewater Barge Lines operates a marine terminal. The terminal handles containers and serves as a tug and barge maintenance and operations facility including marine and upland facilities.

These surrounding properties are all zoned IH (see Figure 4.2-2)

Area 300 – Uses immediately surrounding Area 300 are as follows:

- North: Lower River Road (SR 501) and Columbia River Wetland Mitigation Bank
- East: Parcel 1A wetland
- South: Port rail system and the Subaru of America automobile import facility
- West: Farwest Steel

The Columbia River Wetland Mitigation Bank is a 154-acre mitigation bank developed in partnership with the Port. It includes 78 acres of enhanced wetlands and 25.5 acres of created wetlands. Credits from the wetland work on site are available for purchase to off-set wetland impacts on other properties. The Parcel 1A wetland is an approximately 10-acre parcel previously enhanced by the Port for wetland impacts on other properties. The Subaru facility is a port of entry for automobiles and consists of an approximately 70-acre parking and storage facility, a processing building, and facilities for rail car and truck loading. Farwest Steel is a steel fabricator and distributor and occupies an approximately 20-acre parcel, which was purchased from the Port in 2011. The site includes an office building and fabrication/warehouse building.

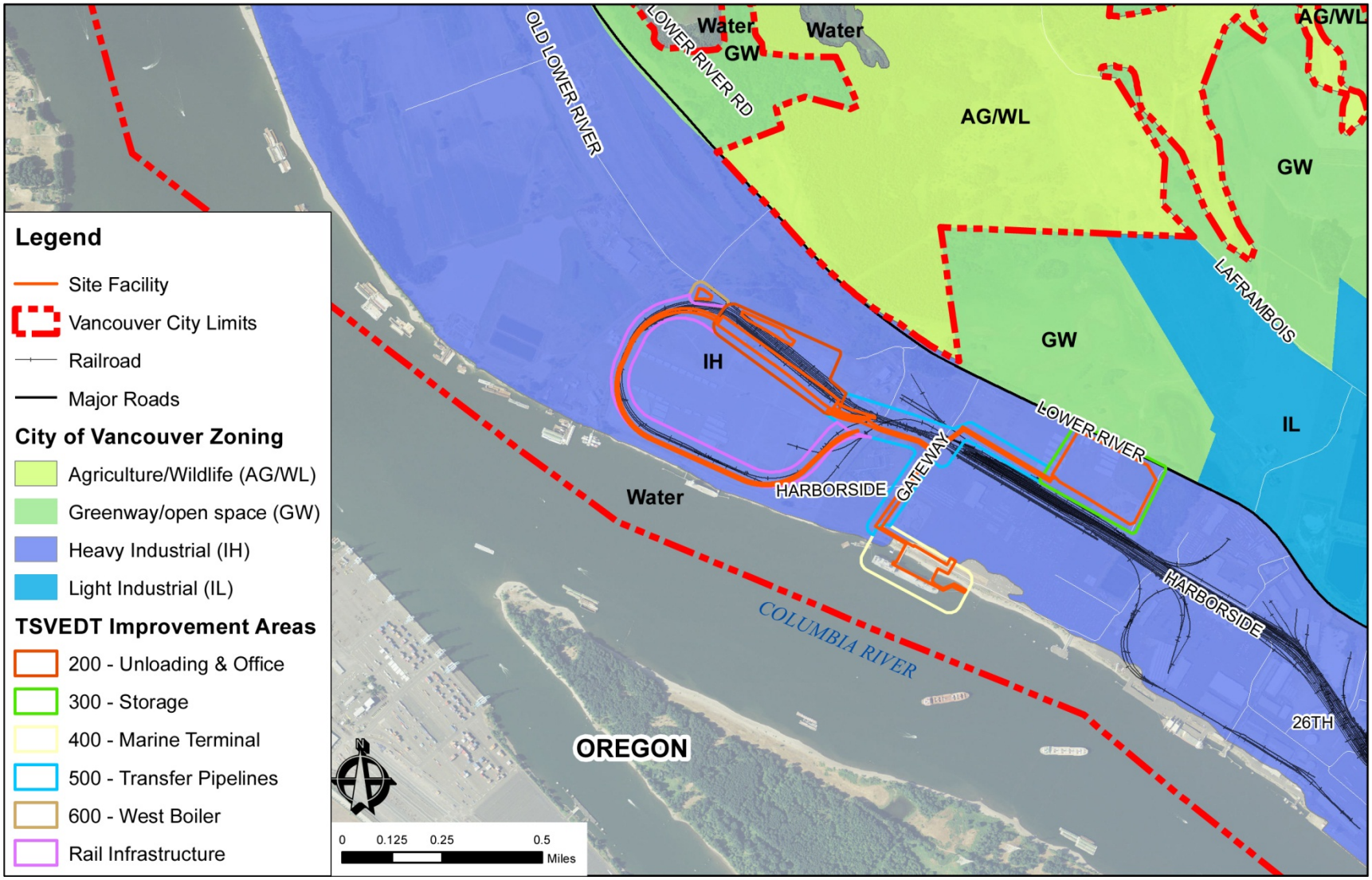

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Figure 4.2-2. City of Vancouver Zoning in Site Vicinity

The surrounding properties are all zoned IH, with the exception of the Columbia River Wetland Mitigation Bank located north of Lower River Road which is zoned Greenway (see Figure 4.2-2). The Greenway zone is intended to encourage the preservation of agricultural and wildlife use on land which is suited for agricultural production and is valuable for wildlife habitat (VMC 20.450.020(B)(2)).

Area 400 – Uses immediately surrounding Area 400 are as follows:

- North and East: Subaru of America automobile import facility
- South: Columbia River
- West: CalPortland Aggregate Yard

The Subaru site is described above and the CalPortland site is an approximately 8-acre aggregate yard where various sand and gravels are received by barge and truck, stored on-site and shipped by truck.

The surrounding properties are all zoned IH (see Figure 4.2-2).

Area 500 – Properties adjacent to the pipeline routes are all industrial, with the exception of the Jail Work Center, previously described above, which is located south and west of the pipeline routes.

The surrounding properties are all zoned IH (see Figure 4.2-2).

Area 600 – Uses immediately surrounding Area 600 are as follows:

- North: Old Alcoa Facility Access Road and Parcel 2 mitigation site
- East and South: Terminal 5 rail loop
- West: Tidewater

These areas are described above.

The surrounding properties are all zoned IH (see Figure 4.2-2).

Rail Infrastructure – The rail infrastructure improvements are located on Terminal 5. Surrounding land uses are industrial with the exception of the Jail Work Center located to the east of the existing rail loop.

The surrounding properties are all zoned IH (see Figure 4.2-2).

Port of Vancouver Land Uses

In addition to the land uses immediately surrounding the proposed project site, approximately 50 tenants use the Port for a variety of uses and activities. The Port occupies approximately 4 miles of waterfront and manages a total of 2,127 acres of which approximately 800 acres are currently developed, including a new 108-acre industrial park; 500 acres are undeveloped, 570 acres are devoted to mitigation and another 154 acres constitute the Columbia River Wetland Mitigation Bank. Within the Port's waterfront, there are five marine terminals with 13 shipping berths, with top exports currently including grain, scrap steel, bulk minerals, and pulp (Port Quick Facts, 2013). In addition to main exports, the Port also includes the import and/or export of automobiles, propane, liquid chemicals, and petroleum (including current operations by Tesoro at the Port). In addition to the export and import of products, the Port also provides over 2 million square feet of industrial warehousing.

Land Uses within the Project Vicinity

Land uses beyond the adjacent properties include a variety of land use activities in jurisdictions in Washington and Oregon.

Land uses within this area vary greatly, but primarily include urban and rural residential lands, commercial, industrial (primarily along the Columbia River), and agriculture and forestry (Clark County 2012). According to the Clark County Comprehensive Plan, the following land uses and their acreages for the County and the urban growth area of the City from 2007 are included in the Table 4.2-2 below and are shown in Figure 4.2-3.

Table 4.2-2. Clark County and Vancouver UGA Land Uses

Jurisdiction	Forestry	Agric	Comm'l	Industry/ Employment	Public Facilities	Parks	Residential
Clark County	158,068	35,760	320	307 (industry only)	10	8,968	101,704
Vancouver UGA	0	0	3,732	9,080	1,971	4,445	25,283

City of Vancouver Comprehensive Plan (2011–2030), the City's comprehensive plan, identifies land uses at the project site and those located nearest to it (Figure 4.2-4). The downtown area, located approximately 2 miles southeast of the site, consists primarily of a mix of retail, commercial and residential uses (City of Vancouver, 2011). Surrounding the downtown core and spreading out to the north and east are neighborhoods, including the Fruit Valley Neighborhood approximately 3,200 feet (0.6 mile) east of the site.

The Fruit Valley Neighborhood is the westernmost neighborhood in Vancouver. It consists of a mix of residential, industrial, business, and agricultural uses and natural areas (Fruit Valley Neighborhood Action Plan [NAP], 2008). The neighborhood consists of approximately 50 percent single family homes, 30 percent multi-family, 17 percent manufactured homes, and about 3 percent houseboats or other categories of houses (Fruit Valley NAP, 2008). To the north of the project site are parks and open space lands associated with Vancouver Lake (City of Vancouver, 2011).

The residence nearest to the proposed Facility is an isolated rural house owned by the Port and located at 6818 NW Old Lower River Road approximately 3,100 feet (0.6 mile) northwest of the proposed location of the boiler/steam plant for the rail car unloading facility. In addition, the Clark County Jail Work Center is located off Gateway Avenue between the elements of the proposed project. This facility opened in 2000 and includes 224 beds in a minimum security setting (Clark County, see http://www.co.clark.wa.us/sheriff/custody/jwc.html).

To the south across the Columbia River in Oregon, land uses consist primarily of urban and rural residential, industrial (mostly along the Willamette and Columbia rivers), commercial, and agricultural lands.

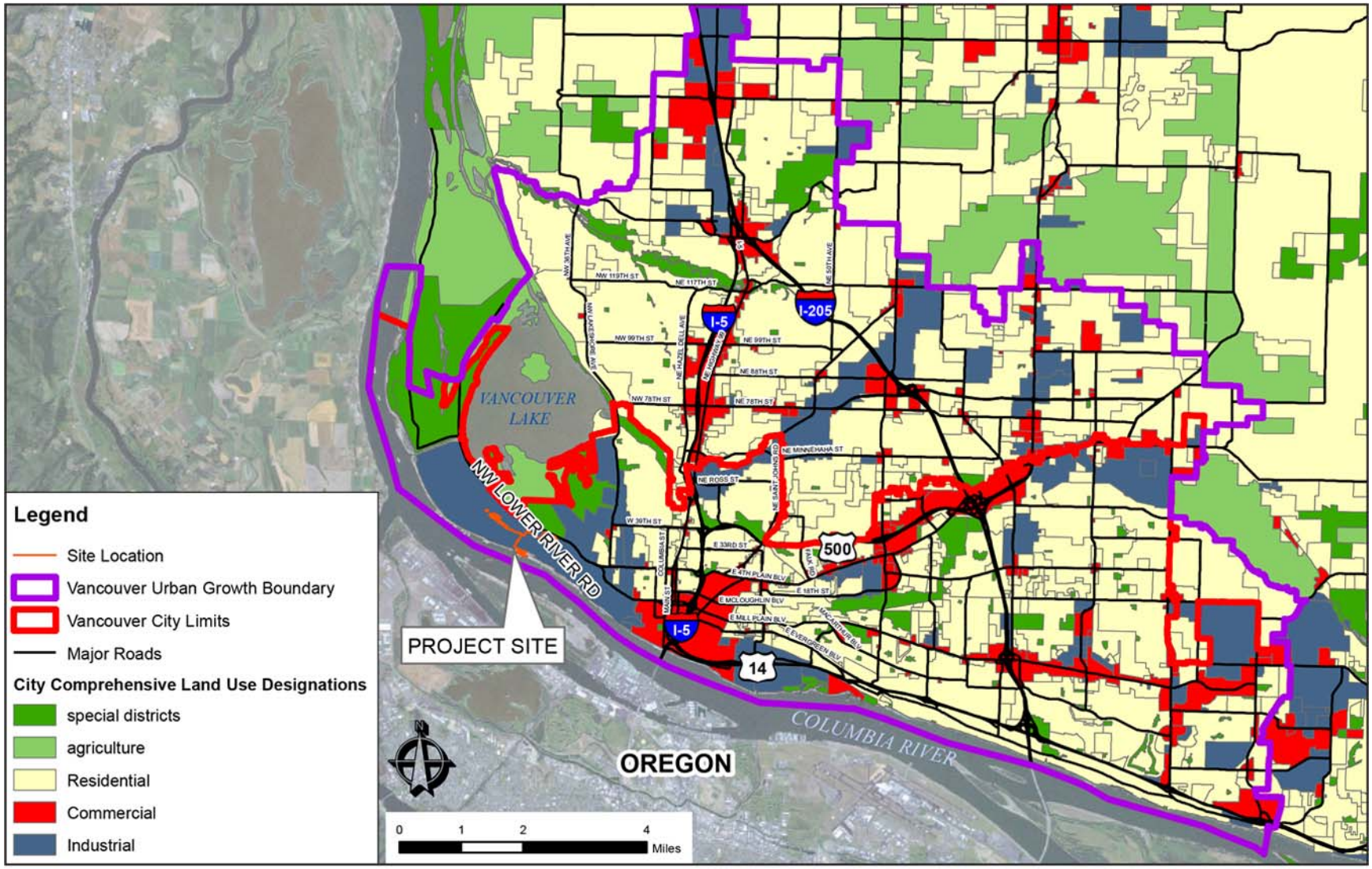

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Figure 4.2-3. General Comprehensive Land Use Designations

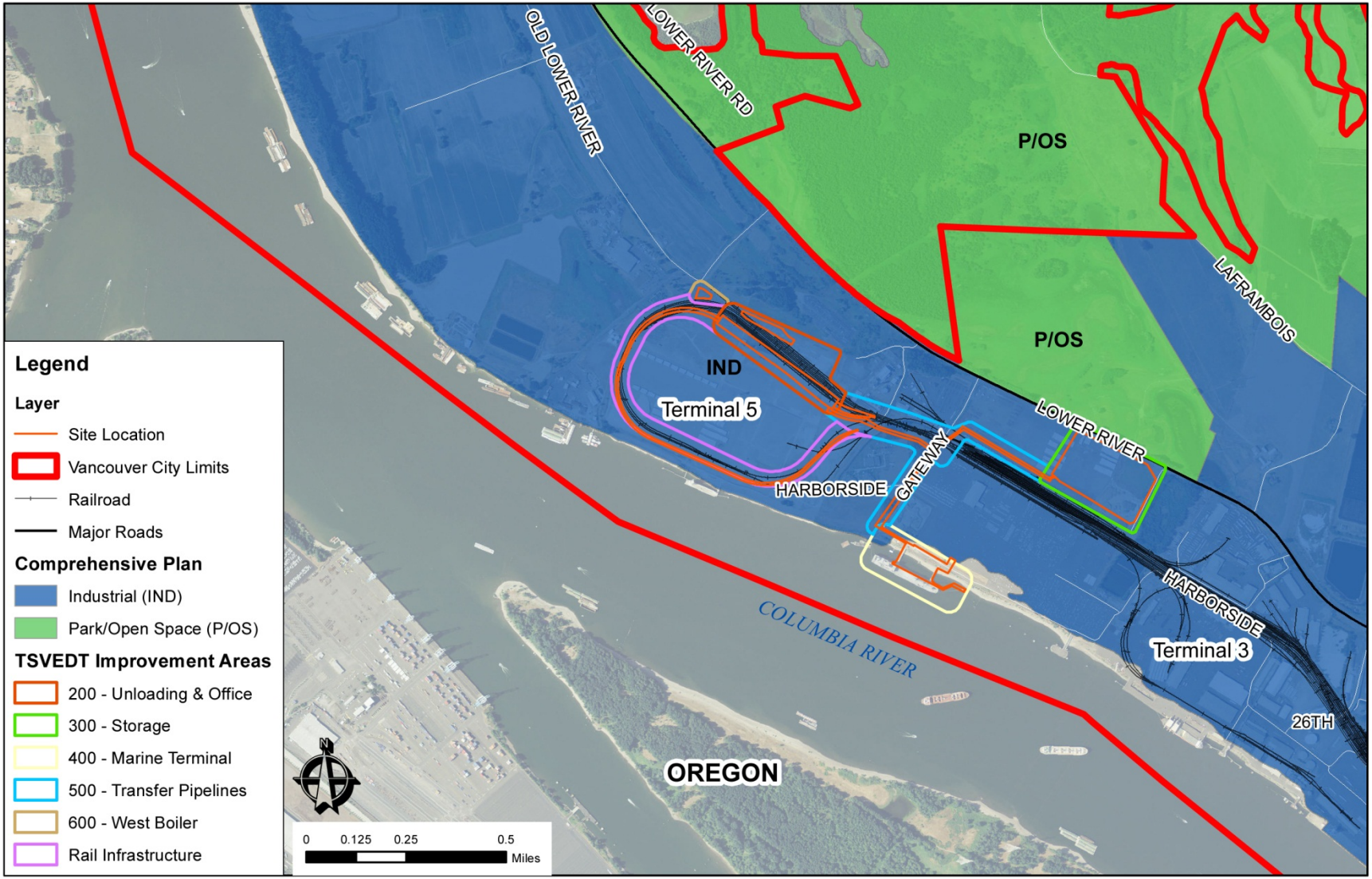

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Figure 4.2-4. Comprehensive Plan

The Port of Portland's Rivergate Industrial District is located immediately across the Columbia River from the proposed project site and 9 miles northwest of downtown Portland. The site consists of 2,800 acres with two marine terminals, industrial warehouse areas, and rail lines. Terminals at this location include an auto import, container, grain, steel, and bulk handling facilities. The west end of Hayden Island is located in the Columbia River between the project site and the Rivergate district. This area of Hayden Island is owned by the Port of Portland and is undeveloped.

4.2.1.2 Relationship to Existing Land Use Plans and Policies

The proposed project site is located at the Port within the City. The property is addressed by the City's comprehensive plan and regulated by Title 20, Land Use and Development, of the Vancouver Municipal Code (VMC), which includes zoning and critical areas regulations, and the City's Shoreline Master Program (SMP). Applicable zoning regulations have also been addressed in section 2.23 of this application.

According to Washington's Growth Management Act (GMA), counties and cities meeting specific population and growth criteria are required to prepare comprehensive plans in accordance with the goals of the GMA as identified in Chapter 36.70A RCW. The County was an initial jurisdiction required to comply fully with the provisions of the GMA and both the City and the County have adopted comprehensive plans in their jurisdictions per the requirements of the GMA.

Land use plans and regulations applicable to the proposed project include the following:

- County
  - *Clark County Comprehensive Plan (2004–2024)*
- City
  - *City of Vancouver Comprehensive Plan (2011–2030)*
  - VMC
    - VMC 20.440 Industrial District (Zoning)
    - VMC 20.740 Critical Areas Protection
    - VMC 20.760 Shoreline Management Area
  - SMP (Effective 9/24/2012)
- Port
  - *Port of Vancouver Strategic Plan (2013–2022)*

A more detailed discussion follows of how these land use plans, policies, and regulations apply to the proposed project.

Clark County Comprehensive Plan

The County comprehensive plan was adopted in September 2007 and most recently amended in 2012 (Clark County 2012). The plan identifies goals and policies to guide growth in the County and includes the minimum requirements of the GMA. The GMA requires that a comprehensive plan consider the 20-year population forecasts, establish urban growth areas, and include (at a minimum) the following: land use, transportation, housing, utilities, capital facilities, and rural elements. The County's plan provides policy guidance and a process to help guide development. While the proposed project is located within the jurisdictional boundaries of the City, and therefore is subject to the City's comprehensive plan as described in the section below, the

County and the City must coordinate in the development of their respective comprehensive plans. Each jurisdiction retains exclusive authority to regulate land uses within its jurisdictional (municipal) boundaries, with the City of Vancouver holding such exclusive authority within the city.

The County's comprehensive plan established the Vancouver Urban Growth Area (UGA), including the project site, in 1995 (Clark County 1994). According to RCW 36.70A.110, UGAs are where urban growth should be encouraged. The plan also established land use designations for lands in the County (Figure 4.2-3). The area of the proposed project is designated as Industrial (IND) by the plan as shown in Figure 4.2-4 (Clark County 2012). The land use policies identified in the plan (Land Use Policy 1.1.1) state that the Vancouver UGA is now and will continue to be a major urban area with a full range of residential, commercial, and industrial uses, etc. The economic development policies included in section 9.1 state that industrial uses should be encouraged in major urban centers, along with the promotion of the long-term holding of prime industrial land and the future development of these industrial lands.

City of Vancouver Comprehensive Plan

The City's comprehensive plan was most recently updated in 2011. As a city planning under the Growth Management Act, the comprehensive plan forms the policy foundation for the legislative enactment of specific land use and zoning regulations, adopted by ordinance. As such, it is the City's responsibility to enact land use and zoning regulations that are generally consistent with the comprehensive plan. To secure development entitlements, an applicant must demonstrate that a project is consistent with adopted land use and zoning ordinances. The proposed project lies entirely within the City limits and therefore is addressed by the City's comprehensive plan and is subject to applicable City land use and zoning code requirements. The proposed project is located within the UGA and is on land designated as Industrial by the City's plan (Figure 4.2-4). This section addresses the policies of the City's comprehensive plan that apply to the project.

Community Development Policies – The community development chapter of the City's comprehensive plan provides policies that guide policy decisions on land use and development in the City. Table 1-5 of the comprehensive plan includes the City's land use designations and definitions of corresponding zoning. Under the Industrial designation, IH-zoned lands include the following activities: "[i]ntensive industrial manufacturing, service, production or storage often involving heavy truck, rail or marine traffic, or outdoor storage and generating vibration, noise and odors." Figure 4.2-4 is the adopted comprehensive plan map for the City indicating the designation of the site and surrounding areas as Industrial. The following policies apply to the project:

- **CD-1 Citywide land supplies**
  Establish land supplies and density allowances that are sufficient to accommodate adopted long-term City of Vancouver population and employment forecast allocations.

The project site is within the UGA and designated Industrial. It is part of the land area designated by the City to fulfill this policy.

- **CD-3 Infill and redevelopment**
  Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties.

The project site has been previously developed and its redevelopment is supportive of this policy.

- **CD-9 Compatible uses**
  Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.

As indicated previously, the site and surrounding areas are zoned for the proposed use and contain similar industrial land uses with the exception of land used for wetland and tree mitigation activities. The Fruit Valley Neighborhood is the closest residential neighborhood to the site and is approximately 0.6 mile east of Area 300. Consistent with this policy, there are no anticipated impacts to the neighborhood from the proposal.

- **CD-11 Archaeological and historic resources**
  Protect and preserve cultural, historic and archaeological resources. Promote preservation, restoration, rehabilitation, and reuse of historically or architecturally significant older buildings. Continually increase knowledge and awareness of historic and archaeological resources, further developing the city's identity and allure. Work with Clark County to maintain state Certified Local Government Status.

As shown in section 4.2.5, consistent with this policy, there are no historic or archaeological resources that are known to be impacted by the project.

Economic Development Policies – The economic development policies of the plan are aimed at encouraging development that leads to increased numbers of jobs for residents and ensuring that enough land is available for industrial development. The following policies apply to the project:

- **EC-2 Family-wage employment**
  Promote the formation, recruitment, retention and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices.

As shown in section 4.4, the project will result in an additional 110 jobs when fully operational. The Socioeconomic Report (Appendix K) estimates direct labor income associated with the full operation is estimated to be $33.0 million (in 2013 dollars). Labor income includes both employee compensation (wages, benefits, and taxes) and proprietor's income. Including both indirect and induced benefits, the operation of the terminal is projected to support a total of 890 jobs in Washington, with associated total income of $64.1 million. The Socioeconomic Report estimates that the jobs directly associated with project operation of the project are likely to generate employee income that is substantially higher than the study area average wage.

- **EC-3 Public revenue enhancement**
  Promote development that enhances revenue generation for public services.

As discussed in section 4.4 and Appendix K, the project will result in additional revenues to the State and local agencies through property, business and occupation and sales taxes.

- **EC-6 Efficient use of employment land**
  Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites.

Consistent with this policy, the project is part of the redevelopment of Terminal 5.

Environmental Policies – The plan's environmental policies promote the protection and enhancement of the environment while still meeting other goals of the comprehensive plan such as community and economic development and housing and infrastructure goals.

- **EN-6 Habitat**
  Protect riparian areas, wetlands, and other fish and wildlife habitat. Link fish and wildlife habitat areas to form contiguous networks. Support sustainable fish and wildlife populations.

As shown in section 2.23, the project is consistent with the City regulations regarding the protection of fish and wildlife habitat. The project will not impact riparian areas, wetland or other fish and wildlife habitat as shown in sections 3.4 and 3.5.

- **EN-7 Endangered species**
  Protect habitat for salmonids and other listed species and facilitate recovery. Encourage and support actions that protect other species from becoming listed.

As shown in section 3.4, listed salmonids and other species use portions of the site and the surrounding areas. As indicated in section 2.23, the project will undergo review under Section 7 of the ESA as part of the federal permit process for the dock improvements. Minimization and mitigation measures will be employed as necessary to protect listed species and habitat that occur in the project area.

- **EN-8 Water quality and quantity**
  Enhance and protect surface water, stormwater, and groundwater quality from septic discharge, impervious surface runoff, improper waste disposal, and other potential contaminant sources. Ensure safe and adequate water supplies and promote wise use and conservation of water resources.

Stormwater and wastewater will be generated from impervious surfaces and site operations. Stormwater will be collected and treated to adopted City standards prior to discharge to the Columbia River. Wastewater from both domestic and industrial sources will be discharged to the City sanitary system. If necessary, industrial wastewater will receive pretreatment.

- **EN-9 Trees and other vegetation**
  Conserve and restore tree and plant cover, particularly native species, throughout Vancouver. Promote planting using native vegetation. Protect historic and other significant trees. Work towards the Vancouver Urban Forestry Program goal of covering 28% of Vancouver's surface area with tree canopy.

As shown in section 3.4, most of the site is impervious and contains little vegetation. Some tree removal will be necessary for the pipeline but this will occur in an isolated area. The project will comply with VMC 20.770 and will plant additional trees to compensate for development that will impact pervious surfaces. In addition, trees will be planted as part of landscaped buffers and parking lot landscaping where currently no trees exist.

- **EN-10 Air quality**
  Protect and enhance air quality, in coordination with local and regional agencies and organizations.

As indicated in sections 3.2 the project will generate emissions during both construction and operations. A permit for air discharge, included in section 5.1 of this application, will be obtained as part of the EFSEC process and the project will comply with all applicable regulations.

- **EN-11 Hazard areas**
  Manage development in geologically hazardous areas and floodplains to protect public health and safety.

The project area contains geologic hazards as described in section 3.1 and floodplains as described in section 3.3.3. The project will be built to comply with adopted standards for construction in seismic hazard areas. The only project element in floodplains is the dock. It will be constructed to withstand flooding and the dock surface will be above the 100-year flood level.

As shown, the proposed Facility is consistent with the City's comprehensive plan and applicable policies because the proposed use is an industrial use located on land designated as Industrial within the UGA; in addition, the Facility will promote economic development and will be designed and operated in compliance with all applicable environmental regulations and policies to ensure the protection of sensitive resources.

City of Vancouver Shoreline Master Program

The Shoreline Management Act (SMA) applies to all counties and cities that have "shorelines of the state." The SMA requires that these jurisdictions prepare and adopt shoreline master programs (SMP). The *City of Vancouver Shoreline Master Program* was approved in September of 2012 as required by RCW Chapter 90.58 and WAC Chapter 173.26. Within the project area, the Columbia River is a shoreline of statewide significance. The shoreline jurisdiction includes the waterbody and all areas within 200 feet of the ordinary high water mark (OHWM). The SMP designates the shoreline environment of the upland areas on the site as High Intensity and the areas of the site below the OHWM of the river as Aquatic.

The Facility includes a number of elements within the shoreline jurisdiction including modifications to the existing rail loops, dock improvements, and other activities associated with the shiploading within Area 400. Within the High Intensity and Aquatic designations, water-dependent industrial uses are permitted activities. The SMP defines a water-dependent use as follows: "a use or a portion of a use which requires direct contact with the water and cannot exist at a non-water location due to the intrinsic nature of its operations." The purpose of the proposed Facility is to transfer crude oil from rail cars to ships. Consequently, the proposed Facility activities clearly meet the definition of a water-dependent use. Further, per Policy 4.3.5.1, the purpose of the High Intensity designation is "to provide for high-intensity water-oriented

commercial, transportation, and industrial uses….” Table 6-1 of the SMP lists water-dependent industrial uses as permitted in the High Intensity and Aquatic shoreline designations with no setback or height limits.

Compliance with applicable SMP policies is further addressed in Section 2.23 .

Vancouver Municipal Code

The project is located within the City and therefore subject to the VMC. Compliance with City development standards is also addressed in section 2.23 and in the Pre-Application Submittal and City Pre-Application Conference Notes included as Appendix I.1. The following zoning ordinances apply to the proposed project.

Industrial District (VMC 20.440) – Zoning – Zoning in the City is shown on the attached map (Figure 4.2-2). The IH zoning of the site allows a variety of industrial uses, including the proposed Facility, which will comply with “warehouse/freight movement” as defined in Section 20.160.020 of the VMC. This definition is:

> *Uses involved in the storage and movement of large quantities of materials or products indoors and/or outdoors; associated with significant truck and/or rail traffic. Examples include free-standing warehouses associated with retail furniture or appliance outlets; household moving and general freight storage; cold storage plants/frozen food lockers; weapon and ammunition storage; major wholesale distribution centers; truck, marine and air freight terminals and dispatch centers; bus barns; grain terminals; and stockpiling of sand, gravel, bark dust or other aggregate and landscaping materials.*

“Warehouse/Freight Movement” is listed in Table 20.440.030–1 in VMC 20.440 as a permitted use within the IH zone. In addition, “railroad yards” is listed as a permitted use within the IH zone.

Table 4.2-3 below shows how the proposal is consistent with the City’s development standards for the IH zone.

Table 4.2-3. Development Standards (VMC Table 20.440.040-1)

Development Criteria	IH Zone	Proposed
Minimum Lot Size	None	N/A
Maximum Lot Coverage	100%	N/A
Minimum Lot Width	None	N/A
Minimum Lot Depth	None	N/A
Minimum Setbacks	Per VMC 20.925 5 feet (west side of Area 300) 10 feet (north side of Area 300)	5 feet for west side of Area 300 60 feet for north side of Area 300
Maximum Height	None	Approx. 50 feet (rail unloading)
Minimum Landscaping Requirement (% of total net area)	0%	≤5%

Critical Areas Protection (VMC 20.740) – The critical areas found on the site include fish and wildlife habitat conservation areas, frequently flooded areas, and geologic hazard areas (seismic

hazard). Development is proposed, to some extent, in each of these areas as described below. Compliance with this section of code is further addressed in Appendices I.1 and I.2.

Fish and Wildlife Habitat Conservation Areas (VMC.20.740.110) – Project activities at berths 13 and 14 in Area 400 are located within the riparian management area (RMA) and riparian buffer (RB) area of the Columbia River. The riparian boundaries are measured landward from the biological OHWM and are limited by existing impervious surfaces. The existing riparian habitat is of low value because it is functionally isolated from the Columbia River.

Frequently Flooded Areas (VMC 20.740.120) – Plans include the use of the existing dock. It is not anticipated that any fill will be placed in the flood fringe or floodway. Further, to ensure any in-water structures included in the proposed project will withstand elevated river levels in flood events, the structures will be approved by a structural engineer licensed in Washington.

A portion of the storage area on Parcel 1A (Area 300) is identified as an isolated floodplain previously approved for fill.

Geologic & Seismic Hazards (VMC 20.740.130) – The project site is mapped by Clark County GIS as having moderate-to-high potential for liquefaction or dynamic settlement within the site area of the proposed project. As discussed in detail in section 3.1, a preliminary geotechnical report has been completed for the project that addresses the liquefaction potential on the site and recommends construction techniques to address any identified potential soil instability and seismic issues.

Shoreline Management Area (VMC 20.760) – Portions of the project area are located within 200 feet of the OHWM and are subject to the requirements of VMC 20.760 (Appendix I.2). The SMP is used to regulate uses within the shoreline management area as identified in VMC 20.760.030.

Port of Vancouver Strategic Plan

The *Port of Vancouver Strategic Plan (2013–2022)* is a document that helps focus the Port's efforts in future planning and development. The strategic goals of the plan include the following: maximize marine business and development as well as industrial business and development, develop and preserve multimodal transportation access, and generate and sustain diversified revenues. The proposed project will help increase the Port's marine business and diversify revenues at the Port to promote its long-term sustainability and economic base.

Port of Vancouver Comprehensive Scheme of Harbor Improvements

The Port has adopted a comprehensive scheme of harbor improvements per RCW 53.20.010.

State of Washington

The siting of the Facility is regulated at the state level by EFSEC, under Chapter 80.50 RCW (Energy Facilities - Site Locations) and Title 463 WAC. Applicants for certification from EFSEC are required to submit detailed information on the proposed development and its impacts. The application for site certification must also describe efforts to minimize or mitigate possible adverse impacts on the physical or human environment (WAC 463-60-085). Further, the Applicant is required to set forth insurance, bonding, or other arrangements proposed in order to mitigate for damage or loss to the environment (WAC 463-60-075). The proposed Facility is subject to EFSEC jurisdiction.

Chapter 80.50 RCW preempts all state and local approvals relating to energy facility sites that are under the jurisdiction of EFSEC. Certification pursuant to Chapter 80.50 RCW takes the place of any permit, certificate, or similar approval that would otherwise be required. Procedures to be followed by EFSEC in determining whether or not to recommend that the state pre-empt local land use plans or zoning ordinances for a site or portions of a site for an energy facility are set forth in WAC 463-28. The Council generally requires that the Applicant make reasonable efforts to achieve consistency with applicable local land use and zoning ordinances, as well as shoreline management plans in effect at the date of the application filing. If an Applicant is unable to resolve specific noncompliance issues, EFSEC may recommend that the Governor exercise the State's preemption.

4.2.1.3 Impacts

No impacts to existing land uses are anticipated. Therefore, no mitigation measures are specifically identified.

4.2.2 Light and Glare

4.2.2.1 Existing Environment

The proposed Facility is located at the Port and in an area designated as industrial in the City's comprehensive plan. Existing ambient lighting levels at the site come primarily from neighboring sources that include Farwest Steel, Kelley Steel, Tidewater, the CPU River Road Generating Plant, the Jail Work Center, various import-export facilities using the adjacent rail lines and Columbia River terminals, and headlights along SR 501. Light from distant residential and commercial land use sources is minimal, primarily because of their distance from the site and the low light associated with residential areas. Minimal, if any, light comes from the existing Port stormwater and mitigation facilities north of SR 501. While there are no permanent light sources on the Columbia River, there is a designated anchorage area directly across the channel from berths 13 and 14 and oceangoing vessels using the anchorage will have various levels of lighting.

4.2.2.2 Lighting

Construction phase: During construction, outdoor lighting may include limited construction lighting and on-site safety lighting or warning flashers.

Permanent lighting: The project proposes to install outdoor lighting in various areas. This lighting will include low-level lighting around exits (minimum 2 foot-candles) and general outdoor lighting (from 0.2 to 5 foot-candles) including ground level operating areas, roadways, fuel storage areas, and shiploading, rail car unloading, and parking areas. This lighting will be provided for operator access and safety under regular operating conditions. Precise detailed placement of lighting fixtures has not yet been determined, but outdoor lights will be a combination of pole-mounted and structure-mounted lights and likely will be standard streetlight height (20 to 40 feet).

Outside lighting likely will be placed above doorways, walkways, and stairs around the exteriors of buildings and ancillary equipment. Generally, lighting angles will be determined by an evaluation of the economics of fixture wattage, light patterns, and light levels.

Spot lighting will be provided for illumination-level enhancement where needed around loading equipment maintenance areas and stairwells and catwalks. This lighting will be higher in

intensity than general outside lighting (up to 32 foot-candles), but will be limited to specific areas. This lighting can be adjusted to minimize light spillover or direct glare in response to specific site conditions.

4.2.2.3 Impacts

During construction, minor temporary outdoor lighting impacts may occur; however, most construction activities will occur during daylight hours and will be temporary in nature. The estimated construction duration is 9 to 12 months. Upon project completion, light and glare impacts on neighboring properties are expected to be negligible or nonexistent because the land uses on those properties are similar to the uses proposed for the Facility, as are their hours of operation and security needs.

Potential glare impacts will be minimized during the day by the use of non-reflective light paint colors on exterior surfaces. Using full cut-off light boxes, adjusting light direction, and using supplemental light shields/vegetation to provide additional screening, if necessary, will minimize light spillover at night. The Facility is expected to make a minimal contribution to overall ambient light levels in the immediate vicinity. There are no residential areas north, south, or west of the site that would be affected by proposed lighting. There are residential areas to the east within 1 mile of the Facility but most impacts are limited by the landform and existing vegetation. Impacts to wildlife as a result of construction and operational lighting is discussed in further detail in section 3.4.4.2.

4.2.2.4 Mitigation Measures

Most construction will occur during the day. At night, lights will be directed towards the site and will be the minimum wattage required for safety and operations.

Development elements, except for storage tanks, will be painted with earth tones. The storage tanks will be painted with nonreflective paint to reduce surface glare from direct sunlight during the day and headlights at night.

4.2.3 Aesthetics

This section describes the visual qualities of the existing landscape around the project area and the potential changes to these qualities resulting from construction and operation of the Facility.

4.2.3.1 Methodology

For the purposes of this assessment, methodologies used by federal resource managers were employed. The most widely known methodologies are those developed by the U.S. Department of Agriculture, Forest Service (*Landscape Aesthetics, A Handbook for Scenery Management*, USDA USFS, 1995) and the U.S. Department of Transportation, Federal Highways Administration (*Visual Impact Assessment for Highway Projects*, USDOT FHWA, 1981). While neither methodology applies directly to this project, conducting a visual inventory and identifying viewer sensitivity form a general framework for assessing the project's potential visual impacts. While EFSEC has used both of these methodologies in prior proceedings (most recently in analyzing visual impacts of wind energy facilities), the landscape and land use setting for this facility are considerably different, necessitating consideration of the industrial landscape as context, both in measuring impacts as well as the expectations and sensitivities of viewers.

The visual resource methodology used to inventory and assess the potential impacts of this project includes the following steps:

- Prepare an inventory existing visual quality;
- Identify and evaluate potentially sensitive viewers and viewpoints within the landscape context of the development;
- Use visual simulations to describe the visual changes introduced by the construction and operation of the Facility;
- Assess the visual impacts from potentially sensitive viewpoints within the visual context of the project and an existing heavy industrial zone; and
- Recommend mitigation measures.

Field reconnaissance was conducted to determine the general visibility of the proposed Facility from the identified potentially sensitive viewpoints (e.g., residences, travel routes, public parks or other sensitive viewpoints). Visual impacts were assessed based on the visibility of changes from potentially sensitive viewpoints as a result of construction and operation of the project. Visual simulations of facilities were produced using scaled site photographs and 3-dimensional modeling software. These simulations allowed the assessment of potential impacts and the development of recommendations for mitigation.

4.2.3.2 Inventory

The project site is located within a highly industrialized area at the Port on the north bank of the Columbia River and west of the downtown area of the City. As described in earlier sections, the project includes construction and operations at five different locations within the Port. The dominant natural features of the area are the Columbia River, Vancouver Lake, and the Vancouver Lake Lowlands. The site, which is generally flat, is south of NW Lower River Road (SR 501). The adjacent natural areas include deciduous riparian vegetation, open grassland, and natural and modified shoreline conditions. The site has been highly modified by riverbank stabilization, imported fill, and the development of heavy industrial land uses and transportation corridors. The site is zoned IH. Surrounding uses include Farwest Steel, Kelley Steel, the CPU River Road Generating Plant, the Jail Work Center, a propane terminal, and various import-export facilities using the adjacent rail lines and Columbia River terminals. The site and its surroundings are heavily modified from their original natural state and are typified by industrial facilities including large industrial buildings, large expanses of impervious surfacing, utility and railroad corridors, fencing, and open storage. The stormwater and mitigation sites operated by the Port adjacent to the project site offer some vegetation; however, these limited sites are generally visually and physically disconnected from the surrounding landscape.

Past Industrial Use

Alcoa began operations at the Port of Vancouver in the early 1940s at the site of the proposed project. The new aluminum plant was constructed in Vancouver to take advantage of the inexpensive hydropower produced from the dams recently constructed along the Columbia River. The smelter and fabrication facilities produced rod, wire, cable, and other aluminum products that were shipped throughout the world. The extent of the aluminum smelting and manufacturing activity is illustrated on the historic aerial photo Figure 4.2-5. Alcoa operated the facility through the early 2000s.

Since the plant's closure, site has been remediated to Ecology's standards and redeveloped for other industrial uses. Because of its industrial history, manufacturing processes and structures have dominated the appearance of the project site for more than 70 years. These historic uses

resulted in the development of numerous large structures, utility, and transportation facilities. The proposed project is consistent with historic industrial uses and will not result in new visual impacts to the site and adjacent areas.

Landscape Setting

In addition to adjacent industrial Port lands, the landscape setting is characterized by the Vancouver Lake Lowlands. This landscape area includes Frenchman's Bar Regional Park, Shillapoo Wildlife Area, Vancouver Lake Regional Park, and other open space lands owned by the state and managed for wildlife. East of the site, residential and industrial areas are found along Fruit Valley Road. Additional residential areas are located on the bluffs overlooking Vancouver Lake and the Port. These residential areas range from approximately 0.6 mile to 1.25 miles from the project site. The Columbia River is directly south of the site. The Port of Portland owns the western end of Hayden Island on the south shore of the Columbia River across from the Port of Vancouver.

Visual Quality

The general character and setting of the existing landscape are described above. Within the project limits, past and current industrial activities have modified the landscape character greatly. SR 501, other industrial uses, and overhead utility lines separate the project area visually and physically from the adjacent natural features. The visual quality of the project area is consistent with the manmade conditions within the Port.

Based on the described character and setting, three general descriptions were developed to characterize the visual quality of the project site. These visual quality descriptions were developed from the land uses and the visual patterns created by the existing natural and manmade features. The descriptions follow.

- **Urban/Industrial –** This landscape is common to urban areas and urban/industrial fringes. Human elements are prevalent or landscape modifications exist which do not blend with the adjacent natural surroundings (low visual intactness and unity). The character and setting of the site, and its visibility from surrounding areas, will be that of a heavily industrialized landscape, dominated by rail infrastructure, commodity storage, processing and shipping, with or without the project.
- **Rural –** The landscape exhibits reasonably attractive natural and human-made features/ patterns, although these are not visually distinctive or unusual within the region. The area provides some positive visual experiences such as natural open space with some existing agricultural areas (farm fields, etc.) or well-maintained and landscaped urban areas.
- **Unique/Distinctive –** This landscape exhibits distinctive and memorable visual features (landforms, lakes and rivers, etc.) and patterns (vegetation/open space) that are largely undisturbed—usually in a rural or open space setting.

Viewer Sensitivity

Potential viewer sensitivity depends on viewer types and exposure (number of viewers and view frequency), view orientation and duration, viewer frame of reference and expectation, and viewer awareness/sensitivity to visual changes. For the purposes of this report, levels of viewer sensitivity were evaluated using the following criteria:

- **Low** – Viewer types representing low visual sensitivity include industrial/warehouse, utility, and shipping and transportation workers. Compared with other viewer types, the number of viewers is generally considered small and the duration of their view is short. The activities of these viewers typically focus their attention and limit their awareness/sensitivity to the visual setting immediately beyond the workplace.
- **Moderate** – Viewer types representing moderate visual sensitivity consist of highway and local travelers. The awareness and sensitivity of this set of viewers are considered moderate because destination travelers often have a focused orientation. The level of sensitivity is influenced by the rate and frequency of travel. Delivery drivers who often travel a particular route will have less sensitivity than pedestrians who move slowly through an area.
- **High** – Residential and recreational viewers and viewers accessing public places (parks, beaches, etc.) are considered to have comparatively high visual sensitivity. Their views may be of longer duration and higher frequency.

Viewpoints

To assess the potential visual impacts resulting from this project, the existing conditions were reviewed. This work included a photographic inventory of the landscape setting to identify important viewpoints where visual impacts from the project may be observed. This task considered sensitive viewers in determining final viewpoints. Areas of the project not visible from public roadways and lands, including adjacent Port industrial operations, were not included in the analysis. The viewpoints and the project vicinity are illustrated in Figure 4.2-7.

Four viewpoints were determined to assess potential impacts resulting from project:

- **Viewpoint 1** was selected to assess potential impacts for motorists, bicyclists, and pedestrians traveling SR 501 and viewing the storage area (Area 300). This viewpoint is approximately 400 feet from the storage area. Primary viewers include Port tenants and customers, park users traveling to/from Frenchman's Bar and Vancouver Lake parks, and recreational bicyclists. Because of the short duration of view, recreational users passing by the storage area have been assigned moderate viewer sensitivity. Port tenants and customers have been assigned low viewer sensitivity (see Figure 4.2-8).
- **Viewpoint 2** was selected to assess potential impacts for users at Franklin Neighborhood Park and residents of the Northwest Neighborhood. This viewpoint includes two separate sub-viewpoints (Viewpoint 2a and Viewpoint 2b) with slightly different perspectives of the storage area to assess potential impacts for different viewers. It should be noted that other park and residential areas are located closer to the Facility in the Fruit Valley Neighborhood. Because of the flat topography and the existence of natural features and built structures located between the neighborhood and the Facility, the site is not visible from the Fruit Valley Neighborhood. No visual impacts are anticipated. Located on a bluff overlooking the Port, Franklin Park is approximately 1.25 miles from the storage area and the Northwest Neighborhood is approximately 0.65 mile from it. Because of the proximity of residential and park areas to the Facility, viewers have been assigned moderate viewer sensitivity rather than the high sensitivity typically associated with this viewer type (see Figure 4.2-9).
- **Viewpoint 3** was selected to assess potential impacts for commercial maritime and recreational boaters on the Columbia River. Dock facilities located at Area 400, and to a lesser extent the storage area, will be visible from the Columbia River. This viewpoint is approximately 0.30 mile from dock and 0.75 mile from the storage area. Maritime users have

been assigned a low sensitivity. Because of the proximity of boaters to the Facility, recreational viewers have been assigned moderate viewer sensitivity rather than the high sensitivity typically associated with this viewer type (see Figure 4.2-10).

- **Viewpoint 4** was selected to assess potential impacts for motorists traveling NW Old Lower River Road. This viewpoint is approximately 100 feet from the west boiler area (Area 600) and 750 feet from the unloading and office area (Area 200). Traffic through this roadway corridor is relatively light consisting primarily of Port tenants, customers, and agricultural workers. Because of the duration, frequency, and types of user groups traveling through this corridor, a low viewer sensitivity has been assigned (see Figure 4.2-11).

Table 4.2-4 below summarizes the four viewpoints that were selected for this analysis, the sensitivity of viewers, and existing visual quality from these viewpoints.

Table 4.2-4. Viewpoints, Sensitive Viewers, Existing Visual Quality

View Number	Viewpoint	Sensitive Viewers (Sensitivity)*	Visual Quality
1	SR 501, looking west	Motorists, bicyclists, and pedestrians traveling SR 501. Primary users include Port tenants and customers (L), park users traveling to/from Frenchman's Bar and Vancouver Lake parks (M), and recreational bicyclists (M).	Urban/Industrial Rural
2a & 2b	Franklin Neighborhood Park (2a) and Northwest Neighborhood (2b), looking southwest	Park users and residents of the Northwest Neighborhood (M).	Urban/Industrial Rural
3	Columbia River Shoreline, looking north	Maritime (L) and recreational river (M) users.	Urban/Industrial
4	NW Old Lower River Road, looking east	Motorists traveling NW Old Lower River Road (L). Primary users include Port tenants and customers and employees and visitors of adjacent industrial sites (e.g. Tidewater).	Urban/Industrial

*L = low; M = moderate; H = high viewer sensitivity

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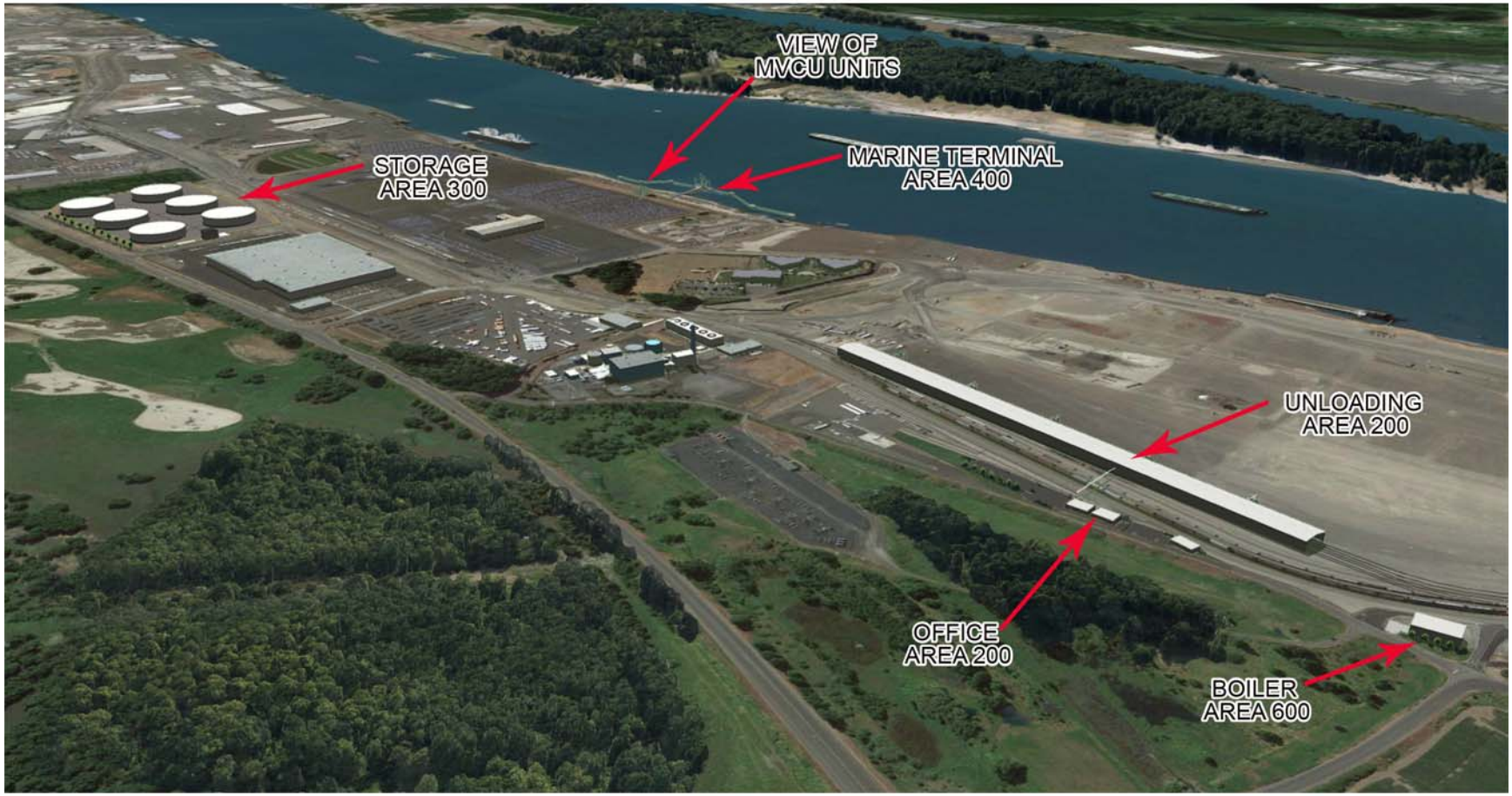
Figure 4.2-5. Historical Aerial Photo



BergerABAM	**Figure 4.2-6. Bird's Eye Photo Simulation**

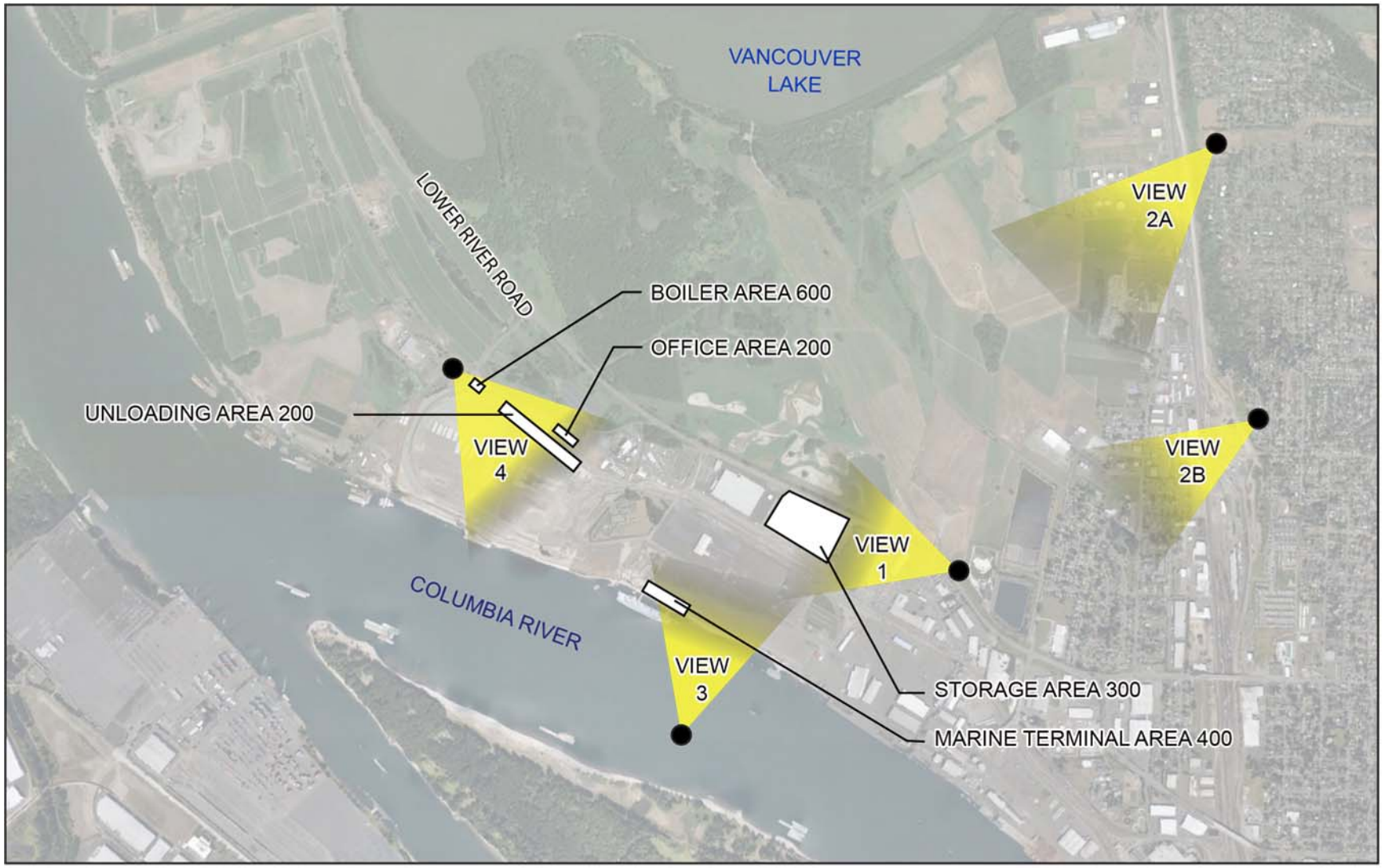


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Figure 4.2-7. Viewpoints and Vicinity

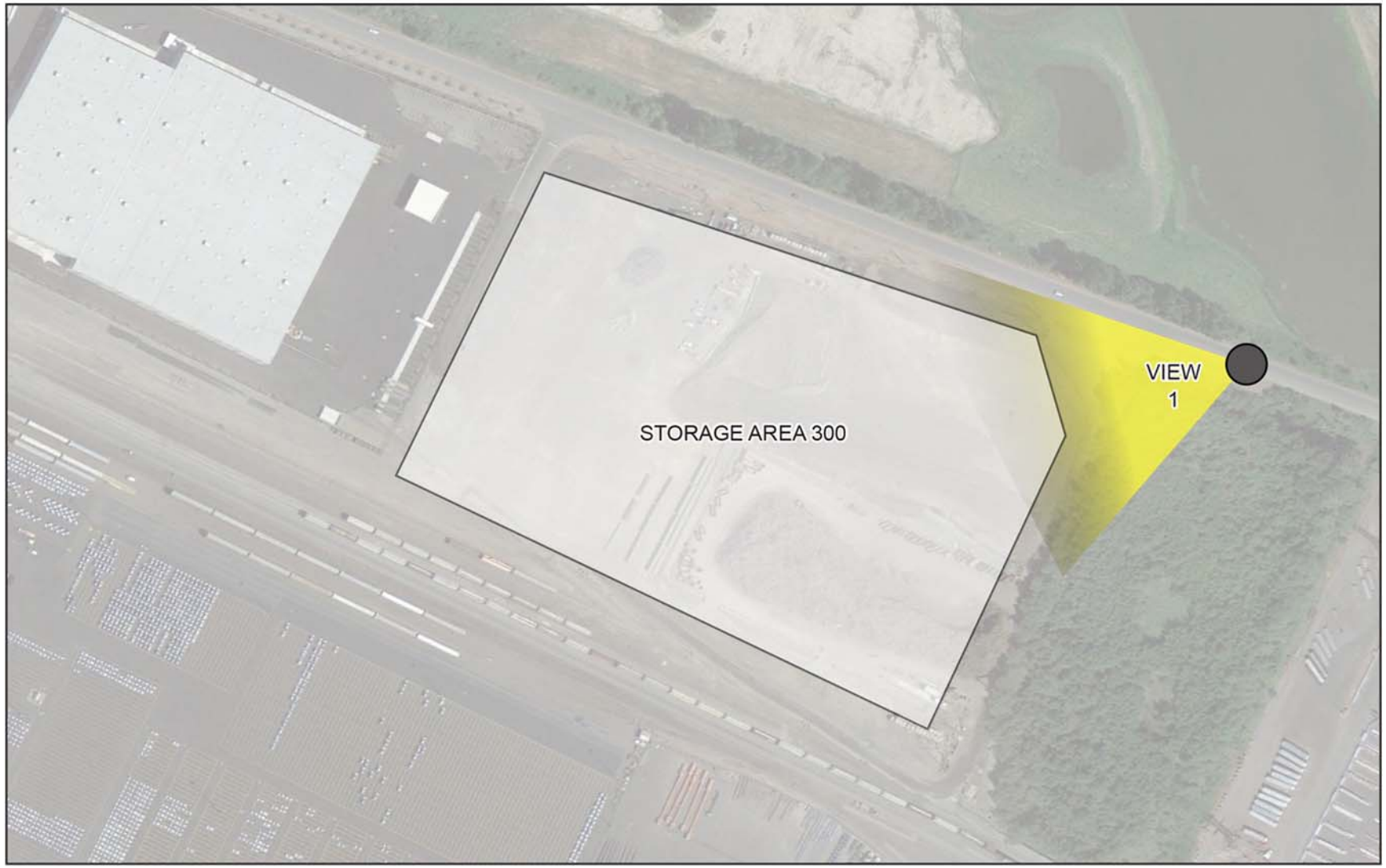

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Figure 4.2-8. Viewpoint 1

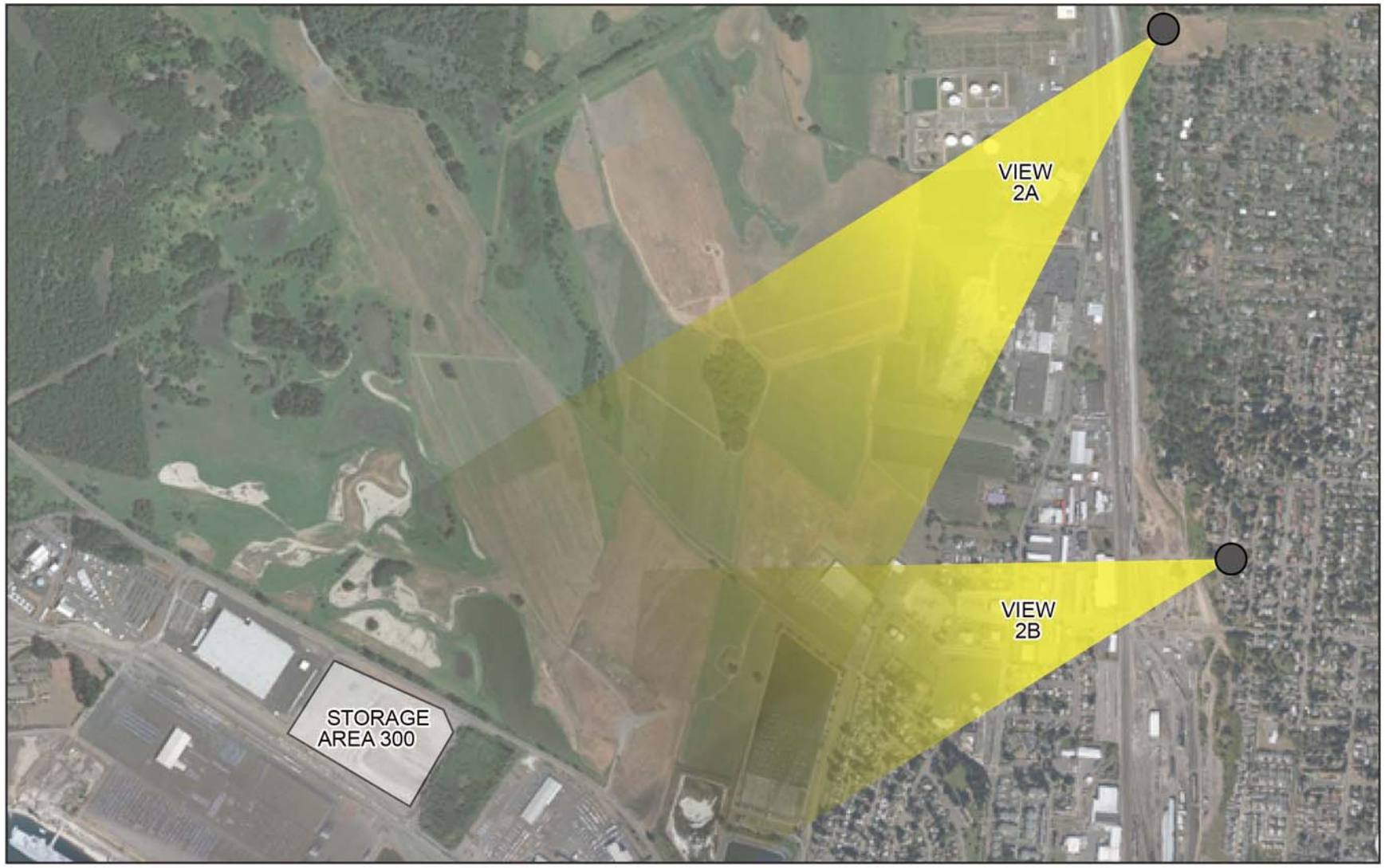

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Figure 4.2-9. Viewpoint 2

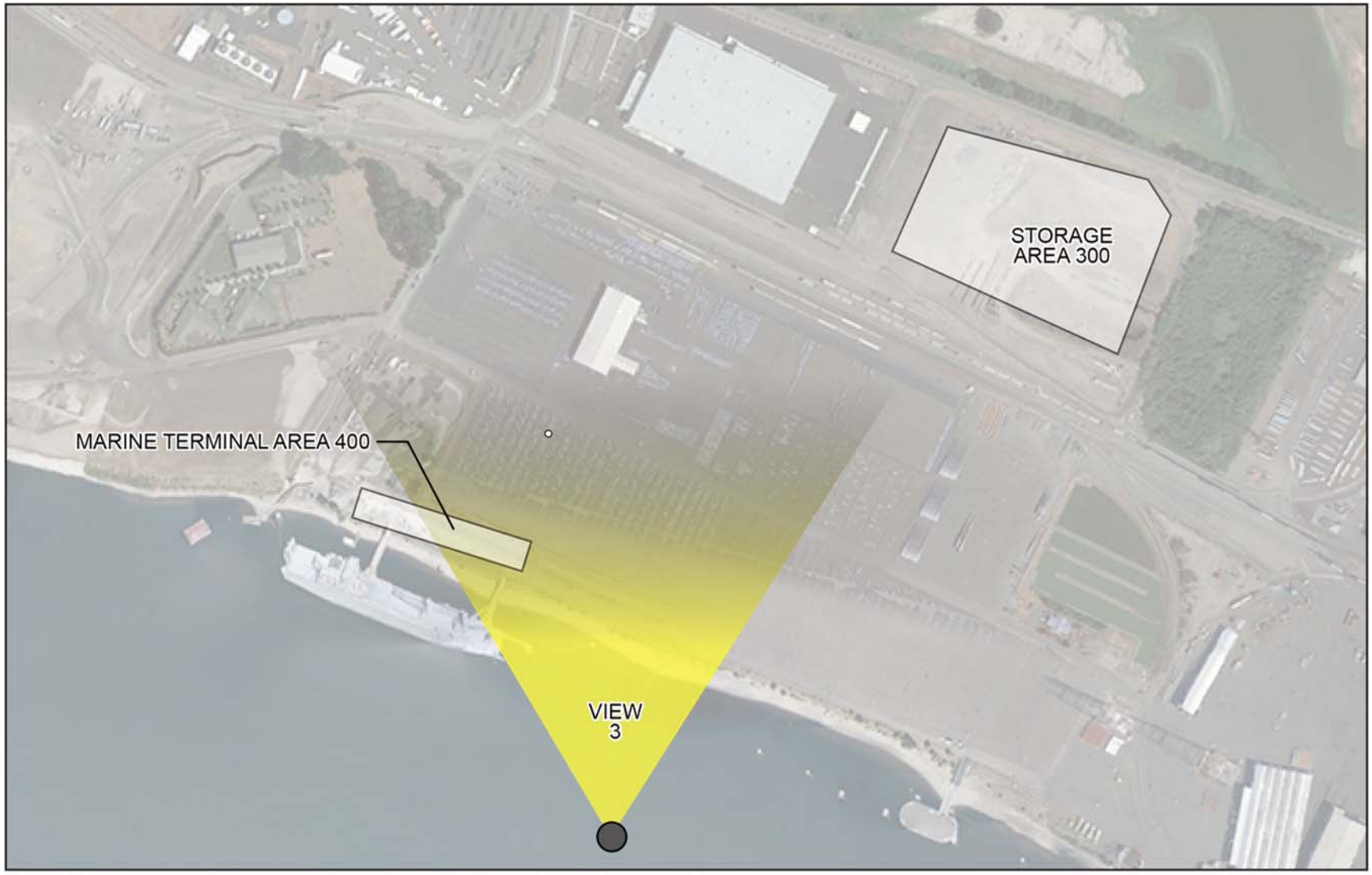

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Figure 4.2-10. Viewpoint 3

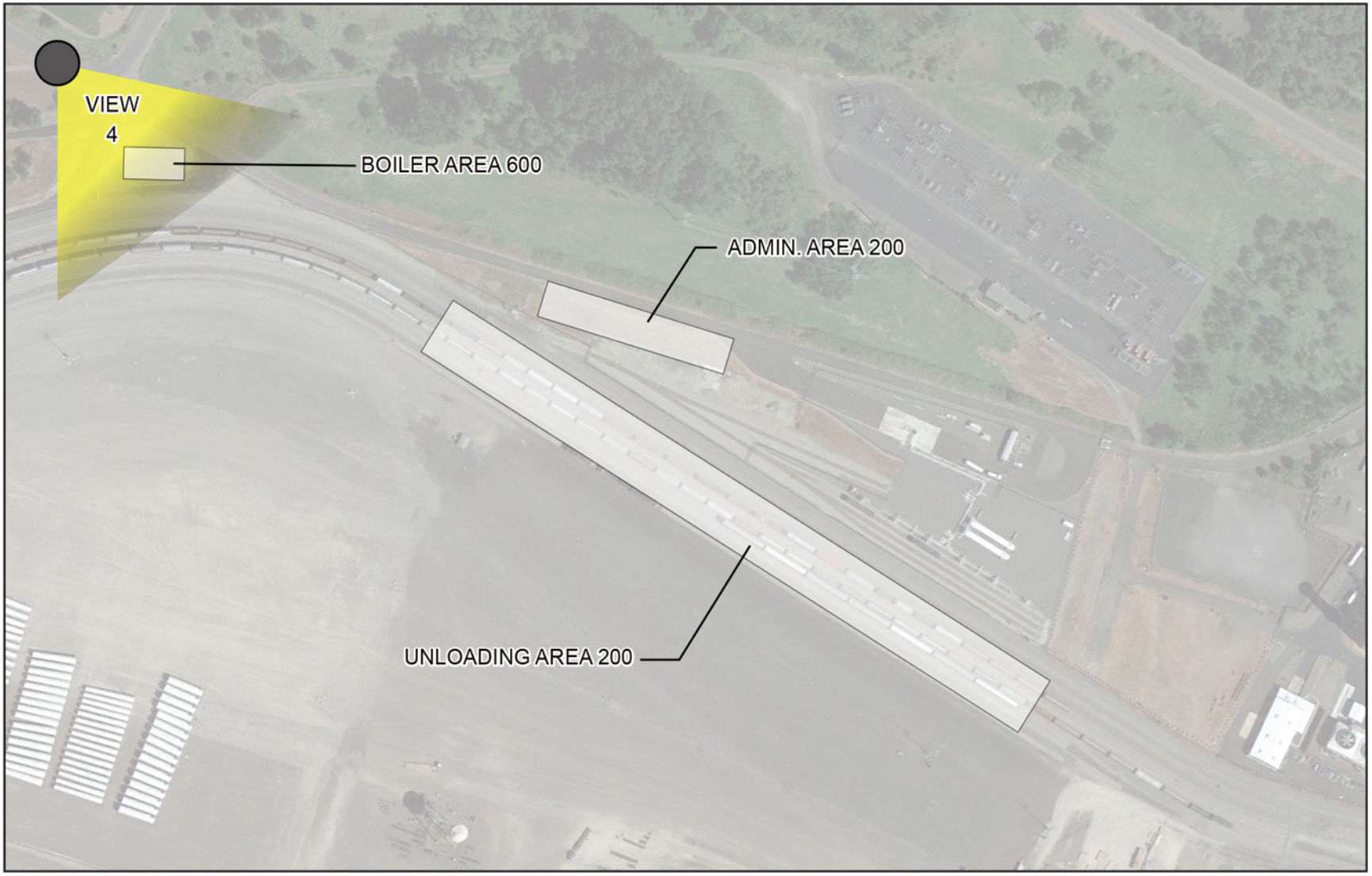

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Figure 4.2-11. Viewpoint 4

4.2.3.3 Visual Assessment

In order to assess the impacts to landscapes and views potentially affected by the proposed Facility, visual simulations were prepared illustrating the constructed condition of the project. The visual simulations were developed using photographs taken with a digital SLR camera from various focal lengths from 27 mm to 105 mm. Photographs were taken of the existing topographic and vegetative features showing both close-in and distant views of the affected adjacent developed, recreation, residential, neighborhood, roadway and river areas. 3-D models and illustrations were created of the proposed structures using a combination of AutoCAD, Google Sketchup Pro, and Adobe Photoshop. The 3-D models were then geo-referenced and placed in Google Earth Pro. Perspective views of the 3-D models were generated for each structure using the camera locations used for the digital photographs. Images exported from the 3-D model were then superimposed over the high-resolution digital photographs to simulate the constructed condition of the built structures and proposed landscape improvements within the existing landscape setting. The digital photographs and the simulations represent before and after images and help describe the visual change associated with this project. No other photo editing or touchup work was done to the simulations.

The tentative heights of the components of the Facility are presented in Table 4.2-5.

Table 4.2-5. Estimated Heights of Components

Structure	Height (feet)
Tanks	48
Boiler Building	45
Administration/Office Building	12
Rail Car Unloading Building	48

The visual simulation task and analysis provided the following visual assessment.

SR 501

The assessment of visual impacts on those who use the public roadway abutting and directly north of the storage area (Area 300) used one vehicle point (Figures 4.2-12 and 4.2-13). Views from other locations along NW Lower River Road will be similar in nature. NW Lower River Road is a vehicular and non-motorized transportation corridor for travelers bound for the Port and for users of the recreation resources in the area such as Vancouver Lake and Frenchman's Bar parks, the Columbia River, and state recreation lands within the Vancouver Lake Lowlands. The Port property to the east of the storage area is covered with trees that obscure most views of the site from the east. Views of the project are apparent as the traveler nears the storage area. The tanks and the containment berm and fencing will be visible from this viewpoint, although the construction of the storage area is proposed to include a 6-foot-high containment berm that will screen most of the industrial activities from pedestrian and vehicular views. The project will include buffer landscaping including street trees, shrubs, and groundcover plantings. The proposed landscape will soften the views of the storage area from SR 501. Although the storage area structures will be visible from SR 501, this view is not inconsistent with other Port industrial facilities and uses along this corridor.

BergerABAM	**Figure 4.2-12. Viewpoint 1 Existing**

BergerABAM	**Figure 4.2-13. Viewpoint 1 Simulation**

Franklin Park and Northwest Neighborhood
This viewpoint (see Figures 4.2-14 and 4.2-15) illustrates the potential visual impacts of the Facility from the urban open spaces overlooking the Port. A second viewpoint – a street-level view from a residential street within the Northwest Neighborhood – was selected. This viewpoint (see Figures 4.2-16 and 4.2-17) illustrates the potential visual impacts of the Facility from the residential neighborhood overlooking the Port. The park and neighborhood are at an elevation approximately 150 feet above the proposed Facility. Although the elevated perspective of this viewpoint provides open westerly views, the distance from the viewpoint to the Facility and the extensive trees and many manmade structures in the foreground restrict views of the proposed structures and the potential impacts are minimal.

Columbia River Shoreline
The project includes buildings and loading structures at the existing marine terminal (Area 400) located on the Columbia River (see Figures 4.2-18 and 4.2-19). The evaluation included the potential visual impacts of the Facility as seen by users at the Columbia River water level. Although the primary use of the river in this area is heavy marine, recreational boaters pass through en route to recreational areas up- and downstream of the project and views are potentially affected by the proposed Facility. The shoreline at the Port includes several docks, piers, and other industrial structures. Because of the working nature of this waterfront, the proposed cranes and structures associated with this project will have limited visual impact to river users.

NW Old Lower River Road
One viewpoint was used to assess visual impacts on those who use the public roadway near the west boiler building and rail car offloading facility. A short segment of NW Old Lower River Road is adjacent to this part of the Facility and the proposed structures may be briefly visible to roadway users traveling through this corridor. The proposed visual simulation (see Figures 4.2-20 and 4.2-21) examines the potential impacts of the Facility on a viewer located in the public right of way. Although the structures will be visible from NW Old Lower River Road, this view is not inconsistent with other Port industrial facilities and uses along this corridor.

Temporary Visual Impacts
Temporary visual changes introduced by construction activities include changes during construction. Viewers will observe earthwork equipment, construction trailers, building construction, and cranes. Construction will last 9 to 12 months and no interim screening will be provided. Standard erosion control measures will be implemented during construction periods.

4.2.3.4 Visual Impacts
In general, visual impacts to the overall landscape setting resulting from construction of the Facility are expected to be low. The proposed uses are similar to the historic, existing and ongoing land disturbances created by other industrial development. Required landscaping along SR 501 and at proposed parking areas will provide screening, shaded areas, and some unity with surrounding landscape when mature (approximately 10 years). The form, color, and scale of buildings and elements will be similar to nearby heavy industrial developments and the Facility will be visually compatible with the industrial land uses surrounding the development.

This analysis examines the aesthetic impacts of this project. The primary concerns are the potential impacts from the residential and recreation areas and recreation users near the site.

BergerABAM	**Figure 4.2-14. Viewpoint 2a Existing**

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Figure 4.2-15. Viewpoint 2a Simulation

BergerABAM	**Figure 4.2-16. Viewpoint 2b Existing**

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Figure 4.2-17. Viewpoint 2b Simulation

BergerABAM	**Figure 4.2-18. Viewpoint 3 Existing**

BergerABAM	**Figure 4.2-19. Viewpoint 3 Simulation**

BergerABAM	**Figure 4.2-20. Viewpoint 4 Existing**

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Figure 4.2-21. Viewpoint 4 Simulation

Because of the industrial nature of the Port, the proposed Facility is generally consistent with the existing land uses and built environment. The visual impact assessment was based on the evaluation of the changes to the existing visual quality and sensitive viewers. Viewer sensitivity should be considered within the context of reasonable expectations of those experiencing views of a heavily industrialized area. The assessment of impacts was based on the visual simulations of the changes portrayed in each image. The levels of impacts are identified as high, moderate, and low:

- **High Level of Impact (H) –** assigned in situations in which the storage area, buildings, or other structures would be highly visible to a high number of sensitive viewers and would impact the visual quality of the landscape setting negatively. Mitigation measures may or may not provide benefit to this level of impact.
- **Moderate Level of Impact (M) –** assigned in situations in which the storage area, buildings, or other structures would be visible to a moderate number of sensitive viewers. Moderate impacts may be generally consistent with adjacent land uses and some mitigation may be required to minimize impacts to sensitive viewers. Views of the storage area from SR 501 are considered to have a moderate level of impact although the mitigation measures that are already part of the project will reduce impacts.
- **Low Level of Impact (L) –** assigned in situations in which the storage area, buildings, or other structures would be minimally visible or visual impacts would be difficult to perceive because of distance, compatibility with other existing land uses, or screening or buffering. Industrial facilities in the foreground of other industrial facilities would not change the visual quality and would be considered a low level of impact. A project that affects a low number of viewers may be a low level of impact. The views from Franklin Park and the Northwest Neighborhood are considered to have low levels of impact because of the distance of the viewpoint from the existing landscape and the manmade structures in the foreground. The views from the Columbia River and NW Old Lower River Road are considered to have low levels of impact because of the viewpoint distance and industrial context.

Potential visual impacts are summarized in Table 4.2-6 below.

Table 4.2-6. Summary of Visual Impacts from Representative Viewpoints

View Number	Viewpoint	Existing Visual Quality	Existing Visual Sensitivity*	Anticipated Visual Impacts*
1	SR 501, looking west	Urban/Industrial Rural	M, L	M
2a & 2b	Franklin Neighborhood Park and Northwest Neighborhood, looking southwest	Urban/Industrial Rural	M	L
3	Columbia River Shoreline, looking north	Urban/Industrial	L, M	L
4	NW Old Lower River Road, looking east	Urban/Industrial	L	L

*Visual sensitivity and impact: L = low; M = moderate; H = high

4.2.3.5 Mitigation Measures

While visual impacts are not considered to be significant, to minimize impacts to all viewpoints, the project will implement the following mitigation measures. These are already required by the City and are standard development requirements. They include:

- Existing trees will be used as landscape buffers and will remain along SR 501 to reduce visual impacts.
- A landscape buffer with street trees, shrubs, groundcovers will be established along SR 501, entrance roads, and facilities along Old Lower River Road.
- Landscaping will be provided in parking lots per City requirements.
- Non-reflecting light colors will be used on structures.

4.2.4 Recreation

4.2.4.1 Inventory of Recreational Facilities

Regionally popular recreational activities include outdoor sports such as boating, windsurfing, fishing, hiking, biking, rock climbing, and camping. As a result of the area's proximity to many rivers, streams, and mountains, many outdoor recreation opportunities are readily available to residents. Recreational opportunities in the immediate vicinity (within an approximately 2-mile radius) of the proposed Facility are listed in Table 4.2-7 and shown in Figure 4.2-22.

Table 4.2-7. Public Park and Recreation Facilities in the Immediate Vicinity of Project

Name of Park/Facility	Facilities	Owner
Vancouver Lake Park	• 234-acre regional park located along the west shore of Vancouver Lake • 2.5 mile trail connection to Frenchman's Bar Park • Lake access with a sandy beach • Playground equipment • Picnic shelters • Restrooms • Hand launched watercraft access • Vancouver Lake Rowing Club	Vancouver-Clark Parks & Recreation (VCPRD)
Frenchman's Bar Park	• 120-acre regional park located on the Columbia River • 2.5 mile trail connects to Vancouver Lake Park • River access with a sandy beach • 8 sand volleyball courts • Playground equipment • Picnic shelters • Restrooms	VCPRD
Shillapoo Wildlife Area (Vancouver Lake Unit)	• 477-acre unit at the south end of Vancouver Lake • Boat launch on the south shore • Trails • Wildlife viewing • Hunting, trapping, fishing • Target Shooting/ trap shooting/archery	Washington Department of Fish and Wildlife (WDFW)

Name of Park/Facility	Facilities	Owner
Burnt Bridge Creek Greenway Trail	• 8-mile hard-surfaced shared-use trail	VCPRD
Franklin Park	• 12-acre neighborhood park • Play equipment • Sports fields • Picnic tables	VCPRD
Fruit Valley Park	• 6-acre neighborhood park • Play equipment • Paved pathways • Picnic tables	VCPRD
Liberty Park	• 0.2-acre park developed in conjunction with the completion of the Mill Plain Blvd. Extension • Play equipment	VCPRD
Various Neighborhood Parks (Lynch, Hidden, Carter, Brickyard, and John Ball Parks)	• Small neighborhood parks (approximately 1 to 5 acres) located in neighborhoods west of I-5 and south of Burnt Bridge Creek • Play equipment • Multi-use fields/open lawn areas • Picnic tables	VCPRD
Kelly Point Park	• 102 acre multi-use park • Canoe launch • Restroom • Historical site • Paved and unpaved trails • Picnic tables • Willamette and Columbia River Access	Portland Parks and Recreation
Smith & Bybee Wetlands Natural Area	• Approximately 2,000 acre natural area • Paved 1-mile trail • Wildlife viewing platforms • Boat launch	Metro

The City's comprehensive plan identifies the various types of parks in the community as neighborhood parks, community parks, regional parks, natural areas and open space, and trails and greenways (City of Vancouver, 2011). Neighborhood parks are approximately 2 to 5 acres in size and provide access to basic recreation opportunities for residents located nearby the park, community parks are typically 20 to 100 acres in size and provide a gathering place for larger groups of users, Regional parks serve residents both throughout the County and beyond and are typically larger than 50 acres in size and provide a diversity of recreational opportunities. Natural areas and open space are reserved for primarily undeveloped spaces that are managed for natural, ecological values as well as for light-impact recreational uses. Lastly, trails and greenways provide paths for non-motorized travel or passage by the general public. There are additional parks and recreation areas beyond the immediate vicinity of the proposed project area. These parks are not addressed in greater detail here because no impacts are anticipated because of their distance from the Facility.

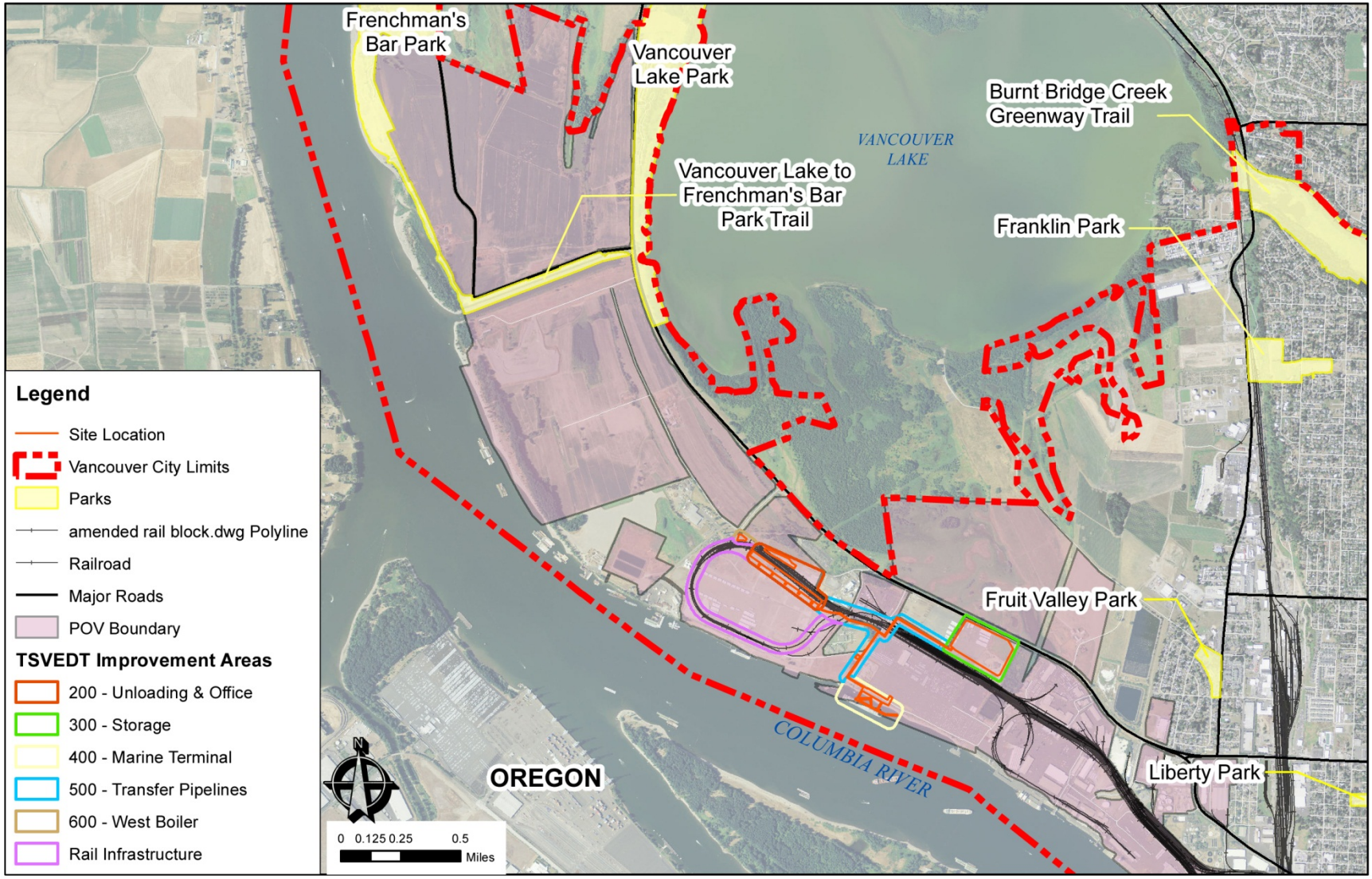

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Figure 4.2-22. Viewpoint 4 Simulation

In addition to established parks and recreational facilities, other recreation areas and sites are located within the vicinity of the Facility. These include NW Lower River Road, which is used for biking, and the Parcel 1A trail, which is a 1,200-foot-long path that runs along the south side of NW Lower River Road from Gateway Avenue to the eastern boundary of the parcel, and provides biking, walking, and wildlife viewing. In addition, the Columbia River is used for boating, fishing and other forms of water recreation.

There are three national recreation areas within 25 miles of the proposed Facility. Fort Vancouver National Historic Site approximately 3 miles to the southeast provides a variety of programs, hands-on educational activities, and living history events. The western end of the Columbia River Gorge National Scenic Area approximately 25 miles to the east provides many outdoor activities, including camping, hiking, fishing, boating, windsurfing, and wildlife viewing. The southeastern corner of the Gifford Pinchot National Forest is located approximately 25 miles to the northeast of the Facility; the national forest provides opportunities for recreational activities including camping, cabins, backpacking, hiking, biking, fishing, hunting, and winter sports.

4.2.4.2 Parks and Recreation Plans

The City and County completed the *Vancouver-Clark Comprehensive Parks, Recreation, and Open Space Plan* in May 2007. This plan covers both jurisdictions and is under the jurisdiction of the consolidated Vancouver-Clark Parks and Recreation Department (VCPRD). The plan identifies current and future recreational needs in the area and establishes priorities for the development of parks, open space, and recreational facilities. The plan also provides a framework for establishment of park policies.

The proposed Facility will not have any direct impact on current or planned park and recreation areas. The development will occur entirely within IND-designated lands zoned for high-intensity development. Therefore, the proposed Facility will not interfere with the goals and objectives of the park plan.

The proposed Facility will not be required to dedicate land for park or open space and/or pay any park impact fees as industrial development is not subject to these requirements. No state or federal recreation regulations or plans apply to the proposed Facility.

4.2.4.3 Impacts

There are no long-term impacts anticipated to recreational facilities as a result of the proposed Facility. No park land or other recreational facilities will be directly impacted by development of the proposed Facility. The increases in the number of area employees attributable to construction and operations employees will be small portions of the population currently served by the park system and the increased use of recreational facilities will likely not be perceptible. There may also be temporary noise and/or visual impacts during construction, but the activities will be similar in nature to other Port activities and are not anticipated to affect recreational facilities or those using these facilities.

4.2.4.4 Mitigation Measures

As stated above, impacts to recreation users and facilities are not anticipated or will be temporary in nature and will occur during the construction phase. Mitigation measures specifically related to noise and air quality will minimize potential impacts during construction.

4.2.5 Historic and Cultural Preservation

4.2.5.1 Introduction

WAC 463-62-362 (5) requires that the Applicant identify all historical and archaeological sites within the area affected by construction and operation of the Facility, and coordinate with the Washington State Department of Archeology and Historic Preservation (DAHP) and interested tribe(s). Archaeological Investigations Northwest, Inc. (AINW) completed the cultural resource review presented below to identify all historical and archaeological sites within the area affected by construction and operation of the Facility. The discussion below presents information in response to this requirement.

4.2.5.2 Coordination

On July 30, 2013, Applicant representatives and AINW and BergerABAM staff, met with Robert Whitlam, State Archaeologist, to introduce the project and discuss cultural and historic resources potentially present at the site. The cultural resources review methodology was described and the results of the review were presented.

To initiate Tribal coordination as required by WAC 463-62-362 (5), correspondence was sent to cultural resource representatives of the Cowlitz Indian Tribe, Confederated Tribes of the Grande Ronde Community Oregon, Chinook Tribe, Confederated Tribes of the Chehalis Indian Reservation and the Yakama Indian Nation by AINW on behalf of the Applicant requesting information on cultural resources, or any other concerns that the Tribe might have with this development. Copies of these letters are attached in Appendix A. Coordination between the Applicant and the Tribes is ongoing.

4.2.5.3 Study Area

The proposed Facility is located at the Port in Vancouver, Clark County, in the western lowlands region of Washington. The project is in the Port's industrial area, bounded on the north by NW Lower River Road and the Columbia River to the south. The cultural resources study area for purposes of this application are those areas to be directly impacted by construction activities located within sections 18, 19, and 20 Township 2 North, Range 1 East, Willamette Meridian. The study area includes the Facility site boundary, as well as the area contained within the temporary construction boundary and temporary laydown areas (see Figure 2.17-1).

4.2.5.4 Environmental Setting

The site is located along the Columbia River. Industrial land surrounded by scattered marshes, wildlife areas, and agricultural parcels characterize the Columbia River landscape in the vicinity. Vancouver Lake is approximately 0.6 mile to the northwest. Material dredged from the Columbia River blankets the rivershore (McGee 1972: Plate 56).

Topographically, the site is flat, although the parts closest to the Columbia River slope steeply from the top of the cut bank down to the shoreline. The steepest grades are near the shoreline, where slopes exceed 25 percent from the top of the bank to the riprapped shoreline. Elevation ranges from about 11 feet above MSL at the shoreline to about 33 feet above MSL in the northern portions of the study area.

The present-day environmental setting has been altered substantially from the historic landscape. The site is generally covered with impervious surfaces related to industrial development and recent surface improvements by the Port. Most of the surface has been filled, paved, and/or

capped in association with developments and remediation activities. Today, the study area is covered by gravel, asphalt, sand, or fill materials related to Port development. Vegetation is generally limited to grasses, non-native weedy herbaceous vegetation, and shrubs.

Prior to substantial alterations of the landscape, early maps and aerial photographs show the current site as a low-elevation wetland along the floodplain (U.S. Army Corps of Engineers [USACE] 1940; U.S. Geological Survey [USGS] 1914, 1921). The 1860 General Land Office (GLO) map reveals small floodplain lakes slightly inland from the shoreline surrounded by marshy areas on either side of the current project area (GLO 1860). Higher elevation terraces were situated to the north of the riverbank.

The study area was formerly wetland prairies and scrub forest and was used historically for agriculture, dairying, pasture lands, and orchards. Over the years, significant landscape changes such as levee construction, dredge spoil deposition, and past and recent industrial developments have altered the original landscape. Based on an aerial photograph from 1935, the western end of the Port's facility was used for agricultural activity (USACE Photo 35-452). An aerial photograph from 1966 shows dredge deposits along the shoreline of the Columbia River (USACE Photo 66-294). A photograph from 1980 shows some agricultural activity, although the area was barren and sandy from the placement of dredge material. By 1991, the area was covered completely by dredge deposits. Aerial photographs from 1940 to the recent period show a change in the shoreline as well as the inland portion of the site (Figure 4.2-23).

4.2.5.5 Cultural Setting

Native Peoples – Prehistoric Period

The archaeological record for the Columbia River bottomlands (also known as the Portland Basin) region is typically limited to sites dating to the last 3,000 years, probably owing to land subsidence coupled with rising sea levels. Sites are located along major waterways, including the Columbia and Willamette rivers and Vancouver Lake. Repeated flooding of waterways and rising Holocene sea levels have removed or deeply buried many low-lying archaeological sites within the Portland Basin (Ames 1994; Pettigrew 1990). Several large village sites dating to later periods have been well studied; these include the Cathlapotle site (45CL1) near Ridgefield, the Meier site (35CO5) near Scappoose, Oregon, and the Sunken Village site (35MU4), which is located on Sauvie Island (Ames et al. 1992, 1996; Croes et al. 2007). Older sites, those predating 3,000 to 3,500 years, tend to be found in uplands at higher elevations. In the County, older sites are found on terraces well above floodplains. Excavations at Sunset Ridge (45CL488) and Morasch Terrace (45CL428) in Camas and Gee Creek (45CL631, 45CL632, and 45CL810) southwest of Ridgefield have been dated to older than 5,500 years ago and some as early as the Late Pleistocene (Ozbun and Reese 2003; Punke et al. 2009; Woodward and Associates 1996). These sites demonstrate that older, datable archaeological deposits are located within the County; however, such sites are less common in the bottomlands.

Late Prehistoric native peoples of the lower Columbia region and the greater Northwest Coast area were considered to be complex hunter-gatherers (Ames and Maschner 1999). These complex hunter-gatherers maintained a hunter (including fishing) gatherer mode of subsistence rather than agricultural practices, and had sophisticated social structures and cultural traditions usually found in agricultural societies. Lower Columbia River groups were residentially sedentary and occupied large plankhouses, were socially stratified by wealth and ascribed status,

and maintained some of the highest population densities in native North America (Ames and Maschner 1999).

Native Peoples – Contact Period

The Columbia River bottomlands region is within the traditional territory of Chinookan-speaking peoples, specifically those who spoke the Multnomah dialect (Silverstein 1990:534). Chinookan-speaking groups possessed cultural traditions bearing similarities to groups on the Pacific Northwest Coast as well as the Columbia Plateau (Silverstein 1990). Chinookan-speaking peoples were ethnohistorically documented as living in large villages comprising one or more plankhouses along major waterways (Moulton 1990).

The Cowlitz, an inland group, regularly traveled to the Columbia River bottomlands. The Cowlitz people were culturally distinct from neighboring tribes, including the Chinook (Hajda 1990). The Lower Cowlitz spoke a Salish dialect and occupied the lower reaches of the Cowlitz River and its tributaries.

Subsistence was based on seasonal availability and included seasonal fish runs of salmon, sturgeon, eulachon, and freshwater fishes; birds; aquatic mammals; and land mammals, primarily deer and elk. Plant foods were seasonal as well and included berries, nuts, and roots as well as bulbs and tubers, such as camas and wapato. Camas and wapato were especially important resources and were harvested in excess for trade (Hajda 1990). People maintained permanent winter villages along the major waterways and temporarily moved to hunting, fishing, and gathering locations for parts of the year (Silverstein 1990).

Euroamerican Settlement-Historical Overview

By the 1840s, most of the County, including the proposed Facility site, was claimed by the Hudson's Bay Company (HBC), a British fur-trading enterprise that established Fort Vancouver in 1825 east of the site. The HBC used the north shore of the Columbia River, in the vicinity of the study area, for farming, pasture land, and dairying (GLO 1854; Moore et al. 1997).

The GLO map from 1863 shows Parcel 1A within the former Donation Land Claim (DLC) of H. Van Allman (DLC No. 57). Henry Van Allman was born in Switzerland and immigrated to the Oregon Territory in 1847. In that same year, Van Allman settled his DLC of 311.37 acres (Clark County Genealogical Society 1989). In 1859, Joseph Petrain purchased the Van Allman DLC and used the land for grazing livestock and agriculture (Downing 1883 as cited in Moore et al. 1997). Petrain was born in Canada and arrived in the County in 1836 as an HBC employee (Clark County Genealogical Society 1989).

Terminal 5 is within the former DLC of J.H. Matthews (DLC No. 44) (GLO 1863). John Harvey Matthews emigrated on the Oregon Trail from Indiana and settled his DLC of 289.06 acres in 1852 (Clark County Genealogical Society 1989). The 1929 Metsker Map for Township 2 North, Range 1 East, Willamette Meridian depicts Parcel 1A as part of a larger property owned by the Grays Harbor Lumber Company, and Terminal 5 as owned by the Spokane Portland and Seattle Railway (Metsker Maps 1929). The Grays Harbor Lumber Company acquired the property as a site for a sawmill (Van Arsdol 1964 as cited in Morris et al. 1997).

The original course of Lower River Road (now NW Old Lower River Road) is shown on the early GLO maps and the 1897 USGS 15-minute quadrangle map for Portland, Oregon (USGS 1897). The road originally paralleled the Columbia River along the natural terrace above the

shoreline, which passed through the current study area. By 1905, the road was shifted north in the current alignment of NW Old Lower River Road (USGS 1905, 1954).

The Port was established in 1912 and soon entered into a contract with G.M. Standifer Construction Corporation to build a shipyard (to the east of the current project area) to aid the World War I effort. Terminal 1 at Vancouver Landing was acquired in 1925, and a grain export facility was constructed in 1934 at Terminal 2. Harbor cranes were acquired at Terminal 2 for unloading large shipments in 1959. Terminals 3 and 4 were developed by 1963. The berths included in the study area were constructed in the 1980s . In 2009, the Port acquired acreage formerly owned by the Evergreen and ALCOA aluminum industries to develop the Port's marine Terminal 5. The rail loop at Terminal 5 was completed in 2010 (Port of Vancouver USA 2013).

4.2.5.6 Cultural Resource Assessment

Records Review

AINW reviewed records available online from the Washington Information System for Architectural and Archaeological Records Data and materials in the AINW library to determine whether archaeological or historic-period resources had been identified within or near the study area. The records search was also done to determine if surrounding areas had been previously surveyed for archaeological resources that might extend into the study area. The study area is located within the Level A, or high (80 to 100 percent) probability on the County archaeological predictive model, and is a "Survey Highly Advised: Very High Risk" area in DAHP's Washington Statewide Predictive Model. The records indicate that several cultural resource studies have been previously conducted within the study area and archaeological resources have been previously recorded in the vicinity of, but not within, the current study area. Table 4.2-8 summarizes the previous studies chronologically, and Figure 4.2-24 shows their locations with respect to the study area.

Table 4.2-8. Previously Recorded Cultural Resource Studies

Author	Date	Area Investigated	Findings
Thomas and Welch	1982	Parcel 1A	• 20th century dairy farm (outside the study area) • Section of original Lower River Road (outside the study area) • Dredge fill from shoreline to 800 feet inland
Forgeng and Reese	1993	Parcel 1A	• No cultural resources • Dredge fill up to 5.3 feet deep on the southern half
King	1995	Parcel 2 (north of the study area)	• 45CL408 (outside the study area)
Thomas	1995	Cogentrix Power Plant (north of the study area)	• No cultural resources • Dredge fill up to 10 to 15 feet deep

Author	Date	Area Investigated	Findings
Moore et al.	1997	Jail Work Center	• No cultural resources • Dredge fill up to 4 feet deep • Sterile native soils identified
Ellis and Mills	1998	Jail Work Center	• No cultural resources
Becker and Roulette	2003	Terminal 5	• No cultural resources • Dredge fill up to 20 feet deep on Columbia River bank and up to 4 to 9 feet thick further inland
Zehendner and Fagan	2008	Columbia River shoreline	• No cultural resources • Dredge fill deposition has substantially changed the shape and elevation of shoreline
Reese	2009a	Terminal 4 Parcel 1A	• No cultural resources • Dredge fill
Reese	2009b	Terminal 4 Pond Reconstruction	• No cultural resources • Dredge fill 3 to 6 m (10 to 20 ft)
Fagan and Zehendner	2009	Terminal 5	• No cultural resources • Dredge fill deposition has substantially changed the shape and elevation of shoreline
Hetzel et al.	2009	West Vancouver Freight Access Terminal 5 Jail Work Center	• No cultural resources • Dredge fill
Chapman and Blaser	2010	Terminal 5	• No cultural resources • Dredge fill
Davis and Ozbun	2011	Parcel 2 (north of the study area)	• No cultural resources • Sterile native soils identified
Jenkins and Davis	2012	Parcel 2 (north of the study area)	• No cultural resources • Sterile native soils identified
Fuld and Reese	2012	Jail Work Center	• No cultural resources • Dredge fill and disturbance

Vancouver Lakes Archeological District – The study area is within the boundary of the Vancouver Lakes Archaeological District (45DT101). This district included 125 sites when it was determined eligible for listing in the National Register of Historic Places (NRHP) in 1982 (Burd 1982). The district encompasses 3,706 acres of alluvial floodplain of the Columbia River, Vancouver Lake, Lake River, the Lewis River, and other associated water bodies. Prehistoric sites in the district range from small lithic scatters to the remains of large winter villages.

Historic-period sites reflecting the early settlement of the County are common in the district as well. While several archaeological sites have been identified near Vancouver Lake, no recorded resources were identified within the present study area.

NW Old Lower River Road Area – Three cultural resource studies were conducted on the north side of NW Old Lower River Road in the Port's Parcel 2, approximately 50 feet north of the portion of the current study area located in Terminal 5 (Davis and Ozbun 2011; Jenkins and Davis 2012; King 1995). One was a cultural resource survey for a utility substation and access road and included a pedestrian survey and excavation of six shovel tests (Davis and Ozbun 2011). Shovel tests appeared to be in undisturbed native soils; however, no archaeological materials were observed. Another study was a predetermination survey for a tree mitigation project and consisted of a pedestrian survey and excavation of four shovel tests (Jenkins and Davis 2012). Shovel tests appeared to be in undisturbed native soils, but no archaeological materials were observed. These recent cultural resource investigations encountered undisturbed native soils but did not encounter archaeological deposits.

Another study was a cultural resource survey for the River Road project (formerly the Cogentrix Pipeline Lateral project) (King 1995). The survey consisted of a pedestrian survey, shovel testing, and auger probing to tests for deeply buried deposits. While no archaeological materials were observed immediately north of the present study area, one archaeological site, 45CL408, was identified during this project and is located approximately 0.6 mile northwest of the present study area (King 1995).

Another cultural resource study close to the study area was conducted for a power plant project within a portion of the old Alcoa facility, located immediately adjacent to the present study area (Thomas 1995). A pedestrian survey was conducted and dredge fill material was noted on the surface. No archaeological materials were observed (Thomas 1995).

Parcel 1A Area – Parcel 1A was first investigated in 1982 as part of a larger survey (Thomas and Welch 1982). This investigation included a pedestrian survey and excavation of 30 shovel tests and augers. Although no archaeological materials were identified in subsurface excavations, the ruins of a 20th-century dairy farm and a portion of the original alignment of Lower River Road were observed southeast of the present study area. Thomas and Welch (1982) state that dredge spoils covered the entire Columbia River beach from the shore to 800 feet inland. Monitoring was recommended in high probability areas and in the vicinity of the old dairy farm and no further work was recommended in the present Parcel 1A study area (Thomas and Welch 1982).

Parcel 1A was investigated again in 1993 for the Port's initial development of the larger Parcel 1 site. During the 1993 study, the area between the BNSF rail track and NW Lower River Road was described as a relatively undisturbed area with a series of ridges, swales, sloughs, and lakes formed by the changing course of the Columbia River over thousands of years (Forgeng and Reese 1993:1). A pedestrian survey was conducted and several backhoe trenches were excavated south of the railroad tracks to explore for buried archaeological sites. Trench excavation revealed dredge fill up to 5.3 feet deep in some places. No archaeological materials were identified and Forgeng and Reese (1993) concluded the native surface of Parcel 1 had been greatly impacted when dredge materials were deposited.

The Parcel 1A and berths 13 and 14 portions of the study area were investigated in 2009 for the Port's Terminal 4 improvements project (Reese 2009a). The Terminal 4 improvements included

the expansion and upgrades of the Subaru facility and creation of marine cargo laydown area within Parcel 1A. Background research and a records review revealed much of the site had been surveyed. A pedestrian survey was conducted in areas that were never surveyed for cultural materials. Sandy fill was observed throughout the survey area and no artifacts were identified. No further work was recommended (Reese 2009a).

Terminal 5 Area – The Terminal 5 portion of the study area was first investigated in 2003 for the Alcoa remediation project (Becker and Roulette 2003). The investigation included background research, analysis of bore log data, and a limited pedestrian survey. The pedestrian survey was conducted in areas where excavation would occur, south of the study area. The bank of the Columbia River was described as consisting of about 20 feet of dredge fill covered with riprap. An analysis of bore log data revealed that between 4 and 9 feet of dredge fill caps native soil. The pedestrian survey did not identify native soils or artifacts and monitoring was recommended for areas where deep excavation may encounter native soil (Becker and Roulette 2003).

Background research and a records review were conducted for the Terminal 5 portion of the study area in 2009 for the Alcoa/Evergreen development project (Fagan and Zehendner 2009). This investigation revealed that the shape and elevation of the north shore of the Columbia River had substantially changed when fill materials were added to facilitate construction of the Alcoa facility in the 1940s. Based on the historical evidence of extensive fill deposits on the parcel and because no archaeological deposits have been identified within or adjacent to the former Alcoa facility, no further archaeological work was recommended (Fagan and Zehendner 2009).

The Jail Work Center property, which borders the study area, was archaeologically investigated in both 1997 and 2012 (Ellis and Mills 1998; Moore et al. 1997; Fuld and Reese 2012). The 1997 fieldwork included a pedestrian survey and excavation of 18 shovel tests and 8 shovel scrapes. Coarse sand and gravel dredge fill deposits were observed on the surface and up to 4 feet deep throughout most of the property. Native soils were identified; however, they consisted of sterile flood deposits. No artifacts were observed during the 1997 survey (Moore et al. 1997). The area Ellis and Mills (1998) examined overlapped with the Moore et al. 1997 survey area. The 2012 fieldwork consisted of a pedestrian survey of a portion of the property. Disturbance representing continual modification of the area and dredge fill deposits were identified, and no artifacts were observed (Fuld and Reese 2012).

Three archaeological studies were performed in the project area in association with the Port's WVFA project (Hetzel et al. 2009; Reese 2009a, 2009b). These studies found no evidence of prehistoric or historic-period archaeological sites. The rail siding was determined to be not eligible for listing in the NRHP (Hetzel et al. 2009). Numerous other archaeological studies have taken place in the immediate vicinity of the study area (Becker and Roulette 2003; Forgeng and Reese 1993; Thomas and Welch 1982).

A cultural resource study was conducted approximately 575 feet south of the present study area in Terminal 5 for a bulk potash handling facility (Chapman and Blaser 2010). A field inspection was conducted to identify archaeological or historic resources. The entire project area had been graded, resurfaced, and covered with gravel, asphalt, or loose sand. Fill materials were observed on the shoreline. No archaeological or historic resources were observed. Remnants of buildings and structures associated with the former Alcoa plant were observed, but none were older than 50 years in age. Construction monitoring was recommended for areas of proposed excavation

below the fill level and into native soils (Chapman and Blaser 2010). Construction monitoring did not identify archaeological deposits.

Columbia River Shoreline Area – In 2008, background research and a records review were conducted for the Columbia River shoreline for a sediment remediation project at the former Alcoa facility (Zehendner and Fagan 2008). This study revealed the north shore of the Columbia River had undergone substantial changes in shape and elevation as dredge fill materials were gradually added during construction of the Alcoa facility. Aerial photographs from 1940 to recent times show the original Columbia River shoreline had been covered with fill and extended south well beyond the former shoreline (Zehendner and Fagan 2008).

Additional Surveys

As described above, several studies within the study area and in the vicinity have noted that dredge fill deposits from 4 to 20 feet thick cover the area. Based on the historical evidence of extensive fill deposits and the fact that several archaeological surveys and subsurface testing projects have found no evidence of intact archaeological deposits within or adjacent to the project area, an archaeological survey was not necessary for this project.

Impacts

All of the study area and the surrounding area have been studied extensively for cultural resources through previous surveys. No cultural resources or archaeological deposits have been found.

Although the study area is within the Vancouver Lakes Archaeological District (45DT101) and the area is mapped as Level A, or high (80 to 100 percent), probability on the County and Washington archaeological predictive model, no archaeological sites have been identified within or adjacent to the study area. Many of the archaeological sites in the area between Vancouver Lake and the Columbia River are found near wetland environments. Because of the marshy floodplain topography, archaeological sites are generally found on higher land than the study area, although buried features have been found in saturated soils. These sites are outside of the study area and would not be impacted.

4.2.5.7 Mitigation Measures

While findings from previous studies indicate a low likelihood for encountering cultural material during construction, an inadvertent discovery plan will be prepared and implemented. The inadvertent discovery plan will include, but not be limited to, these elements:

- Because of the possibility of encountering intact soils beneath the fill in some areas of the study area, and because the study area has been included in previous surveys, if project construction reaches the depth of intact native soils, archaeological monitoring will be conducted if soils are excavated to the surface.
- Should any archaeological resources be found, ground-disturbing activities will be halted in the area of the find in accordance with RCW 27.53.060 (Archaeological Sites and Resources) and RCW 27.44.020 (Indian Graves and Records). Following the stop work, a professional archaeologist will be called to assess the significance of the find and DAHP will be notified to define a course of action.

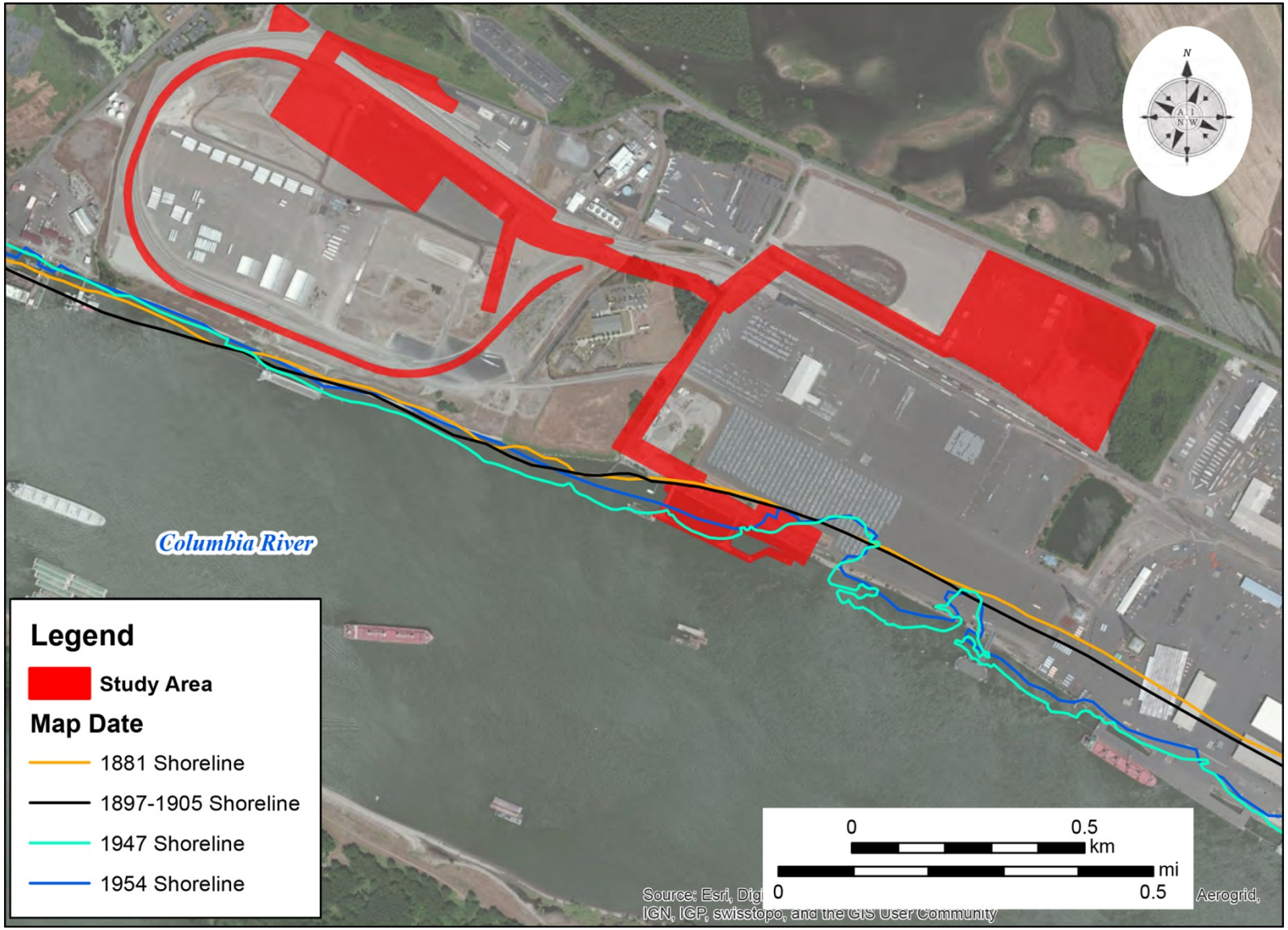

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Figure 4.2-23. Historical Shoreline Configuration

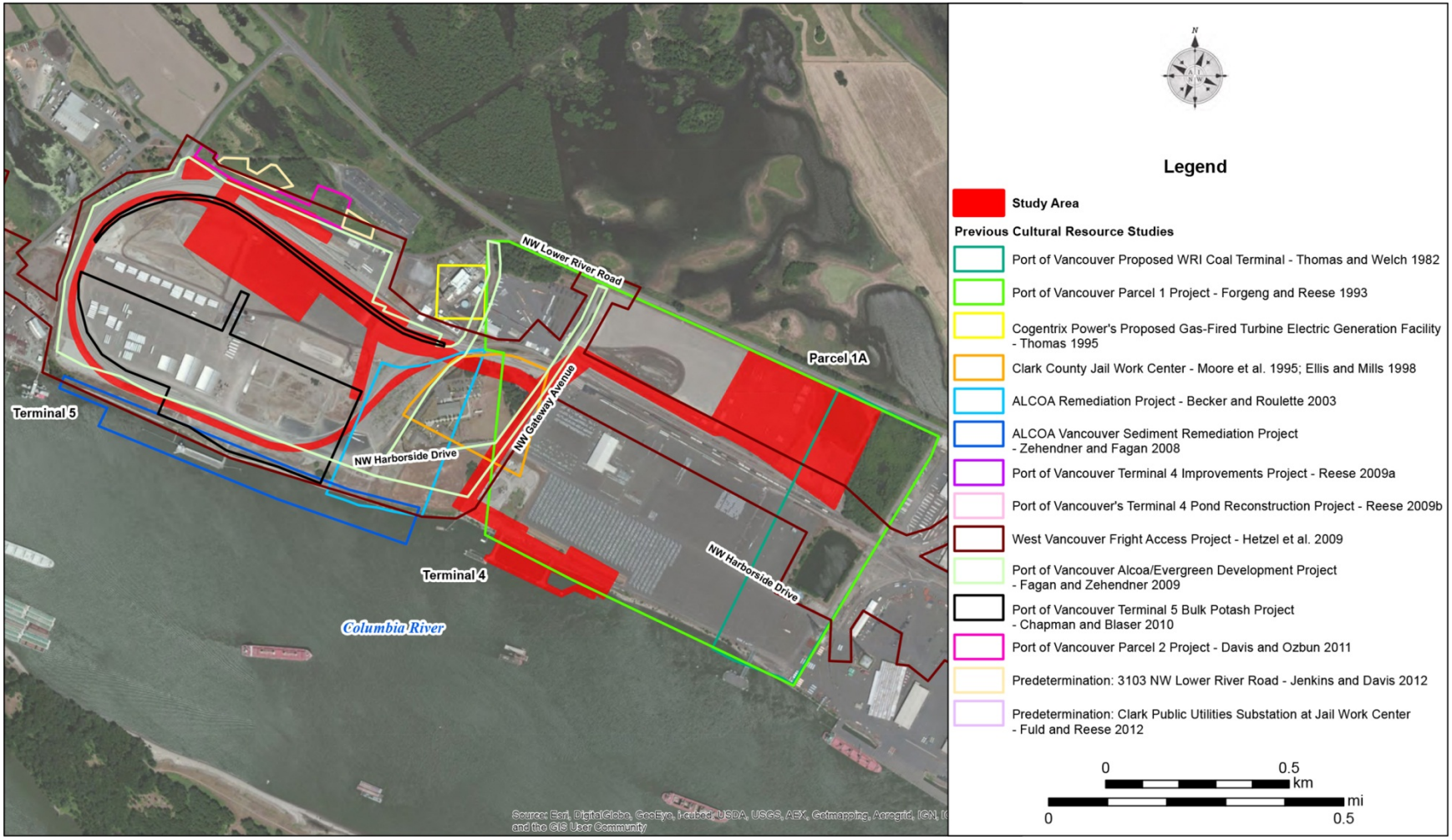

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Figure 4.2-24. Previous Cultural Resource Studies

4.2.6 Agricultural Crops/Animals

4.2.6.1 Existing Conditions

The proposed Facility is not currently used for agricultural purposes. Terminal 5 has been used for industrial purposes since the establishment of the Alcoa facility in the early 1940s (Anchor Environmental LLC 2008) and there is no indication of the previous use of the site for agricultural crops or for grazing. As described in the cultural resource review report completed by AINW dated July 5, 2013, land where Parcel 1A is located was identified as having been used for grazing and agriculture in the late 1800s and early 1900s and the Terminal 5 property would likely have been used for the same purpose. More recently, the Port has used the site as a cargo laydown area.

Agriculture in the vicinity of the proposed Facility began in the 1950s when the wetlands associated with the Shillapoo lakebed were drained to be used for farming (WDFW 2006). The Shillapoo Wildlife Area is now managed to restore wetland and wildlife habitat, although some farming still occurs on these properties. While there are lands near the project area that are still farmed, the lands are zoned agricultural/wildlife (AG-WL), which, according to the zoning code, are lands where agricultural and wildlife uses should be protected and preserved. The following agricultural land occurs within 1.5 miles of the site. The lands zoned AG-WL just to the northeast of NW Lower River Road across from the Facility are farmed, and farming also occurs approximately 0.5 mile just downriver on land also zoned AG-WL; farming and grazing occur on Sauvie Island located approximately 1.5 miles to the northwest across the Columbia River in Oregon (zoned multiple use agriculture [MUA20] and exclusive farm use [EFU]).

4.2.6.2 Impacts

The proposed Facility will not result in any impacts to agricultural crops or animals.

4.2.6.3 Mitigation Measures

Because no impacts are anticipated, no mitigation measures are proposed.

Section 4.3 – Transportation

WAC 463-60-372
Built environment – Transportation.

(1) Transportation systems. The application shall identify all permanent transportation facilities impacted by the construction and operation of the energy facilities, the nature of the impacts and the methods to mitigate impacts. Such impact identification, description, and mitigation shall, at least, take into account: (a) Expected traffic volumes during construction, based on where the work force is expected to reside; (b) Access routes for moving heavy loads, construction materials, or equipment; (c) Expected traffic volumes during normal operation of the facility; (d) For transmission facilities, anticipated maintenance access; and (e) Consistency with local comprehensive transportation plans.

(2) Vehicular traffic. The application shall describe existing roads, estimate volume, types, and routes of vehicular traffic which will arise from construction and operation of the facility. The applicant shall indicate the applicable standards to be utilized in improving existing roads and in constructing new permanent or temporary roads or access, and shall indicate the final disposition of new roads or access and identify who will maintain them.

(3) Waterborne, rail, and air traffic. The application shall describe existing railroads and other transportation facilities and indicate what additional access, if any, will be needed during planned construction and operation. The applicant shall indicate the applicable standards to be utilized in improving existing transportation facilities and in constructing new permanent or temporary access facilities, and shall indicate the final disposition of new access facilities and identify who will maintain them.

(4) Parking. The application shall identify existing and any additional parking areas or facilities which will be needed during construction and operation of the energy facility, and plans for maintenance and runoff control from the parking areas or facilities.

(5) Movement/circulation of people or goods. The application shall describe any change to the current movement or circulation of people or goods caused by construction or operation of the facility. The application shall indicate consideration of multipurpose utilization of rights of way and describe the measures to be employed to utilize, restore, or rehabilitate disturbed areas. The application shall describe the means proposed to ensure safe utilization of those areas under applicant's control where public access will be granted during project construction, operation, abandonment, termination, or when operations cease.

(6) Traffic hazards. The application shall identify all hazards to traffic caused by construction or operation of the facility. Except where security restrictions are imposed by the federal government the applicant shall indicate the manner in which fuels and waste products are to be transported to and from the facility, including a designation of the specific routes to be utilized.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-372, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-372, filed 11/6/92, effective 12/7/92.)

Section 4.3 Transportation

Construction and operation of the Facility will result in additional motor vehicle, rail, and ship traffic. Activities include construction traffic (workers, equipment, and deliveries) on area roadways and operational traffic (employees, visitors, and deliveries of equipment supplies).

4.3.1 Existing Conditions

4.3.1.1 Regional and Site Area Transportation Facilities

The Facility will be located within the Port, on the northern shore of the Columbia River, and will be accessible through roadway, rail, and river transportation networks.

Roadway Transportation

The existing roadway system in the area of the project is shown on Figure 4.3-1. The roadways that are within the vicinity of the project include:

- **Interstate 5** – The main interstate highway on the West Coast, I-5 generally runs parallel to the Pacific Ocean and U.S. Highway 101 from Mexico to Canada. I-5 serves some of the country's largest cities, including Seattle, Portland, Sacramento, Los Angeles, and San Diego. This significant interstate freeway generally provides four travel lanes, but expands to six lanes in the region of the Fourth Plain Boulevard exit. Other exits in the vicinity of the project site, from south to north, include SR 14, Mill Plain Boulevard, East 39th Street/ SR 500, and Main Street.
- **SR 501 (NW Lower River Road and Mill Plain Boulevard)** – This highway is co-managed by WSDOT and the City and is a major truck route with a 50-mph speed limit at the project site. West of I-5, the road leads out of the downtown Vancouver area along Mill Plain Boulevard and then along Lower River Road west of the Fourth Plain Boulevard/Mill Plain Boulevard intersection. As Mill Plain Boulevard, the highway has five lanes of travel and urban design features including a landscaped median, bicycle lanes, and sidewalks. West of the Fourth Plain Boulevard intersection, the highway becomes more rural in nature, slimming down to two travel lanes with left-turn lanes provided at major intersections. The highway generally has wide paved shoulders and fog line striping for bicycle travel and there is a multi-use path at intermittent locations along the south side of the road.
- **Fourth Plain Boulevard –** This is a principal arterial and state route with a 35-mph speed limit (City of Vancouver 2012) and primary access route for car and truck traffic from I-5 to the Port and the project site. West Mill Plain and West Fourth Plain boulevards connect to I-5 approximately 2.5 miles east of the site. Fourth Plain Boulevard extends west from I-5 through the northern section of downtown Vancouver, and merges into SR 501 (NW Lower River Road). Fourth Plain Boulevard is generally composed of two lanes and a turning lane. The bordering properties are both residential and commercial.
- **Old NW Lower River Road (public)** – This two-lane local access road extends south from NW Lower River Road (SR 501) and then west to provide access to local industrial businesses before it circles back to SR 501 to the northwest. The road provides access to the west end of the Port's Terminal 5, Tidewater Barge Lines, Tidewater Terminal Company, Hickey Marine, the West Van Material Recovery Center, and Old NW Lower River Road (private).

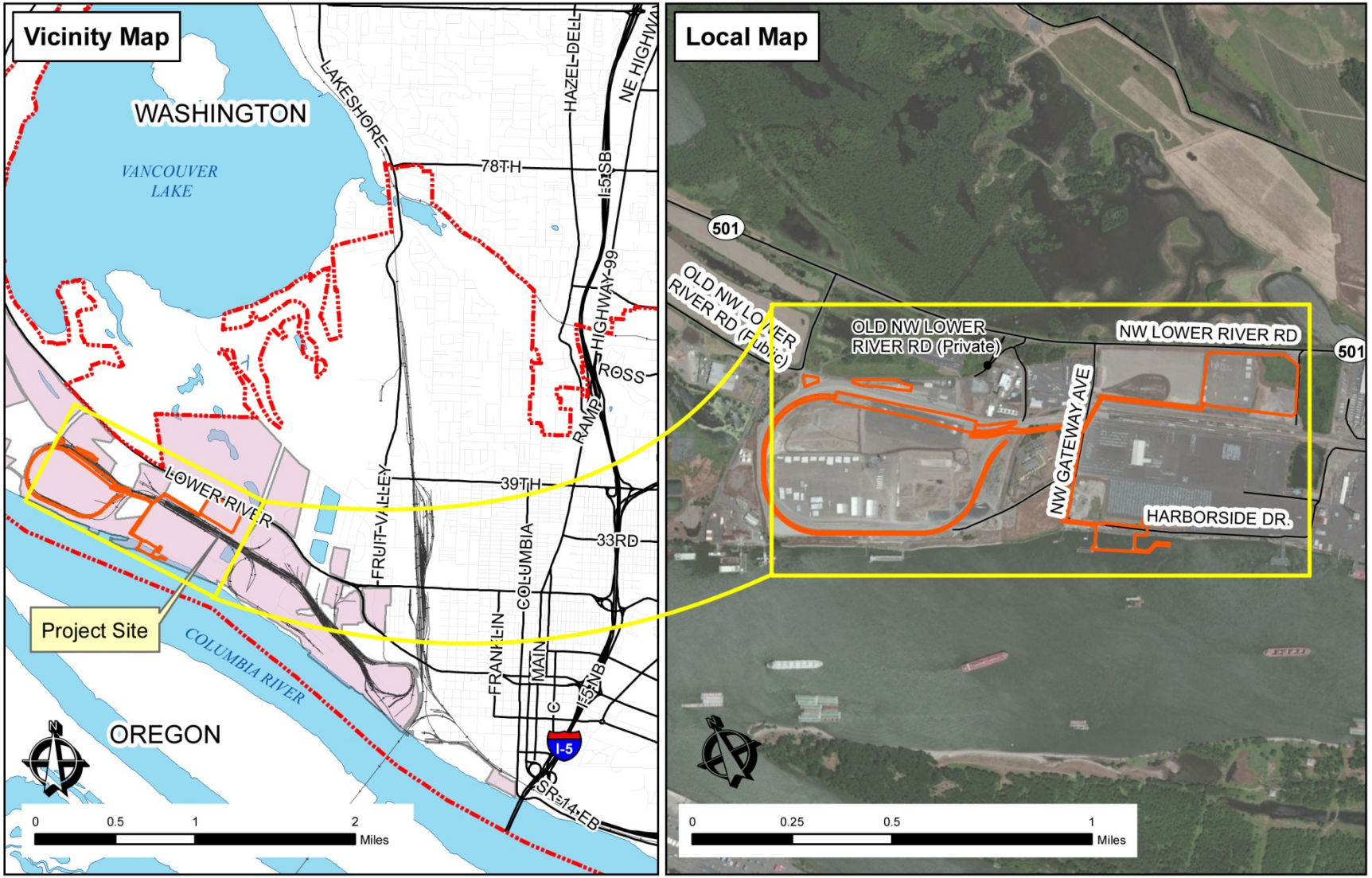

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Figure 4.3-1. Existing Roadway Transportation System

- **Old Alcoa Facility Access Road (private)** – This is a private road that extends east from the public Old Lower River Road where the roadway turns from southbound to westbound. This private road has two lanes of travel, a 15-mph posted speed limit, and no sidewalks. The road, which is maintained by the Port, provides access into Port property, particularly to Area 200, the location of the proposed rail car unloading building and administrative and support buildings. The roadway continues past the project site and ends approximately 800 feet to the east at a gate and the Keyera facility. The roadway continues on to NW Lower River Road but is not open to general traffic.
- **NW Gateway Avenue** – Gateway Avenue is the main entrance to Terminal 5 at the Port. This private roadway has two travel lanes with partial sidewalks, and on-street parking is allowed. The roadway gives access to Terminal 4 and Terminal 5, the Jail Work Center, and CalPortland. The Port is constructing a new overpass for Gateway Avenue that will span Port rail lines with grade-separated access; September 2013 project completion is anticipated. An additional access will be provided into the Terminal 5 loop, with June 2015 completion anticipated.
- Fruit Valley Road – This roadway is a two lane minor arterial with a center turn lane and a 25 and 35 mph speed limit. It is an east/west connection to Fourth Plain Boulevard and serves as an access point to both 39th street to I-5 and mid-town Vancouver, and connects to Lakeshore Drive/78th Street, which offers access to I-5 further north. The roadway is located through mixed zoning, including residential, school zone and industrial.
- 39th Street – This minor arterial connects Fruit Valley Road to I-5. It includes a grade separated crossing of the BNSF Railway and surface streets.

Table 4.3-1 summarizes the characteristics of the existing roadways within the project area.

Table 4.3-1. Existing Transportation Facilities and Roadway Designations

Roadway	Classification	Cross Section	Speed Limit	Side-walks?	Bicycle Lanes?	Median?	On-Street Parking?
Fourth Plain Boulevard	Principal Arterial	3-5 lane	35 mph	Partial	Yes	TWLTL[1]	No
Mill Plain Boulevard (SR 501)	Principal Arterial (State Highway Route)	5-lane	35 mph	Yes	Yes	Raised	Partial
Lower River Road (SR 501)[2]	Principal Arterial (State Highway Route)	2-5 lane[3]	45-50[4]	No[5]	No[6]	No	No
Gateway Avenue	Private Street	2-lane	Not Posted	Partial (east side)	No	No	Yes
Old Lower River Road	Local Street	2-lane	Not Posted	No	No	No	No
39th Street	Local Street	2-lane	25	Yes	Yes	No	Partial

[1] TWLT = two-way left-turn lane with exclusive turn lanes at major street intersections.

[2] NW Lower River Road (SR 501) is both a Principal Arterial and state highway from Fourth Plain Boulevard to the City Limits, and then only a state highway route west of Gateway Avenue.

[3] Cross-section changes from 5 lanes east of 26th Avenue to 2 lanes west of 26th Avenue, with left-turn lanes at major intersections.

[4] Posted speed changes from 45 mph east of Centennial Industrial Park to 50 mph west of Centennial Industrial Park.

[5] There is a new two-way multiuse trail along the south side of NW Lower River Road (SR 501) extending from Gateway Avenue east along the Farwest Steel property as well as the frontage of the proposed Facility in the area of the tank farm.

[6] Although not formally designated as bike lanes, there is fog line striping and sufficient paved shoulder on both sides of SR 501 for bicycle travel.

Existing Traffic Volumes and Level of Service

Existing traffic volumes are identified in detail in Appendix J. Traffic counts were obtained at the study intersections on mid-week days in May 2013 during the weekday morning (6 to 9 AM) and afternoon (4 to 6 PM) peak periods. The counts were compiled and reviewed to identify the peak hour periods for the street system, which occurred from 7 to 8 AM and 4 to 5 PM. All study intersections operate within the acceptable operations threshold. VMC Section 11.80.130B requires signalized intersections maintain LOS E based on the 2000 *Highway Capacity Manual* and a volume/capacity ratio less than 0.95. Unsignalized intersections must maintain a volume/capacity ratio less than 0.95 for the critical movement and/or approach. Because SR 501 is under WSDOT's jurisdiction, intersections along SR 501 are subject to its traffic operation standards, which require LOS D or better. Table 4.3-2 indicates the LOS criteria for signalized intersections.

Table 4.3-2. LOS Criteria

LOS	Average Delay (seconds)
A	≤10
B	>10-20
C	>20-35
D	>35-55
E	>55-80
F	>80

The City bases transportation concurrency on the average peak hour travel speeds on identified arterial corridors (VMC 11.70). The two identified corridors that will receive trips from the proposed Facility are Mill Plain Boulevard (Fourth Plain Boulevard to I-5) and Fourth Plain Boulevard. The current LOS for these corridors is 12 mph for Fourth Plain Boulevard and 10 mph for Mill Plain Boulevard. The 2010-2011 concurrency corridor summary table from the City indicates that Mill Plain Boulevard currently averages 27 mph and Fourth Plain Boulevard averages 23 mph.

Rail Transportation

The project site is located at a crossroads of Washington's major north-south (I-5 corridor) and east-west (Portland to Pasco) rail lines. BNSF, a Class 1 railroad, owns and operates these lines, although it shares operating rights with the Union Pacific Railway (UP) over a significant portion of the I-5 corridor (WSDOT 2009). Currently, the Port provides rail access that extends from the main rail lines and circulates through the Port. Through the multi-phase WVFA project, the Port is constructing modifications to its rail system including a new rail entrance into the Port, expansion of the Port rail network, and loop tracks at Terminal 5.

River Transportation

The Port currently maintains five terminals and 13 berths that lie at the terminus of the Columbia River's shipping channel, creating an international transportation gateway. The Port handles a broad range of cargos for oceangoing and river vessels including wind energy, breakbulk, project and direct transfer cargoes, containers, automobiles, forest products, steel and aluminum products, dry bulk commodities such as bauxite, mineral ores, concentrates, fertilizers, clays, and grains, and liquid commodities such as fertilizer, jet fuel, biodiesel and wood preservatives. The Columbia River navigation channel is maintained by the USACE. The channel begins at the Columbia River bar and continues five miles upriver at a depth of 55 feet and a width of

2,640 feet. After this point, the channel maintains a depth of 43 feet and a width of 600 feet for 106.55 miles to the Ports of Vancouver and Portland. The river above the rail bridge is maintained at a depth suitable for barge traffic.

The number of deep draft vessels entering the Columbia River system has declined markedly over the past two decades. There were an average of 2,100 vessel transits[17] between 1995 and 2000; consisting of 1,930 cargo and passenger vessels (92 percent of total vessel entries) and 170 tanker vessels (8 percent of total vessel entries). Approximately 60 percent of these transits occurred at Oregon ports and 40 percent at Washington ports. During 2011 and 2012, there were an average of 1,414 vessel entries; consisting of consisting of 1,326 cargo and passenger vessels (94 percent of total vessel entries) and 88 tanker vessels (6 percent of total vessel entries). Approximately 51 percent of these transits occurred at Oregon ports and 49 percent at Washington ports.

The number of transits declined from 2,100 (average 1995 to 2000) to 1,414 (average 2011 and 2012), which represented a decrease of 687 vessel entries. This included a decrease of 604 cargo and passenger vessels and 83 tanker vessels. The number of vessel entries decreased by 33 percent. This primarily occurred as a result of increased average vessel size. The average load per vessel increased from 16,658 tons (average load of vessels from 1995 to 2000) to 27,826 tons (average load of vessels for 2011 and 2012), which represents an increase of 67 percent. These changes reflect the increased loads that can be moved on the Lower Columbia River as a result of the channel deepening from 40 feet to 43 feet which was completed in November 2010.

With the proposed project, ship and barge loading will occur at existing berths 13 and 14 on the Columbia River south of the current Subaru facility.

Berths 13 and 14 were developed to serve as a layberth facility in the 1990s – primarily for U.S. government vessels staged to respond to requirements to deploy U.S. forces from West Coast locations. Since construction, the facility has supported U.S. governmental and commercial vessels. Aside from longer-term layberths for government vessels, commercial vessel use has been for minor maintenance and cleaning while waiting to load cargo at Columbia River ports.

Air Transportation

The nearest international airport is Portland International Airport (PDX), which is about 25 minutes away by automobile via SR 501 and I-5, then to SR 14 east to I-205, south across the I-205 Bridge, and along Airport Way to the airport. PDX has scheduled commercial passenger and freight service.

The City owns and operates Pearson Airfield for general aviation purposes (City of Vancouver 2012). This historic airport is located approximately 3 miles east of the project site. The project site is not located within the regulated airport approach services per VMC 20.570-1.

[17] A transit is a single trip on the river. One ship-call requires two transits.

Public Transit
Public transit does not serve the site. C-TRAN (the area's public transit provider) Route #25 is the transit route closest to the site. It travels on West Mill Plain and Fruit Valley Road, approximately 1.5 miles east of the site. The Port is currently developing a multi-modal path that would provide access from the proposed Facility site to the existing terminus of this transit route.

Parking
No parking is located within the areas proposed for construction on the project site.

4.3.2 Proposed Transportation Project Elements

The Facility will employ road, pedestrian, rail and marine vessel modes of transportation to access and serve the various areas of the Facility. Road access will be provided to all upland Facility areas. Rail access will be provided to Area 200 – Unloading, through the addition of new rail infrastructure. Marine vessel access will be provided to Area 400 – Marine Terminal through upgrades to the existing berths 13 and 14.

4.3.2.1 Transportation Elements by Project Area

Area 200 – Unloading and Office
The proposed project requires an office building and two support buildings, proposed for location in Area 200. These facilities will be located on the north side of the Terminal 5 loop adjacent to Old Alcoa Facility Access Road. Access driveways to NW Old Lower River Road will be constructed for two parking lots – one with 20 stalls and another with 78 stalls. Bicycle parking will be considered for incorporation into the site design. No improvements are anticipated to NW Old Lower River Road. The Applicant will construct, operate and maintain Facility driveways in compliance with City and Port standards; the City will maintain ownership and operation of NW Old Lower River Road.

The rail car unloading building will be located on the north side of the Terminal 5 loop. The building will be approximately 1,850 feet long by 91 feet wide, and will enclose the unloading equipment and tank cars during the unloading process. Pedestrian bridges will allow workers to pass over the unit trains during operations. Additional pedestrian bridges will allow access to the administrative and support buildings over the existing Terminal 5 rail loops. The Applicant will construct and maintain the pedestrian bridges. The bridges will be designed in accordance with applicable building codes and industry and standards for egress.

Rail lines on both sides of the proposed building will prevent direct vehicular access to the building due to the likely presence of trains. However, a surface level crossing will allow access for maintenance vehicles. The Port will construct and maintain this surface level crossing as part of the WVFA project.

Area 300 – Storage
The storage area is approximately 20.84 acres on Parcel 1A, approximately 1,600 feet north of the Columbia River, and located adjacent to NW Lower River Road. Access to this storage area will be from an existing Port owned and maintained shared driveway from NW Lower River Road located at the northwest corner of the site. This driveway currently provides access to Farwest Steel. As proposed, this driveway will be extended along the fenced entrance to the site, and five parking spaces will be provided for maintenance vehicles. Modifications to NW Lower

River Road and the existing driveway are not proposed. The Applicant would construct the extension of the driveway for access to the Facility storage area.

Frontage improvements along the border of the tank farm area and NW Lower River Road are not anticipated. NW Lower River Road is improved with a 12-foot-wide separated shared-use path.

Area 400 – Marine Terminal

Area 400 includes ship or barge loading and support uses on approximately 4.97 acres at existing berths 13 and 14 on the Columbia River south of the current Subaru facility. This area will be accessed via Port-owned and maintained roadways, including Gateway Avenue. Workers will use an existing paved area at the berths for parking and deliveries. The parking will be restriped as necessary.

Some modifications to the existing berths will be required, such as catwalks and a mooring system and the addition of the piping, cranes, support structures, and other equipment necessary to load the vessels (see section 2.3.5.1). In the waterfront design community, it is generally recognized that the International Building Code (IBC) does not sufficiently address the unique design characteristics of waterfront structures like berths 13 and 14. For this reason, the project will adopt the applicable provisions of the Oil Companies International Marine Forum (OCIMF) Mooring Equipment Guidelines, 3rd edition, and will supplement mooring and berthing design, seismic design, and structural load combinations requirements by the applicable provisions of Chapter 31F of the California Building Code, Marine Oil Terminals Engineering and Maintenance Standards (MOTEMS).

The Applicant will construct these modifications, and will exclusively maintain and operate the berths for the duration of the lease with the Port. However, the Port will continue to be responsible for maintenance of berth bathymetry, and will conduct maintenance dredging in accordance with its existing and future dredging permits.

The improvements will be constructed to state building code, and other safety and spill control related standards and requirements discussed in sections 2.10, 4.1.2, and 4.1.4.

Area 600 – West Boiler

A boiler building of approximately 6,600 square feet will be located adjacent to Old NW Lower River Road, just northwest of the administrative and support buildings area. An access driveway from Old NW Lower River Road will be added by the Applicant to provide access and parking for approximately five spaces. The driveway will be constructed to meet city code. The Applicant will maintain this access driveway.

Rail Infrastructure

The project will require the construction of two additional rail loops consisting of approximately 18,000 linear feet of new track located on approximately 5.45 acres at Terminal 5. The additional lines, which will begin and end near the Gateway Avenue overcrossing, will form two complete loops inside the existing rail loops. Figure 2.3.4, illustrates the location of the new loops. The Applicant will work with the Port to construct these loops; the Applicant will maintain these two loops for the life of the Facility. The design and implementation of these loops fall within the criteria established and evaluated as part of the WVFA project (see section 4.2).

As described in section 2.3, the Port will construct an additional rail loop as part of the WVFA project that will transfer in the future to exclusive use of the Applicant (based on the lease term for transfer). Once transferred to the Applicant, the Applicant will control operation and maintenance of the loop. At the end of the Facility's lifetime, operation and maintenance of the loop will transfer back to the Port.

All rail facilities will be constructed to meet BNSF's standard criteria for rail facilities (BNSF, 2011), and the AREMA 2013 Manual for Railway Engineering.

4.3.2.2 Estimated Future Traffic Volumes

The analysis of baseline traffic conditions estimates operating conditions for the year 2020, when the Facility is expected to operate at full capacity and at full employment. Also, a baseline future forecast for the year 2025 was prepared, per the City's traffic impact analysis requirements, to identify how the transportation system in the study area will operate 5 years after completion of the proposed development.

This baseline analysis includes the growth in general traffic in the region and the vehicle trips generated by in-process developments in the vicinity of the site, but does not include traffic from the proposed development. The analysis also accounts for planned transportation improvement projects not associated with the proposed development

A 1.5-percent linear annual growth rate was applied to existing year 2013 peak hour traffic volumes over a 7-year period to develop year 2020 baseline traffic volumes for the weekday AM and PM peak hours. This growth rate was applied to major traffic movements at the study intersections along SR 501, but not at minor connections related to Port properties such as Gateway Avenue and Old Lower River Road. Year 2020 baseline traffic volumes were further increased by a 1.5 percent linear annual growth rate to develop year 2025 baseline traffic volumes. Consistent with the 2020 analysis, the growth rate was applied to major traffic movements at study intersections along SR 501. No additional in-process developments or planned roadway improvements were identified at the study intersections for the 2025 horizon year.

One in-process development was identified and included in the 2020 baseline traffic volumes – the Terminal 5 bulk potash handling facility. That facility, which has undergone the required approval processes, is to be located west/southwest of the proposed site. The vehicle trips generated by this in-process development were assigned to the study intersections based on the trip generation and assignment contained in the transportation impact analysis completed for that project by Parametrix.

4.3.2.3 Estimated Future Level of Service

Tables 4.3-3 and 4.3-4 illustrates the build out year 2020 and year 2025 baseline traffic conditions for the respective weekday AM and PM peak hour periods. These results reflect the assumed annual traffic growth pattern and in-process development trips. The study intersections are forecast to continue to operate acceptably under these scenarios during the weekday AM and PM peak hours.

Table 4.3-3. Build-Out Year 2020 Baseline Traffic Conditions Summary

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/Lower River Rd (SR 501)	AM	B	0.08	LOS "D"	Yes
	PM	A	0.08		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.08	LOS "D"	Yes
	PM	A	0.07		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	B	0.68	LOS "D"	Yes
	PM	B	0.34		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	B	NA	LOS "E" & V/C ≤ 0.95	Yes
	PM	A	NA		Yes

Table 4.3-4. Forecast Year 2025 Baseline Traffic Conditions Summary

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/Lower River Rd (SR 501)	AM	B	0.08	LOS "D"	Yes
	PM	A	0.08		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.08	LOS "D"	Yes
	PM	A	0.07		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	B	0.73	LOS "D"	Yes
	PM	B	0.37		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	B	NA	LOS "E" & V/C ≤ 0.95	Yes
	PM	A	NA		Yes

4.3.3 Impacts

4.3.3.1 Traffic

Trip generation estimates of daily and weekday AM and PM peak hour vehicle trip ends for the proposed development were calculated using the standard reference manual, *Trip Generation*, 9th Edition, published by the Institute of Transportation Engineers (ITE). ITE trip rates for land use code 110 (Light Industrial) were used as the basis for estimating vehicle trips. These rates, using permanent employees as the independent variable, are based on empirical observations at similar industrial developments. Table 4.3-5 shows the estimated trip generation for the proposed industrial use.

Table 4.3-5. Estimated Trip Generation

Land Use	ITE Code	Size	Daily Trips	Weekday AM peak hour trips			Weekday AM peak hour trips		
				Total	In	Out	Total	In	Out
Light Industrial	110	110 Employees	332	48	40	8	46	10	36

Truck Traffic

Because the primary function of the proposed Facility is to transfer petroleum from rail cars onto nearby vessels, post-construction operations of the proposed development are not expected to generate tractor-trailer trucks trips on the external street network on typical days. Instead, typical delivery and service vehicle trips are expected.

Site Trip Distribution and Assignment

The estimated vehicle trip distribution pattern was based on a review of the existing weekday AM and PM traffic counts at the Lower River Road (SR 501)/Old Lower River Road intersection (where all external trips are expected to enter and exit the site) as well as the existing patterns observed at the Mill Plain Boulevard (SR 501)/Fourth Plain Boulevard intersection. All site trips were assigned to points east along SR 501, reflecting the location of the Port and major destinations to the east such as the downtown area of Vancouver and I-5.

2020 Year of Opening with Project Traffic Conditions

This analysis of traffic conditions in year 2020 identifies how the study area's transportation system will operate with the proposed development complete and operating at full capacity and full employment. This analysis includes general regional traffic growth, traffic generated due to in-process developments, and the vehicle trips generated from the proposed development.

Table 4.3-6 summarizes the year 2020 total traffic conditions. As shown, all study intersections are forecast to continue operating adequately during the weekday AM and PM peak hours.

Table 4.3-6. Build-Out Year 2020 Total Traffic Conditions Summary

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/Lower River Rd (SR 501)	AM	B	0.10	LOS "D"	Yes
	PM	A	0.12		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.08	LOS "D"	Yes
	PM	A	0.07		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	B	0.70	LOS "D"	Yes
	PM	B	0.36		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	B	NA	LOS "E" & V/C ≤ 0.95	Yes
	PM	A	NA		Yes

Future Year 2025 5-Year Buildout Traffic Conditions

This analysis of traffic conditions in year 2025 identifies how the study area's transportation system will operate 5 years after the proposed development reaches its peak capacity and full employment. Table 4.3-7 summarizes total traffic conditions in future year 2025 and show that the study intersections are forecasted to continue to operate acceptably during the weekday AM and PM peak hours.

Table 4.3-7. Forecast Year 2025 Total Traffic Conditions Summary

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/Lower River Rd (SR 501)	AM	B	0.10	LOS "D"	Yes
	PM	A	0.13		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.08	LOS "D"	Yes
	PM	A	0.07		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	B	0.75	LOS "D"	Yes
	PM	B	0.38		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	B	NA	LOS "E" & V/C ≤ 0.95	Yes
	PM	A	NA		Yes

Vehicle Queuing Analyses

Vehicle queuing analyses were prepared for the study intersections as shown in Appendix J. Based on the analysis, forecast queues can be accommodated within the available storage area at the identified study intersections during the AM and PM peak periods.

Concurrency Corridor Trip Assignment

The transportation impact analysis included an evaluation of the number of trips assigned to the two corridors affected by the development: Mill Plain Boulevard (Fourth Plain Boulevard to I-5) and Fourth Plain Boulevard (Mill Plain Boulevard to I-5)**.** Under the City's "Transportation Concurrency Management: Administrative Manual," both corridors are classified as Category 1 corridors. Between periodic measurements of corridor LOS, Category 1 transportation concurrency corridors are presumed to operate within acceptable LOS and are not evaluated with each development application. However, the City tracks trips distributed to each corridor from approved developments. Where there is a dramatic increase in approved trips in a Category 1 corridor LOS measurement, the City may review the corridor's designation as a Category 1 corridor. As shown by Table 4.3.8, the project will not result in a significant increase in the total number of weekday PM peak hour trips entering the City's concurrency corridors. Assigned trips were recorded by counting trips only once along each section.

Table 4.3-8. Concurrency Corridor Weekday PM Peak Hour Trip Assignment

Corridor	Corridor Limits	PM Peak Hour Trips to Corridor
Mill Plain Boulevard	Fourth Plain to I-5	20
	I-5 to Andresen	0
	Andresen to I-205	0
	I-205 to 136th Avenue	0
	136th Avenue to 164th Avenue	0
	164th Avenue to 192nd Avenue	0
St. Johns/Fort Vancouver Way	Mill Plain to 63rd Street	0
Fourth Plain Boulevard	Mill Plain to I-5	26
	I-5 to Andresen	0

Corridor	Corridor Limits	PM Peak Hour Trips to Corridor
	Andresen to I-205	0
	I-205 to 162nd Avenue	0
Andresen Road	Mill Plain to SR 500	0
	SR 500 to 78th Street	0
112th Avenue	Mill Plain to 28th Street	0
	28th St. to 51st Street	0
164th/162nd Avenue	SR 14 to SE 1st Street	0
	SE 1st Street to Fourth Plain	0
Burton Road/28th Street	18th Street to 112th Avenue	0
	112th Avenue to 138th Avenue	0
	138th Avenue to 162nd Avenue	0
18th Street	112th Avenue to 138th Avenue	0
	138th Avenue to 164th Avenue	0
136th/137th Avenue	Mill Plain to 28th Street	0
	28th Street to Fourth Plain	0
192nd Avenue	SR 14 to NE 18th Street	0

4.3.3.2 Rail

At startup, the operations of the Facility will accommodate up to 2 train arrivals per day and 661 train arrivals per year; at full capacity, operations will accommodate an average of 4 train arrivals per day and 1,713 train arrivals per year. Counting the return trips of empty trains, Facility operations will result in up to 12 trains per day and 3,426 trains per year on the section of the BNSF rail lines that serve the Port (Monty Edberg, Port of Vancouver, Personal Communications, August 12, 2013). Most trains will arrive from the east on the BNSF Pasco to Vancouver line, entering Washington near Spokane. Empty trains will be returned to BNSF control upon leaving the facility, and BNSF will route them to their future use. BNSF states that rail traffic is highly variable and that the railroad can serve the proposed use (F.E. “Skip” Kalb, Jr., Director of Strategic Development, BNSF, July 8, 2013).

The Port is completing the WVFA project, a multi-phase project that will increase rail capacity at the Port and construct new rail access into it. The new access is expected to reduce delays in rail traffic by as much as 40 percent (see Section 4.2). In addition, the City is completing a number of improvements associated with the street and rail system in downtown Vancouver; these changes will close two at-grade rail crossings permanently t, thus improving the efficiency of train operations in the area.

4.3.3.3 Ship

The operations of the Facility will accommodate up to 365 ship calls per year at full operations. This results in additional ship traffic of 730 transits to and from the Facility berth per year. Information from the Columbia River Pilots indicates that the number of inbound vessels (1 transit) varied from as low as 1,404 vessels in 2009 to 2,086 vessels in 2000. 2012 data indicated a total of 1,474 vessels. At maximum capacity, the Facility could increase this number

by 365 vessels per year, a lower volume than the recent peak year of 2000; no impacts to river traffic are anticipated. Current and historical practices to handle vessel traffic in the Lower Columbia River reach would continue to be sufficient to manage all vessel traffic.

4.3.3.4 Parking

The project will provide parking for employees, visitors, deliveries, and maintenance for all project elements as indicated in section 2.23. All parking areas will be paved and stormwater will be collected and treated in accordance with City and other applicable regulatory requirements as described in section 2.11. The total of approximately 119 parking spaces that will be provided exceeds the minimum number of spaces required by VMC 20.945 and no impacts or unmet parking needs are anticipated to result from the project.

4.3.3.5 Construction

Construction is expected to require about one year. Because construction increases the numbers of workers and deliveries in the area of the proposed project temporarily, construction activity can increase traffic and cause occasional delays. Approximately 125 construction workers could be working at a single time in the various areas that are part of the project site. In addition, approximately 83 daily round trip truck deliveries are estimated over the construction period. The 125 construction workers were assumed to arrive during the a.m. peak period and depart during the p.m. peak period. The 83 roundtrip truck deliveries were distributed across the 10-hour daily construction schedule; as such, an estimated 16 total truck deliveries were assumed during both the a.m. and p.m. peak periods (8 in, 8 out), respectively. Based on trip distribution pattern estimates, all construction worker traffic will use the Old Lower River Road entrance from Lower River Road (SR 501). Truck deliveries will be made on a daily basis and are assumed to be spread out evenly over the 10-hour construction period. This resulted in an estimate of 16 truck trips during the a.m. and p.m. peak hours, with an assumed 50% in/50% out distribution (8 in, 8 out). Tesoro Savage also estimates that 11 percent of trucks will use Old Lower River Road entrance from Lower River Road (SR 501), 3 percent will use Gateway Avenue, and 86 percent will use the private access drive east of Farwest Steel.

The typical access route for construction workers and deliveries will be from I-5 to Mill Plain Boulevard and the Mill Plain Extension and then to NW Lower River Road and Old NW Lower River Road. Because this route is accustomed to Port traffic, difficulties with the additional construction traffic along this route are not expected. The impact of construction site generated trips on intersection operations are shown in Table 4.3-9 for the a.m. and p.m. peak periods, respectively. As shown, the study intersections operate acceptably in both the a.m. and p.m. peak hours.

Table 4.3-9. Impact of Construction Traffic

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/Lower River Rd (SR 501)	AM	B	0.10	LOS "D"	Yes
	PM	B	0.32		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.06	LOS "D"	Yes
	PM	B	0.35		Yes
Fourth Plain Blvd/Mill Plain Blvd	AM	B	0.70	LOS "D"	Yes

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
(SR 501)	PM	B	0.37		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	C	NA	LOS "E" & V/C ≤ 0.95	Yes
	PM	B	NA		Yes

Construction workers and vehicles making deliveries can park adjacent to the construction areas. In the area of the tank farm, construction workers can park along the existing driveway and gravel roadway that extend along the southwest border. Construction workers and deliveries bound for the area of the rail car unloading building and administration building can park adjacent to NW Lower River Road and to the proposed permanent parking areas. Parking for the west boiler area can occur adjacent to the driveway and outside the rail loop, with overflow parking near the area of the administration building. Temporary construction parking for berths 13 and 14 can occur along the Port-owned access roads coming up to the berth areas.

The Port expects to commission a traffic study for Terminal 5 if construction of the BHP Billiton project and the Facility occur concurrently (Monty Edberg, Port of Vancouver, Personal Communications, August 13, 2013). The Applicant will participate in jointly implementing any traffic mitigation measures identified by such a study to ensure safe access conditions to the Terminal 5 location.

Transfer Pipeline Corridor – Crude oil will be transported between the rail car unloading building, the tank farm, and berths 13 and 14. The piping will be a combination of above and below-ground installation of either one or two 36-inch-diameter pipelines. Per the current alignments, construction of these pipelines is not expected to affect traffic significantly (see Figures 2.3-9). Some interior Port roadways could be blocked temporarily as the pipeline is constructed.

Temporary traffic control and construction signage will be provided along the alignment so that any impacts are properly managed. A traffic management plan will be required from the Contractor so as to ensure any impacts are mitigated.

Marine Terminal – With respect to the berth modifications at Area 400, some of the work may be performed from the waterside. A small number of tugs or barges will be positioned to conduct this work for a temporary period of time. These construction-related vessels will not be positioned in the main Columbia River navigation channel and will therefore not create any impacts to other river users.

4.3.4 Movement/Circulation of People and Goods

The Facility is being proposed at a location that has been developed specifically for the circulation of bulk goods by train with the capability to transfer goods to marine vessel shipping. Through its development of the WVFA project and the various environmental and permit reviews conducted as described in section 4.2 above, the Port has addressed changes to how tenants will use its facilities for their activities (many of which include the transportation of goods), as well as the impacts to road and river transportation systems serving the Terminal 5 area. The Port has designed and implemented the WVFA project as a means to improve the capacity of its operations, thereby improving access to the movement of goods in general.

Members of the public are generally not allowed access to the tenant controlled areas in vicinity of the site. Members of the public can access the Jail Work Center using Gateway Avenue. Impacts to the current movement or circulation of the general public have been addressed through the traffic analysis above and in Appendix J. Impacts to the circulation of goods have been addressed through the analysis of impacts to road, rail, and vessel traffic systems, also addressed above.

Construction of the WVFA Gateway Avenue Grade Separation ("Gateway overpass") is addressing conflicts between rail activities and road transportation at Terminal 5, by building a bridge that separates vehicle traffic from train traffic below. The new bridge, expected complete in late 2013, will allow cars and trucks to travel over the Port's internal rail corridor while accessing two of the Port's five marine terminals, as well as the Jail Work Center.

The Applicant has carefully sited Facility elements to minimize disruption to the activities conducted by current tenants, and to accommodate future activities as directed by the Port. For example, the transfer pipeline corridor has been carefully routes to avoid conflicts with existing easements; portions of the transfer pipeline will also be located underground to avoid conflict with existing road and rail uses.

The public will not be allowed admittance to any construction or operation areas established as part of the Facility, unless in accordance with the Facility's construction or operations site safety plan and applicable federal security requirements (see Section 2.19).

4.3.5 Mitigation

Based on the results of the transportation impact analysis, the proposed Facility can be developed while maintaining acceptable levels of service and safety on the surrounding transportation system. The analysis developed the following findings:

- All study intersections currently operate acceptably during the weekday AM and PM peak hours and are projected to do so in 2020 and 2025 with site development.
- A review of historical crash data identified no safety-related mitigation needs at the study intersections.
- Intersection sight distance is adequate at all study intersections.
- The proposed development is estimated to generate 332 additional daily trips, 48 weekday AM peak hour trips (40 in, 8 out), and 46 weekday PM peak hour trips (10 in, 36 out). Concurrency corridors receiving trips from the proposed development are operating within the established standards.

The study concluded that specific mitigation was not necessary to address project impacts. However, the study developed the following recommendations to address existing safety or operational issues within the project vicinity:

- The Applicant should work with the Port and City to post a 25 MPH speed limit on Old Lower River Road south of SR 501, where no posted speed sign exists.
- The Applicant should work with the Port and WSDOT to post a YIELD sign to control the channelized northbound right-turn maneuver from Old Lower River Road onto SR 501.
- The Applicant should work with the Port and City to reconfigure traffic control devices at the Old Lower River Road/Old Alcoa Facility Access Road intersection.

- The Applicant should work with the Port to add texturing/coloring treatments to the striped crosswalk on the private access approach to Lower River Road (SR 501), between the Far West Steel property and the proposed Storage area. This treatment is intended to enhance the safety of bicyclists and pedestrians using this crosswalk as part of the adjacent multi-use path.

Section 4.4 – Socioeconomic Impact

WAC 463-60-535
Built environment – Socioeconomic impact.

The application shall include a detailed socioeconomic impact analysis which identifies primary, secondary, positive as well as negative impacts on the socioeconomic environment in the area potentially affected by the project, with particular attention to the impact of the proposed facility on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and local economy. The study area shall include the area that may be affected by employment within a one-hour commute distance of the project site. The analysis shall use the most recent data as published by the U.S. Census or state of Washington sources.

(1) The analysis shall include: (a) Population and growth rate data for the most current ten-year period for the county or counties and incorporated cities in the study area; (b) Published forecast population figures for the study area for both the construction and operations periods; (c) Numbers and percentages describing the race/ethnic composition of the cities and counties in the study area; (d) Average per capita and household incomes, including the number and percentage of the population below the poverty level for the cities and counties within the study area; (e) A description of whether or not any minority or low-income populations would be displaced by this project or disproportionately impacted; (f) The average annual work force size, total number of employed workers, and the number and percentage of unemployed workers including the year that data are most recently available. Employment numbers and percentage of the total work force should be provided for the primary employment sectors; (g) An estimate by month of the average size of the project construction, operational work force by trade, and work force peak periods; (h) An analysis of whether or not the locally available work force would be sufficient to meet the anticipated demand for direct workers and an estimate of the number of construction and operation workers that would be hired from outside of the study area if the locally available work force would not meet the demand; (i) A list of the required trades for the proposed project construction; (j) An estimate of how many direct or indirect operation and maintenance workers (including family members and/or dependents) would temporarily relocate; (k) An estimate of how many workers would potentially commute on a daily basis and where they would originate.

(2) The application shall describe the potential impact on housing needs, costs, or availability due to the influx of workers for construction and operation of the facility and include the following: (a) Housing data from the most recent ten-year period that data are available, including the total number of housing units in the study area, number of units occupied, number and percentage of units vacant, median home value, and median gross rent. A description of the available hotels, motels, bed and breakfasts, campgrounds or other recreational facilities; (b) How and where the direct construction and indirect work force would likely be housed. A description of the potential impacts

on area hotels, motels, bed and breakfasts, campgrounds and recreational facilities; (c) Whether or not meeting the direct construction and indirect work force's housing needs might constrain the housing market for existing residents and whether or not increased demand could lead to increased median housing values or median gross rents and/or new housing construction. Describe mitigation plans, if needed, to meet shortfalls in housing needs for these direct and indirect work forces.

(3) The application shall have an analysis of the economic factors including the following: (a) The approximate average hourly wage that would likely be paid to construction and operational workers, how these wage levels vary from existing wage levels in the study area, and estimate the expendable income that direct workers would likely spend within the study area; (b) How much, and what types of direct and indirect taxes would be paid during construction and operation of the project and which jurisdictions would receive those tax revenues; (c) The other overall economic benefits (including mitigation measures) and costs of the project on the economies of the county, the study area and the state, as appropriate, during both the construction and operational periods.

(4) The application shall describe the impacts, relationships, and plans for utilizing or mitigating impacts caused by construction or operation of the facility to the following public facilities and services: (a) Fire; (b) Police; (c) Schools; (d) Parks or other recreational facilities; (e) Utilities; (f) Maintenance; (g) Communications; (h) Water/storm water; (i) Sewer/solid waste; (j) Other governmental services.

(5) The application shall compare local government revenues generated by the project (e.g., property tax, sales tax, business and occupation tax, payroll taxes) with their additional service expenditures resulting from the project; and identify any potential gaps in expenditures and revenues during both construction and operation of the project. This discussion should also address potential temporal gaps in revenues and expenditures.

(6) To the degree that a project will have a primary or secondary negative impact on any element of the socioeconomic environment, the applicant is encouraged to work with local governments to avoid, minimize, or compensate for the negative impact. The term "local government" is defined to include cities, counties, school districts, fire districts, sewer districts, water districts, irrigation districts, or other special purpose districts

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, amended and recodified as § 463-60-535, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040. 92-23-012, § 463-42-535, filed 11/6/92, effective 12/7/92. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-535, filed 10/8/81. Formerly WAC 463-42-620.)

Section 4.4 Socioeconomic Impact

4.4.1 Existing Conditions

The proposed Facility is located adjacent to the Columbia River in Vancouver, which is the largest city in the County. The County is also within the reach of the larger Portland, Oregon, metropolitan area. Most immediate services, such as police, fire, and ambulance, will be supplied by City of Vancouver providers, but the larger metropolitan area and other surrounding counties are likely to supply a portion of workers and construction material.

For this socioeconomic analysis, the study area is defined as those counties within a 1-hour commute of the project site. These include Clark, Skamania, and Cowlitz counties in Washington, and Multnomah, Clackamas, Marion, Yamhill, and Washington counties in Oregon. Small portions three other counties (Wahkiakum County in Washington and Clatsop and Tillamook counties in Oregon) may fall within a 1-hour commute of the project site (depending on traffic conditions), but these small areas are sparsely populated and workers associated with the project are unlikely to live there .

The following analysis provides county-level detail for each county in the study area and city-level detail for municipalities in the County. The complete socioeconomic report is attached as Appendix K.

4.4.1.1 Population Trends

According to data from the Washington Office of Financial Management (OFM) and the Oregon Office of Economic Analysis (OEA), the population of the study area grew by nearly 800,000 between 1992 and 2012, to approximately 2.8 million. This represents an increase of 38.8 percent over the period. Growth was faster between 1992 and 2002 (i.e., 450,000 new residents, or 22.4 percent than it was between 2002 and 2012 (i.e., 330,000 new residents, or 13.4 percent).

During the same periods, the County experienced faster growth than the study area as a whole. Between 1992 and 2012, the population of the County grew from approximately 257,000 to 431,000, or 68.1 percent. Between 1992 and 2002, the population grew by 98,000, or 38.2 percent, and between 2002 and 2012, by nearly 77,000, or 21.6 percent.

Neighboring counties within the study area experienced varying levels of growth between 1992 and 2012. The two Washington counties (i.e., Cowlitz and Skamania) are mostly rural and saw relatively limited population growth. Together, they account for approximately 25 percent of the population of the County.

In contrast, the Oregon counties in the study area are in a fast-growing urban area, and experienced strong population growth between 1992 and 2012. Nearly 75 percent of the study area population growth over that period occurred in Oregon.

Construction of the project is anticipated to be completed during 2016. Based on population projections from the Washington OFM and Oregon OEA, the population of the study area is projected to grow by 6.3 percent between 2012 and 2016, or by more than 176,000. Growth in the County is anticipated to be slightly faster, with the population rising by 28,000, or 6.5 percent.

The long-term forecast projects growth in the total study area population by an additional 789,000 between 2016 and 2036, or a total of 26.6 percent. In the County, the population is projected to grow by a total of nearly 113,500, or 24.7 percent.

Table 4.4-1. Total Population and Forecast Growth by County in Project Vicinity

	(Thousands)					Growth Rate			
						Actual		Forecast	
County Name	1992	2002	2012	2016	2036	1992-2002	2002-2012	2012-2016	2016-2036
Washington	5,072.1	6,022.9	6,817.8	7,175.6	8,619.1	1.7%	1.2%	1.3%	0.9%
Clark	256.5	354.5	431.3	459.2	572.7	3.3%	2.0%	1.6%	1.1%
Cowlitz	84.1	94.2	103.1	106.5	116.5	1.1%	0.9%	0.8%	0.4%
Skamania	8.6	10.0	11.3	11.4	13.0	1.5%	1.2%	0.2%	0.7%
Oregon	2,985.8	3,515.5	3,883.7	4,100.0	5,089.1	1.6%	1.0%	1.4%	1.1%
Clackamas	294.0	349.2	381.7	404.7	524.2	1.7%	0.9%	1.5%	1.3%
Columbia	38.9	44.8	49.7	52.6	65.3	1.4%	1.0%	1.4%	1.1%
Hood River	17.7	21.1	22.9	24.4	32.7	1.8%	0.8%	1.7%	1.5%
Marion	241.8	293.5	320.5	340.9	440.7	2.0%	0.9%	1.6%	1.3%
Multnomah	603.5	675.4	748.4	783.8	922.2	1.1%	1.0%	1.2%	0.8%
Polk	52.6	65.1	76.6	83.3	116.7	2.2%	1.6%	2.1%	1.7%
Washington	341.4	463.1	542.8	590.8	803.8	3.1%	1.6%	2.1%	1.6%
Yamhill	69.9	88.2	100.6	108.1	147.0	2.4%	1.3%	1.8%	1.5%
Study Area	2,008.9	2,459.0	2,788.8	2,965.7	3,754.8	2.0%	1.3%	1.5%	1.2%

Source: Washington OFM, Oregon OEA

According to data from OFM, most Clark County residents live in incorporated areas of the county, but a large minority lives in unincorporated areas. Even as the total County population grew between 2002 and 2012, the share living in incorporated areas remained near 48 percent.

Vancouver is the largest incorporated municipality in the County, and was home to 37.9 percent of all County residents in 2012. However, even though Vancouver added 13,000 new residents between 2002 and 2012, its population did not increase as fast as other parts of the County, such as Battle Ground, Camas, and Washougal, and its share of County population declined from 40.9 percent.

Table 4.4-2. Total Population and Forecast Growth by City in Clark County

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2011
Clark County	364.9	374.1	385.4	394.6	404.7	412.7	419.1	423.8	425.4	425.4	428.0	66.4
Uninc.	176.0	181.7	186.9	192.5	197.8	199.5	202.3	203.4	203.3	203.3	204.6	29.8
Incorp	188.8	192.4	198.5	202.2	206.9	213.2	216.8	220.4	222.0	222.0	223.4	36.6
Battle Ground	11.2	12.4	14.0	14.7	15.6	16.0	16.7	17.2	17.6	17.6	17.8	6.7
Camas	13.9	14.7	16.1	16.4	17.0	17.7	18.4	18.8	19.4	19.4	19.6	6.1
La Center	1.8	1.9	2.0	2.2	2.4	2.6	2.7	2.7	2.8	2.8	2.8	1.1

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2011
Ridgefield	2.2	2.2	2.3	2.7	3.4	3.8	4.2	4.6	4.8	4.8	5.0	3.0
Vancouver	149.3	150.1	152.1	153.5	154.9	158.6	159.8	161.6	161.8	161.8	162.3	13.9
Washougal	9.1	9.7	10.7	11.3	12.2	12.9	13.5	13.9	14.1	14.1	14.2	5.2
Woodland	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Yacolt	1.1	1.1	1.1	1.2	1.2	1.4	1.5	1.5	1.6	1.6	1.6	0.5

Source: Washington OFM

Nearly one-quarter of the study area population is under 18 years of age, and 15 percent are 62 years old or older. The remaining 61 percent are working age adults, a total of 1.66 million people. The population of Clark County is somewhat younger than that of the study area, with nearly 27 percent under 18 years of age and less than 15 percent aged 62 years or more. The working-age adult population in the County is approximately 248,000.

Females outnumber males in the study area, with 0.978 males for each female. The male-female ratio in the County is nearly identical, with 0.976 males for each female.

Table 4.4-3. Population Age Distribution in Project Vicinity

County Name	Total		Under 18 Years		18 Years to 61 Years		62 Years and Older	
	Pop.	M/F Ratio	Pop.	% of Total	Pop.	% of Total	Pop.	% of Total
Washington	6,652,845	0.993	1,563,419	23.5	4,071,541	61.2	1,017,885	15.3
Clark	421,154	0.976	112,448	26.7	248,060	58.9	60,646	14.4
Cowlitz	101,901	0.980	24,966	24.5	57,676	56.6	19,259	18.9
Skamania	10,979	0.996	2,459	22.4	6,609	60.2	1,910	17.4
Oregon	3,801,991	0.980	866,854	22.8	2,284,997	60.1	650,140	17.1
Clackamas	373,832	0.969	89,346	23.9	220,935	59.1	63,551	17.0
Columbia	49,247	1.002	11,918	24.2	28,711	58.3	8,618	17.5
Hood River	21,962	0.991	5,710	26.0	12,980	59.1	3,272	14.9
Marion	313,020	0.996	82,950	26.5	180,613	57.7	49,457	15.8
Multnomah	724,803	0.977	149,309	20.6	479,820	66.2	95,674	13.2
Polk	74,734	0.940	18,086	24.2	42,897	57.4	13,751	18.4
Washington	524,275	0.970	134,739	25.7	323,478	61.7	66,059	12.6
Yamhill	98,293	1.009	24,770	25.2	57,796	58.8	15,727	16.0
Study Area	2,714,200	0.978	656,701	24.2	1,659,574	61.1	397,926	14.7

Source: U.S. Census Bureau, 2007-2011 American Community Survey

According to 2012 estimates from the U.S. Census Bureau, the ethnic mix of the study area population is primarily white, with white residents accounting for 86.3 percent of the total. Residents of Asian ethnicity accounted for 5.3 percent of the population, African-American accounted for 2.7 percent American Indian and Alaska Natives accounted for 1.5 percent, Hawaiian and other Pacific Islanders accounted for 0.5 percent, and two or more races accounted

for 3.7 percent of the population. Residents of Hispanic origin (of all races) accounted for 12.9 percent of the study area population.

In the County, non-white residents account for a smaller share of the population, although the share of Native Hawaiian/Pacific Islander and two or more races is slightly higher than in the study area as a whole. Hispanic residents (of all races) account for 8.1 percent of the County population.

Table 4.4-4. Race Composition by County in Project Vicinity

	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Two or More Races	Total	Hispanic (all races)
Washington	5,625.34	268.66	126.53	531.40	46.14	298.95	6,897.01	807.6
Clark	385.13	9.24	4.58	19.42	3.20	16.72	438.29	35.4
Cowlitz	93.92	0.83	1.94	1.69	0.29	3.33	102.00	8.2
Skamania	10.46	0.06	0.20	0.11	0.01	0.34	11.19	0.6
Oregon	3,444.77	77.56	68.96	156.08	15.85	136.14	3,899.35	474.2
Clackamas	348.69	3.78	4.10	14.89	1.03	11.38	383.86	31.0
Columbia	46.08	0.25	0.72	0.48	0.11	1.66	49.29	2.2
Hood River	21.24	0.16	0.25	0.34	0.05	0.54	22.58	6.8
Marion	287.97	4.33	7.97	6.90	2.61	10.21	319.99	80.3
Multnomah	614.11	43.75	11.40	52.23	4.73	33.05	759.26	84.3
Polk	69.53	0.55	1.86	1.54	0.27	2.60	76.35	9.7
Washington	454.77	11.49	6.44	50.85	2.90	21.23	547.67	87.8
Yamhill	92.41	1.03	2.02	1.65	0.23	2.92	100.26	15.4
	2,424.31	75.45	41.47	150.09	15.44	103.97	2,810.72	361.44
Share of Total								
Washington	81.6%	3.9%	1.8%	7.7%	0.7%	4.3%	100.0%	11.7%
Clark	87.9%	2.1%	1.0%	4.4%	0.7%	3.8%	100.0%	8.1%
Cowlitz	92.1%	0.8%	1.9%	1.7%	0.3%	3.3%	100.0%	8.0%
Skamania	93.5%	0.5%	1.8%	1.0%	0.1%	3.0%	100.0%	5.5%
Oregon	88.3%	2.0%	1.8%	4.0%	0.4%	3.5%	100.0%	12.2%
Clackamas	90.8%	1.0%	1.1%	3.9%	0.3%	3.0%	100.0%	8.1%
Columbia	93.5%	0.5%	1.5%	1.0%	0.2%	3.4%	100.0%	4.4%
Hood River	94.1%	0.7%	1.1%	1.5%	0.2%	2.4%	100.0%	30.2%
Marion	90.0%	1.4%	2.5%	2.2%	0.8%	3.2%	100.0%	25.1%
Multnomah	80.9%	5.8%	1.5%	6.9%	0.6%	4.4%	100.0%	11.1%
Polk	91.1%	0.7%	2.4%	2.0%	0.4%	3.4%	100.0%	12.6%
Washington	83.0%	2.1%	1.2%	9.3%	0.5%	3.9%	100.0%	16.0%
Yamhill	92.2%	1.0%	2.0%	1.6%	0.2%	2.9%	100.0%	15.3%
Study Area	86.3%	2.7%	1.5%	5.3%	0.5%	3.7%	100.0%	12.9%

Note: Population figures are Census estimates for 2012

Source: U.S. Census Bureau

4.4.1.2 Poverty

The number of people living in poverty in the study area climbed 70.0 percent between 2002 and 2001, according to the U.S. Census Bureau. During that period, the number of residents living in poverty increased in both years, growing from approximately 252,000 in 2002 to 428,000 in 2011.

In Clark County, the growth in poverty was slightly lower than in the larger study area, but the share of residents living in poverty still grew by 61.2 percent, climbing from approximately 36,000 in 2002 to nearly 59,000 in 2011. Only one county in the study area (Skamania County) saw poverty levels grow by less than 50 percent, and in several counties, the growth was greater than 80 percent.

Table 4.4-5. Population Living Below the Poverty Level – All Ages

	Thousands											
County	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**Change 2002-2011**	**% Change**
Washington	623.0	671.2	715.3	732.0	736.9	722.6	727.2	803.3	890.3	931.6	308.6	49.5
Clark	36.4	41.0	44.8	45.9	41.6	39.2	41.6	50.6	53.7	58.7	22.3	61.2
Cowlitz	11.8	13.0	13.8	14.3	15.4	15.2	14.7	16.0	20.8	19.6	7.8	66.5
Skamania	1.2	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.5	1.6	0.5	38.7
Oregon	396.2	423.3	462.2	497.3	487.4	476.6	501.5	536.8	596.6	655.2	259.1	65.4
Clackamas	27.3	30.4	33.1	32.5	29.7	34.2	34.7	35.9	38.8	41.5	14.2	52.1
Columbia	3.7	4.0	4.5	5.0	4.3	4.3	5.5	5.8	6.6	6.0	2.3	62.4
Hood River	2.4	2.6	2.7	3.1	3.1	2.6	2.8	2.7	2.9	3.3	0.9	36.8
Marion	38.3	41.1	44.5	44.7	44.0	45.8	48.0	50.5	55.0	63.4	25.2	65.8
Multnomah	78.7	85.3	93.9	112.8	103.7	103.2	99.0	107.6	130.6	142.3	63.6	80.8
Polk	6.3	6.8	7.7	10.4	9.4	7.9	9.0	10.0	11.6	10.5	4.2	67.0
Washington	36.9	42.2	46.5	48.0	49.1	44.7	50.1	53.3	50.9	67.5	30.7	83.2
Yamhill	8.9	9.3	9.8	11.2	11.9	10.7	11.7	11.5	13.8	13.4	4.5	50.2
Study Area	251.7	276.8	302.6	329.1	313.6	309.1	318.4	345.3	386.2	427.7	176.1	70.0

Source: U.S. Census Bureau

Between 2002 and 2011, the share of the population living below the poverty level grew from 10.1 to 15.6 percent in the study area. County residents fared somewhat better during this time, but the share of residents living below the poverty level grew from 9.6 percent in 2002 to 13.7 percent in 2011. Directly north of Clark County, the poverty rate in Cowlitz County grew from 12.5 to 19.5 percent, and directly to the south, the poverty rate in Multnomah County grew from 11.8 to 19.4 percent.

Table 4.4-6. Poverty Rates (%) in Study Area – All Ages

County	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Change 2002-2011
Washington	10.3	11.0	11.6	12.0	11.8	11.4	11.3	12.3	13.5	13.9	3.6
Clark	9.6	10.5	11.2	11.5	10.2	9.5	9.9	11.8	12.7	13.7	4.1
Cowlitz	12.5	13.6	14.3	15.0	15.7	15.4	14.8	16.0	20.6	19.5	7.0
Skamania	11.6	10.9	11.5	11.1	12.5	11.9	12.2	12.4	13.8	14.9	3.3
Oregon	11.3	12.0	12.9	14.1	13.4	13.0	13.5	14.3	15.8	17.3	6.0
Clackamas	7.6	8.4	9.0	8.9	8.0	9.2	9.2	9.4	10.4	11.0	3.4
Columbia	8.0	8.6	9.5	10.5	8.8	8.8	11.3	11.9	13.4	12.3	4.3
Hood River	11.7	12.5	13.0	15.3	14.7	12.7	13.2	12.9	13.0	14.7	3.0
Marion	13.2	14.1	15.1	15.4	14.7	15.2	15.8	16.4	17.9	20.5	7.3
Multnomah	11.8	12.9	14.2	17.3	15.5	15.0	14.1	15.1	18.0	19.4	7.6
Polk	9.7	10.3	11.3	15.4	13.2	10.8	11.9	13.2	15.7	14.1	4.4
Washington	7.7	8.7	9.3	9.7	9.6	8.6	9.5	10.0	9.7	12.6	4.9
Yamhill	10.5	10.8	11.2	13.0	13.3	11.7	12.5	12.3	14.7	14.1	3.6
Study Area	10.1	11.0	11.8	13.0	12.1	11.7	11.9	12.7	14.3	15.6	5.5

4.4.1.3 Housing

According to data from the U.S. Census Bureau, the study area has more than 1.1 million housing units, with more than 166,000 in Clark County. Results from the most recent American Community Survey indicate that there are more than 9,000 vacant housing units in the County, and that the vacancy rate for rental housing in the County is 5.2 percent. Within the larger study area, there are an estimated 73,000 vacant housing units, and vacancy rates for rental housing range between 4.1 and 8.1 percent.

Table 4.4-7. Housing Units and Vacancy by County in Study Area

	Housing Units			% Vacancy	
County	Total	Occupied	Vacant	Homeowner	Rental
Washington					
Clark	166,270	157,179	9,091	1.9	5.2
Cowlitz	43,227	39,793	3,434	1.9	5.3
Skamania	5,577	4,435	1,142	3.3	5.1
Oregon					
Clackamas	156,150	144,588	11,562	1.6	6.3
Columbia	20,600	19,173	1,427	1.7	4.3
Hood River	9,193	8,204	989	1.9	5.8
Marion	120,482	112,841	7,641	1.9	5.5
Multnomah	322,567	302,224	20,343	2.5	4.1
Polk	30,044	28,111	1,933	2.6	4.2
Washington	211,045	198,593	12,452	2.2	5.3
Yamhill	36,831	33,804	3,027	2.2	8.1
Study Area	1,121,986	1,048,945	73,041		

Source: U.S. Census Bureau, 2007-2011 American Community Survey

County-wide median house values in the study area range between $193,800 and $326,300, according to data from the U.S. Census Bureau 2007–2011 American Community Survey. In Clark County, the median house value is $254,200. The largest number of housing units in both the study area and in the County is valued between $200,000 and $299,999, but there is also a large number of housing units valued at less than $200,000. In the study area, one out of four housing units is valued at less than $200,000, and in Clark County, nearly one-third of housing units are valued at less than $200,000.

Table 4.4-8. Housing Values by County in Study Area

County	Less than $50,000	$50,000 to $99,999	$100,000 to $149,999	$150,000 to $199,999	$200,000 to $299,999	$300,000 to $499,999	$500,000 to $999,999	$1,000,000 or more	Median (dollars)
Washington									
Clark	4,124	2,157	5,739	16,597	39,112	27,929	8,730	1,132	$254,200
Cowlitz	1,638	1,955	3,996	6,451	6,951	4,534	999	258	$193,800
Skamania	151	179	291	416	1,053	910	200	123	$257,600
Oregon									
Clackamas	5,848	1,471	2,542	7,227	27,631	36,422	16,622	3,893	$326,300
Columbia	1,072	668	1,604	2,831	4,702	2,854	873	117	$221,200
Hood River	197	257	298	414	1,333	1,789	1,045	212	$326,900
Marion	5,053	2,632	8,270	16,710	19,766	11,801	3,971	586	$206,700
Multnomah	5,415	2,201	6,915	19,664	58,394	51,365	20,105	2,857	$281,900
Polk	877	605	1,742	4,038	6,055	4,344	1,070	163	$231,900
Washington	4,247	1,449	3,638	10,253	42,238	44,612	15,393	1,944	$300,200
Yamhill	1,909	991	1,888	3,911	6,951	5,238	2,363	384	$237,700
Study Area	30,531	14,565	36,923	88,512	214,186	191,798	71,371	11,669	

Source: U.S. Census Bureau, 2007-2011 American Community Survey

A second source of housing information is the Washington OFM, which provides detail at the municipality level. As shown in the tables on the following two pages, approximately 55 percent of the housing in the County is located in incorporated parts of the County and 45 percent is in unincorporated areas. Vancouver accounts for most of the housing in the incorporated areas, with an estimated 70,249 out of 93,319 housing units in 2012, or 75.7 percent. Battle Ground, Camas, and Washougal account for most of the other housing in incorporated areas

Between 2002 and 2012, the number of housing units in Clark County grew by more than 27,600. Vancouver accounted for more than 28.4 percent of this total, adding more than 7,800 new housing units. Battle Ground, Camas, and Washougal each added more than 2,000 new housing units, while unincorporated parts of the County added nearly 11,800 new units.

Housing vacancy rates have remained steady over the past 10 years in the County, ranging between 5.2 and 5.8 percent. In Vancouver, the vacancy rate has generally ranged between 6.2 and 6.7 percent and, in 2012, it was estimated that there were 45,316 unoccupied housing units in Vancouver.

Table 4.4-9. Housing Characteristics by City in Clark County

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*	2012*
Housing Units											
Clark County	142,050	146,196	150,712	154,819	158,999	162,191	164,926	166,721	167,413	168,416	169,667
Unincorporated	64,562	66,722	68,725	70,868	72,951	73,672	74,784	75,302	75,498	75,908	76,348
Incorporated	77,488	79,474	81,987	83,951	86,048	88,519	90,142	91,419	91,915	92,508	93,319
Battle Ground	3,857	4,311	4,809	5,119	5,375	5,465	5,706	5,857	5,952	6,042	6,084
Camas	5,251	5,533	6,026	6,122	6,382	6,574	6,796	6,925	7,072	7,182	7,341
La Center	652	671	723	765	884	903	941	965	981	996	1,061
Ridgefield	797	815	827	1,022	1,273	1,431	1,544	1,641	1,695	1,779	1,857
Vancouver	62,816	63,785	64,845	65,865	66,655	68,375	69,159	69,875	70,005	70,249	70,663
Washougal	3,695	3,942	4,337	4,627	5,021	5,276	5,468	5,628	5,673	5,717	5,764
Woodland	57	55	53	56	59	47	52	53	53	53	53
Yacolt	363	362	367	375	399	448	476	475	484	490	496
Occupied Housing Units											
Clark County	134,671	138,146	142,394	145,885	149,723	152,780	155,350	157,242	158,099	158,841	160,021
Unincorporated	61,600	63,640	65,529	67,551	69,512	70,176	71,212	71,680	71,843	72,257	72,676
Incorporated	73,071	74,506	76,865	78,334	80,211	82,604	84,138	85,562	86,256	86,580	87,339
Battle Ground	3,687	4,086	4,596	4,807	5,071	5,207	5,402	5,554	5,652	5,729	5,769
Camas	4,938	5,200	5,650	5,731	5,935	6,125	6,333	6,472	6,619	6,709	6,857
La Center	614	635	685	726	809	859	894	920	942	951	1,013
Ridgefield	753	770	781	935	1,156	1,302	1,429	1,529	1,591	1,658	1,731
Vancouver	59,207	59,730	60,698	61,462	62,210	63,795	64,542	65,404	65,691	65,744	66,132
Washougal	3,483	3,705	4,070	4,275	4,610	4,864	5,046	5,191	5,256	5,282	5,325
Woodland	54	45	45	51	55	43	49	49	51	50	50
Yacolt	335	335	340	347	365	409	443	443	454	458	463
Occupancy Rate											
Clark County	94.8%	94.5%	94.5%	94.2%	94.2%	94.2%	94.2%	94.3%	94.4%	94.3%	94.3%
Unincorporated	95.4%	95.4%	95.3%	95.3%	95.3%	95.3%	95.2%	95.2%	95.2%	95.2%	95.2%
Incorporated	94.3%	93.7%	93.8%	93.3%	93.2%	93.3%	93.3%	93.6%	93.8%	93.6%	93.6%
Battle Ground	95.6%	94.8%	95.6%	93.9%	94.3%	95.3%	94.7%	94.8%	95.0%	94.8%	94.8%
Camas	94.0%	94.0%	93.8%	93.6%	93.0%	93.2%	93.2%	93.5%	93.6%	93.4%	93.4%
La Center	94.2%	94.6%	94.7%	94.9%	91.5%	95.1%	95.0%	95.3%	96.0%	95.5%	95.5%
Ridgefield	94.5%	94.5%	94.4%	91.5%	90.8%	91.0%	92.6%	93.2%	93.9%	93.2%	93.2%
Vancouver	94.3%	93.6%	93.6%	93.3%	93.3%	93.3%	93.3%	93.6%	93.8%	93.6%	93.6%
Washougal	94.3%	94.0%	93.8%	92.4%	91.8%	92.2%	92.3%	92.2%	92.6%	92.4%	92.4%
Woodland	94.7%	81.8%	84.9%	91.1%	93.2%	91.5%	94.2%	92.5%	96.2%	94.3%	94.3%
Yacolt	92.3%	92.5%	92.6%	92.5%	91.5%	91.3%	93.1%	93.3%	93.8%	93.4%	93.4%
Unoccupied Housing Units											
Clark County	7,379	8,050	8,318	8,934	9,276	9,411	9,576	9,479	9,314	9,575	9,646
Unincorporated	2,962	3,082	3,196	3,317	3,439	3,496	3,572	3,622	3,655	3,651	3,672
Incorporated	4,417	4,968	5,122	5,617	5,837	5,915	6,004	5,857	5,659	5,928	5,980
Battle Ground	170	225	213	312	304	258	304	303	300	313	315
Camas	313	333`	376	391	447	449	463	453	453	473	484

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*	2012*
La Center	38	36	38	39	75	44	47	45	39	45	48
Ridgefield	44	45	46	87	117	129	115	112	104	121	126
Vancouver	3,609	4,055	4,147	4,403	4,445	4,580	4,617	4,471	4,314	4,505	4,531
Washougal	212	237	267	352	411	412	422	437	417	435	439
Woodland	3	10	8	5	4	4	3	4	2	3	3
Yacolt	28	27	27	28	34	39	33	32	30	32	33

*For 2011 and 2012, the number of occupied housing units, occupancy rate, and unoccupied housing units were estimated on based on occupancy rates for 2008 through 2010.

Source: Washington Office of Financial Management

4.4.1.4 Workforce

According to data from the Bureau of Labor Statistics, between 2002 and 2012, the workforce in the study area grew from 1.33 million to 1.43 million, an increase of more than 108,000 workers or 8.1 percent. In the County, the number of workers increased from approximately 187,000 to 211,000, an increase of approximately 24,000 workers or 12.9 percent.

During the same period, the number of workers employed grew by 7.4 percent in the study area. The number of workers employed grew from 1.22 million to 1.32 million, an increase of more than 91,000 workers. In the County, the number of workers with jobs grew by more than 19,000 (from approximately 170,000 to 189,000), an increase of 11.4 percent.

Because the size of the workforce grew faster than the number of workers employed, the number of unemployed workers in the study area grew by nearly 17,000 between 2002 and 2012. However, this is a significant improvement over the situation of the period between 2010 and 2012, which saw the number of unemployed jump to nearly 155,000 before slowly declining in subsequent years.

In the County, the number of unemployed workers was 4,800 higher in 2012 than in 2002, with approximately 22,000 workers not employed. The number of unemployed workers in the County had dropped to less than 12,000 in 2006 and 2007, but grew to nearly 29,000 in 2009 and to more than 30,000 in 2010 during what is referred to as the Great Recession.

The unemployment rate in the study area declined from 7.8 percent in 2002 to 5.0 percent in 2007, but the impact of the recent recession was a doubling of that rate, to 10.8 percent in 2009 and 10.6 percent in 2010. By 2012, the unemployment rate had dropped to 8.4 percent, an improvement over the situation during the height of the recession but substantially higher than in 2007.

In the County the unemployment rate fell from 9.2 percent in 2002 to a low of 5.6 percent in 2007, before the recession. During the recession, the County unemployment rate grew for three consecutive years, to a high of 14.0 percent in 2010. The rate dropped in both of the most recent two years, but was still 10.2 percent in 2012.

Table 4.4-10. Size of Workforce by County in Project Vicinity

County Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2012	% Change
Washington	3,481,463	2,913,230	2,999,526	3,075,972	3,155,384	3,232,652	3,284,836	3,194,251	3,166,880	3,161,818	3,197,293	376,765	12.1%
Clark	211,442	170,968	180,700	188,730	192,679	196,119	198,829	188,747	186,527	187,179	189,421	24,123	12.9%
Cowlitz	43,067	38,553	39,051	39,637	39,843	40,581	40,493	38,659	38,590	37,912	38,380	284	0.7%
Skamania	5,060	4,295	4,510	4,624	4,688	4,666	4,687	4,415	4,501	4,461	4,515	292	6.1%
Oregon	1,962,908	1,699,679	1,714,447	1,740,990	1,792,039	1,821,827	1,827,032	1,753,853	1,761,867	1,785,400	1,791,730	119,168	6.5%
Clackamas	199,576	175,118	177,506	180,656	185,938	187,337	188,717	181,268	178,777	181,905	183,824	9,838	5.2%
Columbia	24,221	20,823	21,102	21,619	22,409	22,380	22,476	21,357	21,526	21,683	21,912	1,143	5.0%
Hood River	14,497	11,155	11,441	11,538	11,922	12,296	12,632	12,815	13,196	13,304	13,487	2,406	19.9%
Marion	154,899	136,976	137,804	138,962	142,018	143,510	145,044	140,510	141,020	140,720	140,106	7,600	5.2%
Multnomah	404,357	342,767	338,901	340,275	349,215	360,495	365,458	351,922	360,613	369,121	373,015	24,841	6.5%
Polk	38,442	31,996	32,680	33,733	35,249	36,560	37,458	36,391	35,548	35,352	35,198	4,660	13.8%
Washington	293,472	245,736	249,121	255,825	266,761	271,610	273,971	263,334	262,950	269,929	272,777	28,109	10.6%
Yamhill	48,611	40,330	40,790	41,581	43,273	44,232	44,778	42,767	43,386	44,010	44,475	4,866	11.1%
Study Area	1,437,644	1,218,717	1,233,606	1,257,180	1,293,995	1,319,786	1,334,543	1,282,185	1,286,634	1,305,576	1,317,110	108,162	8.1%

Source: Bureau of Labor Statistics

Table 4.4-11. Employment by County in Project Vicinity

County Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2012	% Change
Washington	2,877,022	3,146,154	3,199,234	3,255,527	3,319,252	3,386,775	3,473,010	3,523,739	3,516,008	3,482,239	3,481,463	320,271	11.1
Clark	170,096	189,109	195,202	201,564	204,406	207,853	214,101	217,536	216,991	213,635	211,442	19,325	11.4
Cowlitz	38,218	42,820	42,663	42,724	42,607	43,327	44,119	44,627	44,376	43,072	43,067	162	0.4
Skamania	4,293	4,779	4,928	5,002	5,042	5,001	5,126	5,075	5,188	5,103	5,060	222	5.2
Oregon	1,704,131	1,850,024	1,849,720	1,856,062	1,893,267	1,921,081	1,954,125	1,972,962	1,973,793	1,975,393	1,962,908	87,599	5.1
Clackamas	176,583	189,349	190,199	191,232	195,283	196,328	200,108	201,930	198,863	199,654	199,576	7,241	4.1
Columbia	20,899	23,233	23,207	23,340	23,771	23,737	24,188	24,586	24,484	24,265	24,221	1,013	4.8
Hood River	11,095	12,200	12,353	12,321	12,612	12,878	13,346	13,936	14,384	14,438	14,497	2,392	21.6
Marion	136,577	148,851	149,066	148,651	150,558	151,714	155,295	157,808	158,598	156,976	154,899	3,529	2.6
Multnomah	348,945	374,435	366,118	362,362	368,171	379,016	388,198	392,741	400,065	404,114	404,357	24,070	6.9
Polk	31,647	34,348	34,993	35,752	37,090	38,455	39,688	40,136	39,198	38,834	38,442	3,551	11.2
Washington	247,008	265,300	265,583	269,807	279,060	283,871	289,259	290,455	288,873	292,843	293,472	25,769	10.4
Yamhill	40,511	43,915	43,969	44,285	45,617	46,566	47,868	48,294	48,538	48,604	48,611	3,964	9.8
Study Area	1,225,872	1,328,339	1,328,281	1,337,040	1,364,217	1,388,746	1,421,296	1,437,124	1,439,558	1,441,538	1,437,644	91,238	7.4

Source: Bureau of Labor Statistics

Table 4.4-12. Unemployment by County in Project Vicinity

County Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2012	% Change
Washington	227,676	232,924	199,708	179,555	163,868	154,123	188,174	329,488	349,128	320,421	284,170	56,494	24.8
Clark	17,223	18,141	14,502	12,834	11,727	11,734	15,272	28,789	30,464	26,456	22,021	4,798	27.9
Cowlitz	4,565	4,267	3,612	3,087	2,764	2,746	3,626	5,968	5,786	5,160	4,687	122	2.7
Skamania	475	484	418	378	354	335	439	660	687	642	545	70	14.7
Oregon	139,609	150,345	135,273	115,072	101,228	99,254	127,093	219,109	211,926	189,993	171,178	31,569	22.
Clackamas	13,155	14,231	12,693	10,576	9,345	8,991	11,391	20,662	20,086	17,749	15,752	2,597	19.7
Columbia	2,179	2,410	2,105	1,721	1,362	1,357	1,712	3,229	2,958	2,582	2,309	130	6.0
Hood River	996	1,045	912	783	690	582	714	1,121	1,188	1,134	1,010	14	1.4
Marion	10,722	11,875	11,262	9,689	8,540	8,204	10,251	17,298	17,578	16,256	14,793	4,071	38.0
Multnomah	30,571	31,668	27,217	22,087	18,956	18,521	22,740	40,819	39,452	34,993	31,342	771	2.5
Polk	2,135	2,352	2,313	2,019	1,841	1,895	2,230	3,745	3,650	3,482	3,244	1,109	51.9
Washington	18,355	19,564	16,462	13,982	12,299	12,261	15,288	27,121	25,923	22,914	20,695	2,340	12.7
Yamhill	3,234	3,585	3,179	2,704	2,344	2,334	3,090	5,527	5,152	4,594	4,136	902	27.9
Study Area	103,610	109,622	94,675	79,860	70,222	68,960	86,753	154,939	152,924	135,962	120,534	16,924	16.3

Source: Bureau of Labor Statistics

Table 4.4-13. Unemployment Rate by County in Project Vicinity

County Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Washington	7.3%	7.4%	6.2%	5.5%	4.9%	4.6%	5.4%	9.4%	9.9%	9.2%	8.2%
Clark	9.2%	9.6%	7.4%	6.4%	5.7%	5.6%	7.1%	13.2%	14.0%	12.4%	10.4%
Cowlitz	10.7%	10.0%	8.5%	7.2%	6.5%	6.3%	8.2%	13.4%	13.0%	12.0%	10.9%
Skamania	10.0%	10.1%	8.5%	7.6%	7.0%	6.7%	8.6%	13.0%	13.2%	12.6%	10.8%
Oregon	7.6%	8.1%	7.3%	6.2%	5.3%	5.2%	6.5%	11.1%	10.7%	9.6%	8.7%
Clackamas	6.9%	7.5%	6.7%	5.5%	4.8%	4.6%	5.7%	10.2%	10.1%	8.9%	7.9%
Columbia	9.4%	10.4%	9.1%	7.4%	5.7%	5.7%	7.1%	13.1%	12.1%	10.6%	9.5%
Hood River	8.2%	8.6%	7.4%	6.4%	5.5%	4.5%	5.3%	8.0%	8.3%	7.9%	7.0%
Marion	7.3%	8.0%	7.6%	6.5%	5.7%	5.4%	6.6%	11.0%	11.1%	10.4%	9.6%
Multnomah	8.1%	8.5%	7.4%	6.1%	5.1%	4.9%	5.9%	10.4%	9.9%	8.7%	7.8%
Polk	6.3%	6.8%	6.6%	5.6%	5.0%	4.9%	5.6%	9.3%	9.3%	9.0%	8.4%
Washington	6.9%	7.4%	6.2%	5.2%	4.4%	4.3%	5.3%	9.3%	9.0%	7.8%	7.1%
Yamhill	7.4%	8.2%	7.2%	6.1%	5.1%	5.0%	6.5%	11.4%	10.6%	9.5%	8.5%
Study Area	7.8%	8.3%	7.1%	6.0%	5.1%	5.0%	6.1%	10.8%	10.6%	9.4%	8.4%

Source: Bureau of Labor Statistics

According to data from the U.S. Census Bureau 2011 County Business Patterns, health care and social assistance are the largest sources of jobs in the study area, accounting for approximately 150,000 of the 1 million jobs. Retail trade is the second-largest source of employment, accounting for 126,000 jobs, followed by manufacturing (110,000 jobs), accommodation and food services (99,000 jobs), and wholesale trade (69,000 jobs).

The Facility falls into the transportation and warehousing sector, which accounted for nearly 37,000 jobs in the study area in 2011.

Average wages vary significantly by sector and county. According to the County Business Pattern data, the average annual wage for the region, across all sectors, was $45,700. In the transportation and warehousing sector, the average annual wage is slightly lower, at $44,300, and in the County, it is $39,200. This information is shown in greater detail by the tables on the following pages.

Table 4.4-14. Employment by Sector in 2011

NAICS	Description	Clark County, Washington	Cowlitz County, Washington	Skamania County, Washington	Clackamas County, Oregon	Columbia County, Oregon	Hood River County, Oregon	Marion County, Oregon	Multnomah County, Oregon	Polk County, Oregon	Washington County, Oregon	Yamhill County, Oregon	Study Area Total
0	Total for all sectors	107,452	30,312	1,185	121,901	6,948	8,501	93,122	375,965	10,795	223,496	26,599	1,006,276
11	Agriculture, forestry, fishing and hunting	110	737	2	243	245	150	1,152	700	410	258	232	4,089
21	Mining, quarrying, and oil and gas extraction	277	89		50	54		286	50	10	66	50	872
22	Utilities	50	50		300	150	50	251	4,272	50	700	50	4,523
23	Construction	8,710	2,872	101	8,347	357	378	5,005	15,509	807	10,936	1,089	54,111
31-33	Manufacturing	11,195	5,974	150	15,779	1,177	1,095	8,247	31,389	1,564	26,982	5,547	109,099
42	Wholesale trade	5,601	1,109	14	9,180	56	300	3,735	22,714	289	26,003	300	69,001
44-45	Retail trade	15,238	4,678	142	17,281	1,347	1,269	15,420	37,000	1,606	28,400	3,312	125,693
48-49	Transportation and warehousing	2,986	983	10	4,087	296	106	3,551	20,718	244	3,088	560	36,629
51	Information	3,751	369	14	1,909	55	192	1,827	10,789	50	9,146	188	28,290
52	Finance and insurance	4,633	877	50	5,053	292	142	3,540	20,119	245	9,911	800	45,662
53	Real estate and rental and leasing	2,067	344	10	2,450	89	50	2,034	8,631	181	4,713	257	20,826
54	Professional, scientific, and technical services	6,535	838	50	8,294	251	385	3,891	29,224	333	16,581	614	66,996
55	Management of companies and enterprises	1,872	700		2,751	10	50	1,347	14,282	10	11,640	199	32,801
56	Administrative and support and waste management and remediation services	6,693	741	10	6,304	165	139	6,029	25,117	270	18,065	833	64,366
61	Educational services	1,369	294		2,051	47	50	3,000	14,799	187	5,739	2,778	30,264
62	Health care and social assistance	18,946	5,634	85	17,213	999	1,790	18,616	56,182	2,455	24,088	4,357	150,365
71	Arts, entertainment, and recreation	1,817	349	10	1,773	69	653	1,132	6,390	161	3,291	216	15,851
72	Accommodation and food services	10,477	2,572	504	12,284	914	1,241	9,498	40,086	1,247	16,415	3,976	99,214
81	Other services (except public administration)	5,065	1,176	27	6,549	300	356	4,731	18,026	653	7,402	1,079	45,364

Source: 2011 County Business Patterns (U.S. Census Bureau)

Table 4.4-15. Average Wage by Sector in 2011

NAICS	Description	Clark County, Washington	Cowlitz County, Washington	Skamania County, Washington	Clackamas County, Oregon	Columbia County, Oregon	Hood River County, Oregon	Marion County, Oregon	Multnomah County, Oregon	Polk County, Oregon	Washington County, Oregon	Yamhill County, Oregon	Study Area Total
0	Total for all sectors	$43,100	$42,000	$30,000	$42,800	$30,200	$28,900	$33,300	$47,300	$29,100	$54,600	$35,100	$45,700
11	Agriculture, forestry, fishing and hunting	$60,700	$47,200	$55,500	$27,800	$40,400	n/a	$22,600	$34,100	$37,700	$36,400	$36,200	$34,600
21	Mining, quarrying, and oil and gas extraction	$72,100	$73,000	n/a	n/a	$54,300	n/a	$72,400	n/a	n/a	$53,400	$42,900	$64,000
22	Utilities	n/a	n/a	n/a	n/a	n/a	n/a	$75,300	$97,300	n/a	n/a	n/a	$96,100
23	Construction	$53,100	$53,700	$47,100	$49,400	$34,900	$31,400	$46,400	$61,200	$49,000	$54,400	$39,800	$53,900
31-33	Manufacturing	$53,500	$64,100	n/a	$57,300	$46,300	$35,800	$38,800	$51,700	$36,500	$59,300	$50,700	$53,700
42	Wholesale trade	$74,200	$51,500	$56,200	$56,900	$52,000	n/a	$46,800	$55,200	$42,200	$117,700	$76,300	$80,000
44-45	Retail trade	$27,200	$24,100	$20,000	$26,500	$23,700	$24,400	$24,000	$26,900	$23,700	$26,900	$25,600	$26,300
48-49	Transportation and warehousing	$43,200	$39,200	$24,400	$38,600	$32,800	$29,500	$44,100	$45,100	$34,000	$44,600	$83,300	$44,300
51	Information	$77,300	$42,900	$37,200	$55,200	$31,900	$47,300	$38,200	$67,100	$33,300	$64,600	$44,200	$64,200
52	Finance and insurance	$55,200	$42,500	$14,600	$57,900	$36,700	$50,900	$47,400	$78,600	$34,000	$58,200	$45,700	$65,200
53	Real estate and rental and leasing	$34,700	$21,600	$19,300	$35,000	$25,700	$34,200	$28,200	$38,000	$16,800	$36,600	$23,100	$35,400
54	Professional, scientific, and technical services	$50,600	$39,900	$40,100	$69,100	$31,100	$47,600	$43,600	$70,600	$32,400	$57,800	$40,900	$62,600
55	Management of companies and enterprises	$99,700	$77,800	n/a	$73,700	n/a	n/a	$61,900	$92,900	$45,200	$114,600	$78,700	$97,700
56	Administrative and support and waste management and remediation services	$27,100	$25,000	$15,900	$30,600	$24,500	$21,600	$23,900	$28,400	$27,700	$29,900	$25,400	$28,400
61	Educational services	$19,700	$17,300	n/a	$22,400	$14,600	n/a	$21,700	$26,600	$20,000	$22,800	$20,700	$24,100
62	Health care and social assistance	$48,300	$42,200	$30,400	$49,300	$27,100	$30,600	$40,700	$53,000	$28,400	$46,000	$36,600	$47,600
71	Arts, entertainment, and recreation	$19,500	$16,200	n/a	$20,300	$13,000	$15,100	$18,400	$33,400	$10,900	$27,600	$20,900	$26,500
72	Accommodation and food services	$15,900	$14,700	$20,600	$16,200	$12,800	$16,100	$14,600	$17,900	$13,700	$16,500	$22,200	$16,900
81	Other services (except public administration)	$23,800	$21,900	$18,600	$23,500	$20,800	$22,600	$23,700	$29,900	$21,900	$29,600	$19,000	$26,900

Source: 2011 County Business Patterns (U.S. Census Bureau)

Table 4.4-16. Employment Trends and Forecast in Southwest Washington

Industry	Est. Emp. 2009	Est. Emp. 2014	Est. Emp. 2019	Avg. Annual Growth Rate 2009-2014	Avg. Annual Growth Rate 2014-2019	Avg. Annual Growth Rate 2009-2019	State Rate
Natural Resources And Mining	1,000	1,100	1,100	1.9%	0.0%	1.0%	1.4%
Construction	11,500	12,000	13,300	0.9%	2.1%	1.5%	1.1%
Manufacturing	17,800	20,200	21,500	2.6%	1.3%	1.9%	1.1%
Wholesale Trade	6,900	7,700	8,500	2.2%	2.0%	2.1%	1.4%
Retail Trade	19,300	21,000	22,200	1.7%	1.1%	1.4%	1.0%
Transportation, Warehousing And Utilities	5,800	6,600	7,400	2.6%	2.3%	2.5%	1.6%
Information	3,300	3,800	4,100	2.9%	1.5%	2.2%	2.3%
Financial Activities	7,400	7,800	7,900	1.1%	0.3%	0.7%	0.3%
Professional And Business Services	16,200	19,000	22,400	3.2%	3.3%	3.3%	2.9%
Education And Health Services	24,100	27,100	31,100	2.4%	2.8%	2.6%	2.0%
Leisure And Hospitality	15,800	16,800	18,100	1.2%	1.5%	1.4%	1.3%
Other Services	5,800	6,100	6,200	1.0%	0.3%	0.7%	0.4%
Government	30,200	31,500	33,700	0.8%	1.4%	1.1%	0.9%
Total Nonfarm	165,100	180,700	197,500	1.8%	1.8%	1.8%	1.4%

Note: Southwest Washington is Clark, Cowlitz, and Wahkiakum County Washington Employment Security Department

Most of the largest employers in the County fall into one of four sectors: medical services, education, manufacturing, and government. The medical sector includes the largest employer in 2012, PeaceHealth Southwest Washington; other medical providers in the top 28 employers include the Vancouver Clinic, Legacy Salmon Creek Medical Center, Veterans' Administration Medical Center, and Kaiser Permanente Northwest. These five providers account for more than 22 percent of the jobs generated by the top employers

Education accounts for nearly one-third of the jobs generated by the top 28 employers. Major agencies include the Evergreen, Vancouver, Battle Ground school districts as well as Clark College and Washington State University Vancouver.

Manufacturing accounts for nearly 15 percent of the jobs provided by the top 28 employers in the County. Top manufacturers include WaferTech, Northwest Natural Products, SEH America, Georgia-Pacific, Frito-Lay, and Columbia Machine.

Government agencies represent two of the top 28 employers, and account for more than 9 percent of the jobs.

Table 4.4-17. Major Employers in County

2012 Rank	Employer	2012 FTE
1	Southwest Washington Medical Center	2,841
2	Evergreen Public Schools	2,455
3	Vancouver Public Schools	2,203
4	Clark County, Washington	1,561
5	Fred Meyer Stores, Inc.	1,500
6	Battle Ground Public Schools	1,213
7	Bonneville Power Administration	1,181
8	WaferTech, LLC	1,040
9	Clark College	985
10	City of Vancouver	932
11	The Vancouver Clinic	912
12	Legacy Salmon Creek Medical Center	860
13	VA Medical Clinic	809
14	BNSF Railway Railroad	800
15	Northwest Natural Products, Inc.	790
16	Camas School District No. 117	750
17	Kaiser Permanente Northwest	724
18	SEH America	711
19	Wells Fargo	654
20	Dick Hannah Dealerships	650
21	Charter Communications	605
22	Educational Service District No. 112	600
23	Georgia-Pacific LLC	508
24	Frito-Lay, Inc.	475
25	Columbia Machine, Inc.	400
26	Clark Co. Public Transportation Benefit Area	384
27	Washington State University, Vancouver	352
28	CPU	340

Source: Columbia River Economic Development Council

A recent study completed for the Port included an analysis of where workers live. Excluding rail crew and rail headquarters employment, more than 75 percent of the workers with jobs directly related to the Port (and its tenants) are residents of the County. This includes 45.8 percent who are residents of Vancouver, and 29.9 percent who live elsewhere in the County. Nearly 20 percent of Port-related workers commute from Oregon, including 12.1 percent from Multnomah County.

Table 4.4-18. Distribution of Port of Vancouver Direct Jobs by Place of Residence

Location	Percent	Direct Jobs
Vancouver	45.8%	579
Other Clark	29.9%	378
Skamania	0.5%	7
Other WA	3.5%	45
Multnomah	12.1%	152
Washington	1.1%	14
Clackamas	3.2%	40
Other OR	3.2%	41
Other U.S.	0.7%	8
Total	100.0%	1,265

4.4.1.5 Lodging

Clark County is one of seven counties in the Portland, Oregon, lodging market, as defined by STR Lodging. According to STR Lodging, the Portland market currently has total of 25,903 hotel rooms, of which approximately 10 percent are in the County.

Two-thirds of the hotel rooms in the County are at hotels rated as upper economy, midscale, or upper midscale. The two least-expensive hotel types, economy and midscale, each account for approximately 20 to 23 percent of the available rooms in the County, and there are a total of approximately 1,100 such rooms.

In the Portland market, these three least expensive tiers of hotels account for 56 percent of the total rooms available. Nearly 11,000 available rooms in the Portland market are in economy or midscale hotels.

Table 4.4-19. Hotel/Motel Rooms in Portland Market

County	Economy	Midscale	Upper Midscale	Upscale	Upper Upscale	Luxury	Total
Clark County, WA	521	587	571	642	226	-	2,547
Clackamas County, OR	517	525	464	685	230	-	2,421
Columbia County, OR	90	112	40	-	-	-	242
Multnomah County, OR	2,750	2,328	2,417	3,358	3,971	581	15,405
Washington County, OR	1,207	588	1,314	1,013	366	124	4,612
Yamhill County, OR	276	221	66	20	-	93	676
Portland market total	5,361	4,361	4,872	5,718	4,793	798	25,903

Source: STR Lodging

Another source of data for the hotel market is PKF Hospitality Research, LLC. PKF provides data for sub-markets of the Portland region, as well historical occupancy data. According to PKF, occupancy at hotels in the Airport/Vancouver sub-market averaged 59.8 percent between 2008 and 2012. The revenue per available room (Revenue PAR) averaged approximately $50.00 during that period, and the estimated revenue per occupied room was approximately $82.50.

The Airport/Vancouver sub-market is the least expensive of the four tracked by PKF. Average occupancy is also relatively low.

Table 4.4-20. Hotel/Motel Occupancy & Revenue in Portland Market

Year	Downtown		Airport/ Vancouver		Beaverton/ Sunset Hwy West		Lake Oswego/ I-5 South	
	Occupancy	Revenue PAR	Occupancy	Revenue PAR	Occupancy	Revenue PAR	Occupancy	Revenue PAR
2008	72.3%	$93.94	63.2%	$56.20	63.3%	$57.36	60.2%	$53.36
2009	66.8%	$78.01	54.2%	$44.13	57.4%	$45.84	54.2%	$43.81
2010	71.3%	$84.02	57.3%	$44.83	66.0%	$50.25	57.7%	$47.48
2011	74.0%	$91.45	59.8%	$48.19	69.6%	$58.73	59.4%	$50.43
2012	75.9%	$100.45	64.6%	$53.90	72.3%	$66.55	62.2%	$55.77
2013 ytd	66.0%	$77.72	57.2%	$46.97	65.3%	$63.72	54.7%	$46.77

Source: PKF Hospitality Research, LLC

4.4.1.6 Taxes

The proposed project is located on land owned by the Port. Port land is not subject to property taxes, but privately owned improvements located on land leased from the Port are subject to property tax. In this case, all of the equipment associated with the Facility will be subject to property taxes.

The total property tax at the project location is $14.11773 per thousand dollars of assessed value. The distribution of these taxes is presented in the following table. Schools are the primary recipient of property taxes, with $5.609446 going to Vancouver schools and $2.489687 going to the state school fund.

Table 4.4-21. Breakdown of Taxing District Millage Rate

Taxing District	Tax Rate
Port Vancouver General Adref	0.000449
County General Adref	0.003626
Veterans Asst	0.009925
City Vancouver General Adref	0.010346
Dev Disability	0.012500
Mental Health	0.012500
Vancouver Library Capital Facilities	0.256084
Sd37 Vancouver M&O Adref	0.016503
Conservation Futures	0.062500
Port Vancouver Bonds	0.223412
Port Vancouver General	0.211683
County General	1.537209
Sd37 Vancouver Debt Svc	1.851094
Sd37 Vancouver M&O	3.758351
State Schools	2.489687
City Vancouver General	3.161863
Ft. Vancouver Regional Library	0.500000
Totals	**14.11773**

Source: Clark County Assessor

4.4.1.7 Fire, Police, and Medical Services

Fire Protection

The Vancouver Fire Department provides services to 246,441 people in the combined City of Vancouver and Clark County Fire District 5 service area, which is comprised of 90.9 square miles. The Fire Department consists of 198 personnel. The Fire Department serves a population equating to the second largest city in Washington State with the highest call volume per firefighter and the fewest firefighters per thousand in population of comparable cities in the state. Vancouver Fire Department is a full service fire department, providing: fire suppression, prevention, emergency medical services, hazardous materials, trench and confined space rescue, water rescue, high angle rescue, and citywide emergency management. These services are provided by ten fire stations.

The Vancouver Fire Department maintains a Class 4 rating from the Washington Surveying and Rating Bureau. Class 1 is the best rating, classified as the ideal fire department, and Class 10 is one with the most deficiency points or no department at all. The Fire Department was downgraded one class in October 2002 due to staffing, fire prevention, and marine response deficiencies. This resulted in an increase in insurance premiums paid by most businesses in the fire service area.

Table 4.4-22. Fire Departments in Clark County

Department	City
City of Vancouver	Vancouver
Clark County	Camas
City of Camas	Camas
City of Washougal	Washougal
Town of Yacolt	Yacolt
Cowlitz County Fire District 1	Woodland

Source: Dun & Bradstreet

Police Services

The Vancouver Police Department covers approximately 49 square miles and provides 24-hour response for public safety and services within the City. The Facility is located approximately 5.5 miles west of the nearest police station, located at 2800 NE Stapleton Road. The VPD currently employs 185 sworn staff, with 62 Police Officers, 10 Corporals and 18 Sergeants assigned to patrol. VPD provides police services and respond to 911 calls for service.

The VPD provides a range of public safety and police services including patrol, investigations division, and special operations division. The VPD currently has on staff 3 EMT-Paramedics and 2 EMT-IV Technicians that provide medical support as part of the region's SWAT Team.

Medical Services

The closest hospital to the Facility is the Peace Health Southwest Washington Medical Center which is approximately 7.5 miles east of the Facility on Mill Plain Boulevard. Southwest Washington Medical Center is designated as a Level II Trauma Center by the Washington State Department of Health. There are five levels of trauma centers designated by the state with Level I providing the highest level of care and Level V providing the lowest level. Harborview Medical Center in Seattle is the only Level 1 Trauma Center in Washington State. In Oregon, Legacy Emanuel and Oregon Health Sciences University in Portland are both Level I Hospitals designated by the State of Oregon. The State of Oregon has a 4 level designation with Level I

providing the highest level of definitive, comprehensive care for severely injured patients. Legacy Emanuel and Oregon Health Sciences University are approximately 10 and 14 miles south of the project site, respectively.

Table 4.4-23. Ambulance Service Providers in Project Vicinity

Department	City
City of Vancouver	Vancouver
Clark County	Camas
City of Camas	Camas
City of Washougal	Washougal
Town of Yacolt	Yacolt
Cowlitz County Fire District 1	Woodland

Source: Dun & Bradstreet

4.4.1.8 School Enrollment

School enrollment in the study area has grown slowly over the past 6 school years. Total enrollment grew from 423,542 during the 2007–2008 school year to 425,891 during the 2012–2013 school year. The increase in enrollment of 2,349 students represents average annual growth of just 0.11 percent.

Within the study area, enrollment in the County grew at one of the fastest rates. Schools in the County saw an increase of nearly 2,000 students between the 2007–2008 and 2012–2013 school years, with growth of 0.51 percent.

Table 4.4-24. Enrollment Trends in Project Vicinity

County	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013	Avg. Annual Growth
Washington							
Clark	76,106	76,782	76,720	76,644	77,134	78,054	0.51%
Cowlitz	17,930	17,715	17,382	17,161	17,013	16,931	-1.14%
Skamania	1,213	1,294	1,617	1,538	1,307	1,198	-0.25%
Oregon							
Clackamas	58,590	58,847	58,394	57,996	57,702	57,870	-0.25%
Columbia	8,639	8,584	8,281	8,241	8,139	7,835	-1.93%
Hood River	3,968	3,973	4,026	3,989	4,076	4,086	0.59%
Marion	60,051	60,268	60,068	60,474	60,324	60,691	0.21%
Multnomah	90,278	89,814	90,080	90,474	91,010	90,405	0.03%
Polk	6,749	6,749	6,710	6,666	6,569	6,514	-0.71%
Washington	83,404	83,699	84,165	85,155	85,471	85,863	0.58%
Yamhill	16,614	16,612	16,763	16,506	16,438	16,444	-0.21%
Study Area	423,542	424,337	424,206	424,844	425,183	425,891	0.11%

Source: Washington Superintendent of Public Instruction, Oregon Department of Education

4.4.2 Impacts

4.4.2.1 Construction

The Applicant has developed estimates of the manpower needed for the construction of the Vancouver facility. Over the nine-month construction period, a total of 250 construction workers will be employed, with a maximum of 125 workers on site per day. The trades represented by these workers will vary over the course of the project, depending on the project phase. The total number of each category of worker is presented in Table 4.4-26.

The project is located in a major metropolitan area (i.e., Portland-Vancouver MSA) that is capable of supplying most of the needed construction workforce. As demonstrated in Table 4.4-26, for most of the trades required, peak construction employment will account less than 3 percent of the available local workforce. The exceptions are ironworkers (10.7 percent of local workforce) and boilermakers (5.9 percent); a portion of these workers in these trades may need to travel from outside of the Portland-Vancouver region.

Table 4.4-25. Impact on Local Workforce

Trade	Regional Employment	Project Maximum	% Increase
Mechanical	2,285	50	2.2%
Electricians	4,872	35	0.7%
Operating Engineers	1,689	25	1.5%
Laborers	5,637	53	0.9%
Ironworkers	300	32	10.7%
Carpenters	5,306	20	0.4%
Concrete	876	15	1.7%
Boilermakers	339	20	5.9%
Total	21,304	250	1.2%

Over the nine months of the project the direct employment is projected to be 250 workers, with a maximum of 125 on site per day. For this analysis it is assumed that these workers earn the prevailing wage for Clark County. The total capital cost of the project is estimated to be $110 million, of which an estimated $10 million will be supplies purchased from out of state.

The estimated direct labor income associated with the project is estimated to $20.6 million. Labor income includes both employee compensation (wages, benefits, and taxes) and proprietor's income. While the annual wage in the study area averages $45,700 across all sectors (see Table 4.4-15), the construction jobs associated with the project are likely to generate direct income (including wages and all benefits) that is substantially higher than the study area average wage.

Total economic impacts were estimated using the IMPLAN input-output model. Including both indirect and induced benefits, the construction project is projected to support a total of 677 jobs in Washington, with associated total income of $43.6 million.

Table 4.4-26. Economic Impacts of Construction

Trade	Jobs	Labor Income
Direct	250	$20.6
Indirect and Induced	427	$23.0
Total	677	$43.6

Source: Tesoro Savage Petroleum Terminal LLC, BST Associates using IMPLAN

4.4.2.2 Operations

The proposed terminal will directly employ an estimated 120 workers at full operation. In addition, the terminal will generate work for longshore labor, vessel assist crews, ships pilots, and railroad employees. The number of additional workers in Washington State is presented in Table 4.4-28. In addition to the 120 workers estimated to be employed at the terminal, the largest impact is on line-haul rail, where the additional rail traffic is projected to support an additional 151 rail workers in Washington.

The Applicant is expected to bring a small number of management employees from out of the area, but the remaining terminal jobs are anticipated to be filled by the local workforce.

In addition to the terminal workers, the projected direct employment impacts include:

- Longshore workers will be used for mooring each vessel that calls at the terminal.
- Ship pilots are required for vessels entering and leaving the Columbia River.
- Columbia River Bar Pilots guide ships through the mouth of the Columbia River, between Astoria and the open ocean.
- Columbia River Pilots guide ships between Astoria and the ports and anchorages upriver as far as Portland and Vancouver.
- Each vessel is expected to use the services of two ship-assist tugboats for arrival and departure at the terminal.
- Railroad crews will operate trains from point of origin to the terminal, with approximately one-third of the rail trip occurring in Washington.

Table 4.4-27. Direct Employment from Operation at Full Build-Out

Type of Worker	Jobs
Terminal workers	120
Longshore	2
Pilots – Bar	4
Pilots – River	11
Tug ship assist	15
Line-Haul Rail	151
Total	303

Source: BST Associates, Tesoro Savage Petroleum Terminal LLC

The direct labor income associated with the full operation is estimated to be $33.0 million (in 2013 dollars). Labor income includes both employee compensation (wages, benefits, and taxes) and proprietor's income.

Total economic impacts were estimated using the IMPLAN input-output model. Including both indirect and induced benefits, the operation of the terminal is projected to support a total of 890 jobs in Washington, with associated total income of $64.1 million.

As illustrated in Table 4.4 15, the average wage in the study area is $45,700 per year across all sectors, and $44,300 in the transportation and warehousing sector. Including wages and benefits, the jobs directly associated with operation of the project are likely to generate employee income that is substantially higher than the study area average wage.

Table 4.4-28. Economic Impact of Full Operation

Trade	Jobs	Labor Income
Direct	303	$33.0
Indirect and Induced	587	$31.1
Total	890	$64.1

Source: Tesoro Savage Petroleum LLC, BST Associates using IMPLAN

4.4.3 Taxes

The project will be subject to a variety of state and local taxes. Taxes on the construction will be assessed on a one-time basis, while taxes on operations will be on-going. Construction-related taxes evaluated for this analysis include Business and Occupation tax (B & O) and retail sales taxes. For operations, the annual property tax impact was evaluated.

4.4.3.1 Construction-related Taxes

Businesses in Washington are subject to the B & O tax, which is levied on gross sales. Construction of the terminal would be subject to the state B & O tax rate of 0.00471. With a construction value of $110 million, the total state B & O tax associated with construction would be $518,100.

In addition to the state B & O tax, a number of cities levy a local B & O tax. However, there is no local B & O tax in the City of Vancouver.

Retail sales tax is assessed against the value of the construction project. In Vancouver total sales tax rate is 8.4%, of which 6.5% goes to the State and 1.9% to local government. The $110 million in construction is projected to generate a total of $9.24 million, of which the State would receive $7.15 million and local government $2.09 million.

In total, construction of the terminal is expected to generate $9.76 million in non-recurring taxes, of which Washington State can be expected to receive $7.67 million and local government $2.09 million.

Table 4.4-29. Summary of Construction-related Tax ($ millions)

Trade	State	Local	Total
Business and Occupation	$0.52	$0.00	$0.52
Retail Sales	$7.15	$2.09	$9.24
Total	$7.67	$2.09	$9.76

Source: BST Associates

4.4.3.2 Operations-related Tax

The project is located on land owned by the Port of Vancouver. Port land is not subject to property taxes, but privately owned improvements located on land leased from the Port are

subject to property tax. In this case, all of the equipment associated with the Project would be subject to property taxes.

Based on the taxing millage rate of an adjacent parcel, the property tax rate at the project location is $14.11773 per thousand dollars of assessed value. The distribution of these taxes is presented in the following table. Schools are the primary recipient of property taxes, with $5.609446 going to Vancouver schools and $2.489687 going to the state school fund.

The value of the project is estimated to be $110,000,000. Based on this value, the annual property tax generated is estimated to be $1,552,951 in current (2013) dollars.

Table 4.4-30. Property Tax

Taxing District	Tax Rate	Est Property Tax
Port Vancouver General Adref	0.000449	$49
County General Adref	0.003626	$399
Veterans Asst	0.009925	$1,092
City Vancouver General Adref	0.010346	$1,138
Dev Disability	0.012500	$1,375
Mental Health	0.012500	$1,375
Vanc Library Capital Facilities	0.256084	$28,169
SD37 Vancouver M&O Adref	0.016503	$1,815
Conservation Futures	0.062500	$6,875
Port Vancouver Bonds	0.223412	$24,575
Port Vancouver General	0.211683	$23,285
County General	1.537209	$169,093
SD37 Vancouver Debt Svc	1.851094	$203,620
SD37 Vancouver M&O	3.758351	$413,419
State Schools	2.489687	$273,866
City Vancouver General	3.161863	$347,805
Ft Vancouver Reg Library	0.500000	$55,000
Totals	14.11773	$1,552,951

Source: Clark County Assessor, BST Associates

4.4.4 Mitigation

The socioeconomic conditions will not be negatively affected; therefore, no mitigation measures will be required.

Tesoro Savage
Vancouver Energy Distribution Terminal

PART 5 APPLICATIONS FOR PERMITS AND AUTHORIZATIONS

Section 5.1 – Air Emissions Permits and Authorizations

WAC 463-60-536
Applications for Permits and Authorizations – Air emissions permits and authorizations.

(1) The application for site certification shall include a completed prevention of significant deterioration permit (PSD) application and a notice of construction application pursuant to the requirements of Chapter 463-78 WAC.

(2) The application shall include requests for authorization for any emissions otherwise regulated by local air agencies as identified in WAC 463-60-297 Pertinent federal, state and local requirements.

(04-23-003, recodified as § 463-60-536, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-536, filed 10/11/04, effective 11/11/04.)

Section 5.1 Air Emissions Permits and Authorizations

5.1.1 Introduction

Tesoro-Savage Petroleum Terminal, LLC (Tesoro-Savage) proposes to construct a facility in Vancouver to receive crude oil by rail and transfer it to vessels. The Tesoro Savage Vancouver Energy Distribution Terminal (Facility) will emit air pollutants and therefore must obtain certain air quality permits before construction of the Facility can commence. Air permits are required for construction and operation of the emissions units associated with the stationary source. Emissions from mobile sources, including ships, trains, and vehicles, are regulated under other federal mobile source emission standards and are therefore not regulated or addressed under the stationary source air permitting process.

The Energy Facility Site Evaluation Council (EFSEC) is the lead state agency responsible for environmental permitting of facilities that have the capacity to receive more than an average of 50,000 barrels per day of crude or refined petroleum products that has been or will be transported over marine waters. EFSEC has responsibility for technical review of air quality concerns and for administering preconstruction permits. If a project is subject to the major source permit program (see section 5.1.3.3.2), as this project is, the United States Environmental Protection Agency (USEPA) co-signs the major source permit.

Under Washington Administrative Code (WAC) 463-78-005, EFSEC has adopted by reference the general air quality regulations Ecology has established in Chapters 173-400, 173-401, 173-406, and 173-460.[18] It should also be noted that regulations established by the Southwest Clean Air Agency (SWCAA) do not directly apply to the Facility. However, SWCAA regulations are discussed in this application to demonstrate that even if the local regulations did apply, the Facility would be compliant.

5.1.1.1 Organization

This section constitutes a combined Notice of Construction (NOC) and Prevention of Significant Deterioration (PSD) permit application. Although an air quality permit application typically begins with a project description, this permit application is a component of a broader Application for Site Certification. Section 2.3, Construction on Site, of this application provides a detailed project description.

Key components of this air quality permit application are as follows:

- Section 5.1.2 describes the components of the project that emit air pollutants and presents estimated emissions. Emissions are based on vendor information, emissions regulations, and the BACT analysis. A more detail discussion of BACT is included in Attachment 1.
- Section 5.1.3 identifies and discusses potentially applicable air quality regulations.
- Section 5.1.4 describes an air quality dispersion modeling analysis used to estimate concentrations of criteria pollutants and toxic air pollutants (TAPs) in the vicinity of the

[18] Because EFSEC has adopted the Ecology regulations by reference, this section cites directly the Ecology regulations for the reader's convenience.

project (i.e., Class II areas). Section 5.1.4 also compares predicted ambient concentrations with regulatory criteria.

- References are provided in Section 1.5, Sources of Information, of this Application.

The Facility is a minor source of all pollutants subject to regulation under the Clean Air Act with the exception of greenhouse gases. As a result, the Facility triggers major new source review exclusively for greenhouse gases. As no ambient air quality standards exist for greenhouse gases, the only applicable requirement in the greenhouse gas PSD process is a Best Available Control Technology (BACT) analysis. However, as noted above, this section also includes a state BACT analysis for the regulated air pollutants other than greenhouse gases, ambient air quality modeling for criteria pollutants and TAPs, and a list of applicable air quality standards.

5.1.1.2 Summary of Findings

This permit application is summarized as follows:

- Emissions units at the Facility will employ Best Available Control Technology to ensure emissions of all regulated pollutants are less than major source thresholds except greenhouse gases. Consequently, greenhouse gas emissions are addressed through the Prevention of Significant Deterioration permit process while all other emissions are addressed in a minor source Notice of Construction application.
- The Facility will comply with all federal and state emissions standards, including New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants.
- Predicted total concentrations of the criteria air pollutants emitted from the Facility are less than the National and Washington Ambient Air Quality Standards (NAAQS and WAAQS) established to protect human health and welfare. The maximum predicted concentrations attributable to the Facility are added to the existing background concentrations to ensure a conservative analysis.
- Estimated emissions or predicted concentrations of toxic air pollutants released from the Facility are below Ecology's Small Quantity Emissions Rates (SQER) or Ecology's Acceptable Source Impact Levels (ASIL) for all TAPs, demonstrating that the Facility emissions will be in compliance with Washington's toxic air pollutant regulations.

5.1.2 Project Emissions

5.1.2.1 Criteria Pollutant Emissions

Criteria pollutants, including oxides of nitrogen (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter (PM)[19], will be emitted by emissions units at the Facility. Facility emission units include natural gas-fired boilers, marine vapor combustion units (MVCUs), and emergency fire-water pumps, as well as fugitive VOC emissions from crude oil storage tanks and piping components. The following sections discuss the development of emission estimates for each of these emission units. Detailed supporting emission calculations are presented in the spreadsheets in Attachment 2.

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[19] Virtually all of the particulate matter from the Facility emissions units will be $PM_{2.5}$. For simplicity, this application generally refers to PM but the applicability and compliance will be assessed assuming PM is all PM2.5.

5.1.2.1.1 Natural Gas-Fired Boilers Servicing Area 200 - Unloading Operations

As described in greater detail in Part 2 of this application, the Facility will receive crude oil from railcars. The oil will be unloaded from the railcars and pumped to storage tanks. Steam provided by natural gas-fired boilers to be located near the railcar unloading area will be used on an as needed basis to heat up to 30 railcars at a time, reducing the viscosity of the crude oil sufficiently for the railcar unloading process to be completed within a reasonable time period. Similarly, when necessary, steam will be used to heat up to two of the six crude oil storage tanks to maintain crude oil viscosity such that it can be transferred to marine vessels at the dock.

Three boilers, each with a nameplate heat input capacity of 62 million British thermal units per hour (MMBtu/hr) will be located near the railcar unloading area (these boilers are referred to as the unloading boilers). Typically, no more than two of these boilers will operate at any given time, with the third boiler kept as a redundant unit. To allow for uninterrupted steam supply, the third boiler may start up and begin producing steam for a limited period of time before one of the operating boilers is shut down. For the purposes of evaluating compliance with short-term (1-24 hour) ambient standards and ASILs, all three boilers were assumed operating for 24 continuous hours. For the purposes of evaluating compliance with annual ambient standards and ASILs, two boilers were assumed operating at capacity every hour of the year. This conservative assumption is sufficient to address the occasional startup of the third boiler.

Unloading boiler emission rates were calculated assuming Cleaver Brooks 1500 CBEX Elite natural gas-fired boilers, or equivalent, will be installed and operated. The unloading boilers could operate throughout the year (i.e., 8,760 hours per year), but at varying loads dictated by railcar arrival schedules and the viscosity of the crude oil contained in the railcars. The estimated annual and hourly unloading boiler emission rates and assumptions are presented in Tables 5.1-1 and 5.1-2, respectively.

Table 5.1-1. Area 200 Unloading Boilers Maximum Annual Emission Rates[1]

Pollutant	Tons	Basis[2]
NO_X	5.95	Activity: 8,760 hr/yr Emission Factor: 0.011 lb/MMBtu – BACT
CO	19.5	Activity: 8,760 hr/yr Emission Factor: 0.036 lb/MMBtu – BACT
PM	4.06	Activity: 8,760 hr/yr Emission Factor: 0.0075 lb/MMBtu – AP-42, Section 1.4 (Natural Gas Combustion)
VOC	2.70	Activity: 8,760 hr/yr Emission Factor: 0.005 lb/MMBtu – BACT
SO_2	1.99	Activity: 8,760 hr/yr Emission Factor: 0.00367 lb/MMBtu – based on annual average gas sulfur content (1.31 gr/100 scf) as determined by testing, plus a 25% safety factor
GHG (CO_2e)	63,284	Activity: 8,760 hr/yr Emission Factor: 117 lb/MMBtu – composite of the CO_2, CH_4, and N_2O emission factors from 40 CFR Part 98 Tables C-1 and C-2, using the GWP factors from Table A-1

Notes:
1) Annual emission rates assuming continuous capacity operation of two boilers.
2) Assumptions in "Basis" column used to calculate the maximum annual emissions.

Table 5.1-2. Area 200 Unloading Boiler Hourly Emission Rates[1]

Pollutant	lb	Basis[2]
NO_X	0.68	Emission Factor: 0.011 lb/MMBtu – BACT
CO	2.22	Emission Factor: 0.036 lb/MMBtu – BACT
PM	0.463	Emission Factor: 0.0075 lb/MMBtu – AP-42, Section 1.4 (Natural Gas Combustion)
VOC	0.309	Emission Factor: 0.005 lb/MMBtu – BACT
SO_2	0.448	Emission Factor: 0.00725 lb/MMBtu – based on maximum hourly average gas sulfur content (2.59 gr/100 scf) as determined by testing, plus a 25% safety factor

Notes:
1) Hourly average emission rates for a single boiler, based on a maximum firing rate of 62 MMBtu/hr.
2) Assumptions in "Basis" column used to estimate the maximum hourly average emissions.

5.1.2.1.2 Natural Gas-Fired Boilers Servicing Area 300 - Storage

As described in the previous section, crude oil received at the Facility may require heating to be unloaded from the railcars. This crude oil will be transferred from the rail unloading area to two of the six crude oil storage tanks in the storage area, which are insulated and equipped to be steam-heated. The steam used to heat these tanks will be provided by two boilers, each with a nameplate heat input capacity of 12.5 MMBtu/hr that will be located in the storage area (these boilers are referred to as the storage area boilers). Typically, only one of the storage area boilers will operate, with the second kept as a redundant unit. To allow for uninterrupted steam supply, the second boiler may start up and begin producing steam for a limited period of time before the operating boiler is shut down.

For the purposes of evaluating compliance with short-term (1-24 hour) ambient standards and ASILs, both boilers were assumed to be operating at capacity for 24 continuous hours. For the purposes of evaluating compliance with annual ambient standards and ASILs, a single boiler was assumed operating at capacity every hour of the year. This conservative assumption is sufficient to address the occasional startup of the second boiler.

The storage area boiler emission rates were calculated assuming Cleaver Brooks 300 CBEX Elite natural gas-fired boilers, or equivalent, will be installed and operated. A storage area boiler could operate throughout the year (i.e., 8,760 hours per year), but at varying loads dictated by the presence of crude oil in the tanks with heating capability, and the viscosity of the crude oil contained in the tanks. The estimated annual and hourly storage boiler emission rates and assumptions are presented in Tables 5.1-3 and 5.1-4, respectively.

Table 5.1-3. Area 300 Storage Boiler Maximum Annual Emission Rates1

Pollutant	Ton	Basis[2]
NO_X	0.603	Activity: 8,760 hr/yr Emission Factor: 0.011 lb/MMBtu – BACT
CO	1.97	Activity: 8,760 hr/yr Emission Factor: 0.036 lb/MMBtu – BACT
PM	0.411	Activity: 8,760 hr/yr Emission Factor: 0.0075 lb/MMBtu – AP-42, Section 1.4 (Natural Gas Combustion)
VOC	0.274	Activity: 8,760 hr/yr Emission Factor: 0.005 lb/MMBtu – BACT
SO_2	0.201	Activity: 8,760 hr/yr Emission Factor: 0.00367 lb/MMBtu – based on annual average gas sulfur content (1.31 gr/100 scf) as determined by testing, plus a 25% safety factor
GHG (CO_2e)	6,415	Activity: 8,760 hr/yr Emission Factor: 117 lb/MMBtu – composite of the CO_2, CH_4, and N_2O emission factors from 40 CFR Part 98 Tables C-1 and C-2, using the GWP factors from Table A-1

Notes:
1) Annual emission rates for one boiler, based on a maximum firing rate of 12.5 MMBtu/hr.
2) Assumptions in "Basis" column used to calculate the maximum annual emissions.

Table 5.1-4. Area 300 Storage Boiler Hourly Emission Rates for A Single Unit

Pollutant	lb	Basis[2]
NO_X	0.138	Emission Factor: 0.011 lb/MMBtu – BACT
CO	0.451	Emission Factor: 0.036 lb/MMBtu – BACT
PM	0.0939	Emission Factor: 0.0075 lb/MMBtu – AP-42, Section 1.4 (Natural Gas Combustion)
VOC	0.0626	Emission Factor: 0.005 lb/MMBtu – BACT
SO_2	0.0907	Emission Factor: 0.00725 lb/MMBtu – based on maximum hourly average gas sulfur content (2.59 gr/100 scf) as determined by testing, plus a 25% safety factor

Notes:
1) Hourly average emission rates for a single boiler, based on a maximum firing rate of 12.5 MMBtu/hr.
2) Assumptions in "Basis" column used to estimate the maximum hourly average emissions.

5.1.2.1.3 Marine Vapor Combustion Unit

Crude oil will be transferred from the storage tanks to marine vessels located at the dock at a rate of up to 32,000 barrels per hour (bbl/hr). The daily and annual loading rates will be approximately 47 percent of the maximum hourly loading rate (360,000 bbl/day and 131,400,000 bbl/yr).

Vapors displaced from the tanks on the marine vessels will be collected and routed to a marine vapor combustion unit (MVCU). Emission rates were calculated based on a system consisting of eight Jordan Technologies CEB units. Emissions from the vapors displaced from the tanks were calculated with a net heating value derived using the estimated composition of vapors in the tanks.

Vessels will arrive at the Facility with on-board tanks filled with inert gas with oxygen levels below eight percent. The inert gas consists of cleaned exhaust from dedicated on-board inert gas generators (engines burning ultra-low sulfur distillate). Note that the inert gas is added to the tanks as the cargo is discharged – not at the Facility, which is a loading facility.

When the vessel tanks are filled with crude oil, the vapors from the cargo tanks, made up of hydrocarbon and inert gases, is displaced to the MVCU system, which will combust the hydrocarbons in the vapors. In order to ensure adequate destruction of hydrocarbons by the MVCU, the vapor stream must consist of at least approximately 20 percent hydrocarbon. Based on a theoretical profile of VOC fraction in the displaced vapors as loading progresses (see Attachment 2), the hydrocarbon concentration of the displaced vapors will be less than 20 percent for the first 85 percent of the loading operation, and natural gas will be added if needed to the displaced vapors at the MVCU as an "assist gas" to increase the heating value of the vapors, and ensure adequate destruction. During the final 15 percent of the crude oil loading operation, the hydrocarbon content of the vapors will be greater than 20 percent, and the assist gas will no longer be needed.

The MVCU is expected to achieve a least 99.8 percent destruction of the hydrocarbons in the delivered vapors. The estimated maximum short-term and annual emission rates are summarized in Tables 5.1-5, 5.1-6, and 5.1-7. Table 5.1-5 presents the emissions from combusting displaced vapors in the MVCU, Table 5.1-6 presents the emissions from combusting the assist gas in the MVCU, and Table 5.1-7 presents the sum.

Table 5.1-5. Marine Vapor Combustion Unit Emissions due to Displaced Marine Vessel Vapors

Pollutant	Emission Factor (lb/MMBtu)	Emission Rates[1]		
		(lb/hr)	(lb/day)	(tpy)
NO_X[2]	0.023	5.18	58.3	10.6
CO[2]	0.010	2.25	25.3	4.63
PM[3]	0.0075	1.68	18.9	3.45
VOC[4]	--	4.21	101.0	8.6
SO_2[5]	--	3.02	34.0	6.20
GHG (CO_2e)[6]	135.6	30,410	342,100	62,440

Notes:

1) Emission rates are based on the following maximum crude oil loading rates: 32,000 bbl/hr, 360,000 bbl/day, and 131,400,000 bbl/yr (i.e., 360,000 bbl/day * 365 days/yr). The hydrocarbon content of the displaced vapors was assumed to be 10 percent for the first 80 percent of each loading operation, and to average 50 percent over the final 20 percent. An assumed vapor speciation profile was used with these hydrocarbon content profiles to calculate a composite hourly maximum heat input for the displaced vapor (225.3 MMBtu/hr), and a composite daily/annual average heat input (105.6 MMBtu/hr).
2) NO_X, and CO emission factors provided by Jordan Technologies were combined with the composite heat inputs.
3) Calculated using an emission factor from USEPA's AP-42 Section 1.4 (Natural Gas Combustion) and the composite heat inputs.
4) Uncontrolled VOC emissions were calculated using Equation 2 from AP-42 Section 5.2, assuming a worst-case true vapor pressure of 11 psia, a molecular weight of 44.9 lb/lb-mol, and worst-case vessel arrival condition emission factor of 0.86 lb/10^3 gal (from Table 5.2-3, based on the assumption that the previous vessel cargo was volatile, and that the condition of the arriving tanks is "unclean"). The controlled emission rates presented in the table reflect a destruction efficiency of 99.8% applied to the uncontrolled emission rates.
5) SO_2 emissions were based on the assumption that the H_2S content of the vapors displaced from the marine vessel tanks during crude loading operations would not exceed 100 ppm, the Immediately Dangerous to Life or Health (IDLH) concentration established by the National Institute for Occupational Safety and Health (NIOSH). Because each mole of H_2S combusted yields one mole of SO_2, 100 ppm of H_2S will yield 100 ppm of SO_2. The ideal gas law was used to convert this maximum SO_2 concentration, combined with the hourly, daily, and annual maximum volumes of vapor displaced, to mass emission rates.
6) CO2 emission factor provided by Jordan Technologies as a conservative estimate.

Table 5.1-6. Marine Vapor Combustion Unit Emissions due to Assist Gas

Pollutant	Emission Factor (lb/MMBtu)	Emission Rates[1]		
		(lb/hr)	(lb/day)	(tpy)
NO_X[2]	0.023	0.704	14.4	2.62
CO[2]	0.010	0.306	6.24	1.14
PM[3]	0.0075	0.228	4.65	0.849
VOC[4]	--	0	0	0
SO_2[5]	0.00725	0.222	4.52	0.826
GHG (CO_2e)[6]	117	3,580	73,040	13,330

Notes:

1) Emission rates are based on information from Jordan Technologies that assist gas will be added to the displaced vapors from vessel loading at a rate of 30,600 ft^3/hr whenever the hydrocarbon content is less than 20%. The hydrocarbon content of the displaced vapors was assumed to be less than 20 percent for the first 85 percent of each loading operation, and greater than 20% for the remainder. The assist gas will be pipeline natural gas; a gross or higher heating value of 1,000 Btu/ft^3 was assumed. The worst-case hourly assist gas usage rate was assumed to be the maximum assist gas usage rate, 30,600 ft^3/hr. Daily and annual composite usage rates were calculated assuming the maximum assist gas usage rate of 30,600 ft^3/hr 85% of the time, and no added assist gas 15% of the time (i.e., a daily usage rate of 624,240 ft^3/day, and 227,847,600 ft^3/year.
2) NO_X and CO emission factors provided by Jordan Technologies were combined with the usage rates and gross heating value described above.
3) Calculated using an emission factor from USEPA's AP-42 Section 1.4 (Natural Gas Combustion) and the usage rates and gross heating value described above.
4) The assist gas will be pipeline natural gas, which is comprised almost entirely of CH4, which is not a VOC. The small fraction of natural gas that is VOC will be 99.8% combusted by the MVCU; the resulting VOC emissions were assumed to be negligible.
5) SO_2 emissions were based on maximum hourly average gas sulfur content (2.59 gr/100 scf) as determined by testing, plus a 25% safety factor
6) The GHG emission factor in units of CO_2e is a composite of the CO_2, CH_4, and N_2O emission factors from 40 CFR Part 98 Tables C-1 and C-2, using the GWP factors from Table A-1.

Table 5.1-7. Marine Vapor Combustion Unit – Total Emissions

Pollutant	Emission Rates[1]		
	(lb/hr)	(lb/day)	(tpy)
NO_X[1]	5.89	72.6	13.3
CO[1]	2.56	31.6	5.76
PM[2]	1.91	23.5	4.30
VOC[3]	4.21	101.0	8.64
SO_2[4]	3.24	38.5	7.02
GHG (CO_2e)[5]	36,150	439,400	80,190

Notes:

1) Total emission rates are the sum of the displaced vapor emission rates in Table 5.1-5 and the assist gas emission rates in Table 5.1-6. Estimated CO2 emissions from the inerting gas are included in Table 5.1-7.

5.1.2.1.4 Crude Oil Storage Tanks

There will be six crude oil storage tanks located in the storage area. Each tank will have a storage capacity of approximately 360,000 bbl, and have a working capacity of approximately 340,000 bbl.[20] Each tank will be approximately 48 feet tall (not counting the peak of the fixed roof), and be approximately 240 feet in diameter. Annual throughput for each of the tanks will be 868,700,000 gallons per year, for a total Facility throughput of 5,212,200,000 gallons per year. Each tank is expected to turn over approximately every six days, when the Facility is operating at full capacity. The tanks will feature an internal floating-roof design, with a pontoon-style internal deck. The edge of the deck will be equipped with a mechanical shoe primary seal, and a rim-mounted secondary seal to minimize the quantity of crude oil on the inside walls when the tank is drawn down.

EPA's TANKS 4.0.9d program was used to calculate fugitive emissions from the crude oil storage tanks. EPA' TANKS 4.0.9d program uses working volume to establish a total throughput for estimating fugitive emissions. Speciation information was developed for a range of crude oils[21], and provided to TANKS for the emission rate calculations that are detailed in Attachment 2. Tank emissions calculated by TANKS are summarized in Table 5.1-8, and the input data and results from TANKS are provided in Attachment 2.

Approximately once every 10 years, tanks will require inspection to ensure adequate operational condition. During this inspection process, a tank is completely drained and degassed. Degassing emission calculations were estimated by combining emissions from two calculations. To account for withdrawal losses while draining and refilling the portion of the tank above the level of the feet on the floating roof, emissions were estimated using EPA TANKS 4.0.9d for an internal floating roof tank (parameters specified in Attachment 2). For the losses associated with draining the tank below the feet that hold up the floating roof, working loss emissions1 were estimated using EPA TANKS 4.0.9d with a fixed roof with a height equal to the height of the legs (additional parameters specified in Attachment 2). Working and withdrawal loss emissions were then summed in order to determine the total VOC degassing emissions of approximately 1.6 tons.

Table 5.1-8. Total Crude Oil Storage Tank Emission Rates[3]

Pollutant	Hourly Average Emissions (lb/hr)	Annual Emissions (ton/yr)
VOC	5.38[1]	23.58[2]

Notes:
1) Hourly emission rate is the annual emission rate output from tanks divided by 8,760 hours per year.
2) Annual emission rate is a weighted composite of 80% Bakken crude oils and 20% other crude oils. Approximately every ten years, the annual emissions will be approximately 1.6 tons higher due to tank inspection and maintenance.
3) Emissions are a combined total from all six tanks.

[20] Although the tanks could hold approximately 360,000 bbl, in actual operation internal floating roof tanks are never completely full. The working capacity of the tanks is slightly lower than the total capacity to reflect the maximum volume that each tank will actually hold during operation.

[21] Six crude oils with Reid Vapor Pressures (RVPs) ranging from 0.98 to 8.41, as well as four Bakken crudes (413, 413-light, 423, and 430).

There will be six additional tanks at the Facility not intended to store crude oil. It is occasionally necessary to clean railcars that enter the Facility with dried crude oil from the loading process. This cleaning process uses a large quantity of soapy water to scrub dried crude oil from the shell of the railcar. There are six containment tanks located within the railcar unloading area that could be used to collect wash water from railcar cleaning. In addition to collecting wash water, these tanks could be used to store spilled material. The containment tanks are fixed roof tanks with an estimated height of 24 feet and a 12-foot diameter. It is expected that the throughput for these tanks will result in roughly one tank turnover per week. The liquid itself will be almost entirely soapy water, with only a very small portion of crude oil present in the mixture. Because of this relatively small throughput and small fraction of crude oil present in the mixture, emissions from these containment tanks are considered to be negligible.

5.1.2.1.5 Emergency Diesel Fire Water Pump Engines

Emergency fire water pumps powered by diesel engines will be used in the event that water is needed to fight a fire within the Facility. Each of the engines will be 225 horsepower (hp) or smaller, and, while specific makes and models have not been selected, emission rates were calculated using emission factors for a 225 hp fire water pump engine that is representative of the units that will be installed. All three engines will be fueled with ultra-low sulfur diesel (ULSD). Planned operation of the units will be limited to half an hour a week for readiness testing and one 8-hour test per year, as specified by the National Fire Protection Association's NFPA 25. Calculated emission rates from these engines are summarized in Table 5.1-9.

Table 5.1-9. Emergency Diesel Fire Water Pump Emission Rates

Pollutant	Emission Factor[1] (g/kW-hr)	Emission Rate[4]		
		(lb/hr)	(lb/day)	(ton/yr)
NO_X	0.34	0.124	0.124	0.002
CO	1.60	0.592	0.592	0.010
SO_2	--[2]	0.194	0.194	0.00329
PM	0.17	0.063	0.063	0.00107
VOC	0.37	0.137	0.137	0.00233
CO_2e	717[3]	265	265	4.5

Notes:
1) Provided by manufacturer/data.
2) Based on use of ULSD (15 ppm sulfur by weight).
3) From 40 CFR Part 98 Subpart C.
4) Emissions are for a single diesel fire water pump engine.

5.1.2.1.6 Fugitive Component Leaks

VOC emissions associated with minute vapor leakage from valve seals, pump seals, pressure relief valves, flanges, and similar equipment were calculated using anticipated component counts and USEPA fugitive emissions factors. Fugitive emission factors were obtained from Protocol for Equipment Leak Estimates, USEPA 453-R95-017, November 1995. Fugitive VOC emissions associated with leaks from gaseous and liquid streams are presented in Table 5.1-10. Calculation details are provided in Attachment 2.

Table 5.1-10. Short-term and Annual VOC Emissions from the Fugitive Equipment Leaks

Pollutant	Hourly Average Emissions[1] (lb/hr)	Annual Emissions[2] (ton/yr)
VOC	0.19	0.82

Notes:
1) Hourly emission is the worst-case crude emission rate divided by 8,760 hours per year.

5.1.2.1.7 Locomotive and Marine Vessel Emissions

Crude oil will be delivered to the Facility by rail for transport by marine vessel. Emissions from locomotives and vessels are not included in the Facility emissions inventory or dispersion modeling because they are mobile sources powered by off-road engines, and these sources of emissions are specifically exempted from pre-construction permitting.[22]

5.1.2.1.8 Facility-wide Emissions Summary

Table 5.1-11, 5.1-12, and 5.1-13 summarize the maximum estimated hourly, daily and annual criteria pollutant and GHG emissions from all Facility emissions units.

Table 5.1-11. Hourly Emissions

Pollutant	Emission Rate (lb)						
	Storage Area Boiler	Unload Boiler	MVCU	Components	Tanks	Firewater Pump	Total
NO_X	0.28	2.04	5.89	--	--	0.37	8.57
CO	0.90	6.67	2.56	--	--	1.78	11.90
SO_2	0.18	1.34	3.24	--	--	0.58	5.35
PM	0.19	1.39	1.91	--	--	0.19	3.67
VOC	0.13	0.93	4.21	0.19	5.38	0.41	11.24
CO_2e	2,929	21,672	36,146	3	60	796	61,606

[22] See, e.g., WAC 173-400-030(79) ("Secondary emissions do not include any emissions which come directly from a mobile source such as emissions from the tailpipe of a motor vehicle, from a train, or from a vessel."); In re Cardinal FG Company, EPA Environmental Appeals Board PSD Appeal 04-04 (2005) (holding that Ecology correctly concluded that emissions from a captive on-site locomotive are not attributable to the stationary source); Letter from EPA to Ken Waid (Jan. 8, 1990) stating that "to and fro" vessel emissions are not attributable to a stationary source and that when determining PSD applicability you do not consider those emissions "which result from activities which do not directly serve the purposes of the terminal and are not under the control of the terminal owner or operator.")

Table 5.1-12. Daily Emissions

Pollutant	Emission Rate (lb)						
	Storage Area Boiler	Unload Boiler	MVCU	Components	Tanks	Firewater Pump	Total
NO_X	6.61	48.90	72.65	--	--	0.37	128.53
CO	21.63	160.04	31.59	--	--	1.78	215.04
SO_2	4.36	32.22	38.49	--	--	0.58	75.65
PM	4.51	33.34	23.53	--	--	0.19	61.57
VOC	3.00	22.23	100.98	4.50	129.19	0.41	260.32
CO_2e	70,307	520,140	439,403	65	1,428	796	1,032,139

Table 5.1-13. Annual Emissions

Pollutant	Emission Rate (tons)						
	Storage Area Boilers	Unload Boiler	MVCU	Components	Tanks	Firewater Pumps	Total
NO_X	0.60	5.95	13.26	--	--	0.01	19.82
CO	1.97	19.47	5.76	--	--	0.03	27.24
SO_2	0.20	1.99	7.02	--	--	0.01	9.22
PM	0.41	4.06	4.30	--	--	0.00	8.77
VOC	0.27	2.70	8.64	0.82	23.58	0.01	36.02
CO_2e	6,415	63,284	80,191	12	261	14	150,176

5.1.2.2 Toxic Air Pollutants

The Facility has the potential to emit non-criteria air pollutants that are regulated federally by the CAA Section 112 and others regulated in Washington by Ecology and EFSEC under Chapter 173-460 WAC. Some of these pollutants are deemed "hazardous air pollutants" (HAPs) under the CAA Section 112; others are defined as "toxic air pollutants" (TAPs) under Chapter 173-460 WAC.

Table 5.1-14 compares calculated facility-wide TAP emissions with Washington's Small Quantity Emission Rates (SQERs). If facility-wide emissions of a given pollutant are greater than its SQER, dispersion modeling is required to determine compliance with ambient air quality criteria (Acceptable Source Impact Levels, or ASILs). As shown in Table 5.1-14, eight TAPs exceed the applicable SQERs; compliance with the applicable ASILs will be assessed in Section 5.1.4.

Table 5.1.14 also identifies which of the TAPs is a federal HAP. The HAP emitted in greatest quantity from the Facility is hexane (2.22 tons per year). Aggregate HAP emissions are 2.5 tons per year.

The following sections discuss the estimation of TAP/HAP emissions from each emission unit. Detailed emission calculations are presented in Attachment 2.

Table 5.1-14. Facility-wide Toxic Air Pollutant Emissions

Compound	CAS	HAP?	WA TAP Averaging Period	Emission Rate	SQER	Model?
				lb/avg per	lb/avg per	
Acetaldehyde	75-07-0	Yes	Annual	4.23E-02	71	No
Acrolein	107-02-8	Yes	24-Hour	1.50E-04	0.00789	No
Arsenic	7440-38-2	Yes	Annual	4.31E-01	0.0581	Yes
Benzene	71-43-2	Yes	Annual	1.06E+02	6.62	Yes
Benzo(a)anthracene	56-55-3	No	Annual	3.98E-03	1.74	No
Benzo(a)pyrene	50-32-8	No	Annual	2.60E-03	0.174	No
Benzo(b)fluoranthene	205-99-2	No	Annual	3.89E-03	1.74	No
Benzo(k)fluoranthene	207-08-9	No	Annual	3.89E-03	1.74	No
Beryllium	7440-41-7	Yes	Annual	2.59E-02	0.08	No
1,3-Butadiene	106-99-0	Yes	Annual	2.16E-03	1.13	No
Cadmium	7440-43-9	Yes	Annual	2.37E+00	0.0457	Yes
Carbon monoxide	630-08-0	No	1-Hour	9.23E+00	50.4	No
Chromium, (hexavalent)	18540-29-9	No	Annual	1.21E-01	0.00128	Yes
Chrysene	218-01-9	No	Annual	3.90E-03	17.4	No
Cobalt	7440-48-4	Yes	24-Hour	4.96E-04	0.013	No
Copper	7440-50-8	No	1-Hour	2.94E-04	0.219	No
Cyclohexane	110-82-7	No	24-Hour	1.05E-01	789	No
Dibenzo(a,h)anthracene	53-70-3	No	Annual	2.62E-03	0.16	No
Diesel Engine Particulate	DEP	No	Annual	6.41E+00	0.639	Yes
7,12-Dimethylbenz(a)anthracene	57-97-6	No	Annual	3.45E-02	0.00271	Yes
Ethylbenzene	100-41-4	Yes	Annual	4.53E+01	76.8	No
Fluorene	86-73-7	No	24-Hour	4.73E-05	1.71	No
Formaldehyde	50-00-0	Yes	Annual	2.43E+01	32	No
Hexane	110-54-3	Yes	24-Hour	1.10E+01	92	No
Hydrogen Sulfide	7783-06-4	No	24-Hour	9.45E-03	0.263	No
Indeno(1,2,3-cd)pyrene	193-39-5	No	Annual	3.90E-03	1.74	No
Isopropyl benzene	98-82-8	Yes	24-Hour	3.38E-03	52.6	No
Manganese	7439-96-5	Yes	24-Hour	2.25E-03	0.00526	No
Mercury	7439-97-6	Yes	24-Hour	1.54E-03	0.0118	No
3-Methylchloranthrene	56-49-5	No	Annual	3.88E-03	0.0305	No
Naphthalene	91-20-3	Yes	Annual	1.32E+00	5.64	No
Nitrogen dioxide	10102-44-0	No	1-Hour	7.75E+00	1.03	Yes
Propylene	115-07-1	No	24-Hour	4.18E-04	394	No
Selenium	7782-49-2	Yes	24-Hour	1.42E-04	2.63	No
Sulfur dioxide	7446-09-5	No	1-Hour	4.81E+00	1.45	Yes
Toluene	108-88-3	Yes	24-Hour	1.03E-01	657	No
Vanadium	7440-62-2	No	24-Hour	1.36E-02	0.0263	No
Xylene (-m)	108-38-3	Yes	24-Hour	8.85E-02	29	No
Xylene (-o)	95-47-6	Yes	24-Hour	2.27E-02	29	No
Xylene (-p)	106-42-3	Yes	24-Hour	2.53E-02	29	No

5.1.2.2.1 Natural Gas-Fired Boilers

Emissions of TAPs from the natural gas-fired unloading and storage area boilers were calculated using emission factors from USEPA's AP-42 Section 1.4 (Natural Gas Combustion). TAP emission rates for compounds that are also criteria pollutants (i.e., CO, NO_2, SO_2) were calculated using the same emission factors used to calculate criteria pollutant emission rates. Table 5.1-15 presents short term TAP emissions from three unloading boilers operating at full load and annual TAP emissions from two unloading boilers operating at full load. Table 5.1-16 presents short term TAP emissions from two storage area boilers operating at full load and annual TAP emissions from one storage area boiler operating at full load.

Table 5.1-15. Unloading Boilers Tap Emissions

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Emission Rate[1]		
			(lb/hr)	(lb/day)	(lb/yr)
Arsenic	7440-38-2	0.0002	3.70E-05	8.89E-04	2.16E-01
Benzene	71-43-2	0.0021	3.89E-04	9.34E-03	2.27E+00
Benzo(a)anthracene	56-55-3	0.0000018	3.33E-07	8.00E-06	1.95E-03
Benzo(a)pyrene	50-32-8	0.0000012	2.22E-07	5.33E-06	1.30E-03
Benzo(b)fluoranthene	205-99-2	0.0000018	3.33E-07	8.00E-06	1.95E-03
Benzo(k)fluoranthene	207-08-9	0.0000018	3.33E-07	8.00E-06	1.95E-03
Beryllium	7440-41-7	0.000012	2.22E-06	5.33E-05	1.30E-02
Cadmium	7440-43-9	0.0011	2.04E-04	4.89E-03	1.19E+00
Carbon monoxide	630-08-0	0.036	6.67E+00	1.60E+02	3.89E+04
Chromium, (hexavalent)[2]	18540-29-9	0.000056	1.04E-05	2.49E-04	6.06E-02
Chrysene	218-01-9	0.0000018	3.33E-07	8.00E-06	1.95E-03
Cobalt	7440-48-4	0.000084	1.56E-05	3.73E-04	9.09E-02
Copper	7440-50-8	0.00085	1.57E-04	3.78E-03	9.20E-01
Dibenzo(a,h)anthracene	53-70-3	0.0000012	2.22E-07	5.33E-06	1.30E-03
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000016	2.96E-06	7.11E-05	1.73E-02
Formaldehyde	50-00-0	0.01125	2.08E-03	5.00E-02	1.22E+01
Hexane	110-54-3	1.8	3.33E-01	8.00E+00	1.95E+03
Indeno(1,2,3-cd)pyrene	193-39-5	0.0000018	3.33E-07	8.00E-06	1.95E-03
Manganese	7439-96-5	0.00038	7.04E-05	1.69E-03	4.11E-01
Mercury	7439-97-6	0.00026	4.82E-05	1.16E-03	2.81E-01
3-Methylchloranthrene	56-49-5	0.0000018	3.33E-07	8.00E-06	1.95E-03
Naphthalene	91-20-3	0.00061	1.13E-04	2.71E-03	6.60E-01
Nitrogen dioxide	10102-44-0	0.011	2.04E+00	4.89E+01	1.19E+04
Selenium	7782-49-2	0.000024	4.45E-06	1.07E-04	2.60E-02
Sulfur dioxide	7446-09-5	0.00725	1.34E+00	3.22E+01	3.97E+03
Toluene	108-88-3	0.0034	6.30E-04	1.51E-02	3.68E+00
Vanadium	7440-62-2	0.0023	4.26E-04	1.02E-02	2.49E+00

Notes:

1) Short term emissions from three in-service boilers combined, annual emissions from two in-service boilers combined, each with a maximum heat input rate of 62 MMBtu/hr

2) Note: AP-42 provides a chromium emission factor for natural gas fired external combustion, but does not include guidance for partitioning emissions between the carcinogenic chromium VI (hexavalent chromium) and the chromium III (trivalent chromium). EPA's 2002 National-Scale Air Toxics Assessment (NATA) released June 2009 includes a chromium speciation profile for gas-fired process heaters, which indicates 4 percent of total chromium is chromium VI and 96 percent is chromium III. ENVIRON assumed 4 percent of total chromium emissions were emitted as chromium VI.

Table 5.1-16. Storage Area Boiler Tap Emissions

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Emission Rate		
			(lb/hr)	(lb/day)	(lb/yr)
Arsenic	7440-38-2	0.0002	5.01E-06	1.20E-04	2.19E-02
Benzene	71-43-2	0.0021	5.26E-05	1.26E-03	2.30E-01
Benzo(a)anthracene	56-55-3	0.0000018	4.51E-08	1.08E-06	1.97E-04
Benzo(a)pyrene	50-32-8	0.0000012	3.00E-08	7.21E-07	1.32E-04
Benzo(b)fluoranthene	205-99-2	0.0000018	4.51E-08	1.08E-06	1.97E-04
Benzo(k)fluoranthene	207-08-9	0.0000018	4.51E-08	1.08E-06	1.97E-04
Beryllium	7440-41-7	0.000012	3.00E-07	7.21E-06	1.32E-03
Cadmium	7440-43-9	0.0011	2.75E-05	6.61E-04	1.21E-01
Carbon monoxide	630-08-0	0.036	9.01E-01	2.16E+01	3.95E+03
Chromium, (hexavalent)[2]	18540-29-9	0.000056	1.40E-06	3.37E-05	6.14E-03
Chrysene	218-01-9	0.0000018	4.51E-08	1.08E-06	1.97E-04
Cobalt	7440-48-4	0.000084	2.10E-06	5.05E-05	9.21E-03
Copper	7440-50-8	0.00085	2.13E-05	5.11E-04	9.32E-02
Dibenzo(a,h)anthracene	53-70-3	0.0000012	3.00E-08	7.21E-07	1.32E-04
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000016	4.01E-07	9.61E-06	1.75E-03
Formaldehyde	50-00-0	0.01125	2.82E-04	6.76E-03	1.23E+00
Hexane	110-54-3	1.8	4.51E-02	1.08E+00	1.97E+02
Indeno(1,2,3-cd)pyrene	193-39-5	0.0000018	4.51E-08	1.08E-06	1.97E-04
Manganese	7439-96-5	0.00038	9.51E-06	2.28E-04	4.17E-02
Mercury	7439-97-6	0.00026	6.51E-06	1.56E-04	2.85E-02
3-Methylchloranthrene	56-49-5	0.0000018	4.51E-08	1.08E-06	1.97E-04
Naphthalene	91-20-3	0.00061	1.53E-05	3.67E-04	6.69E-02
Nitrogen dioxide	10102-44-0	0.011	2.75E-01	6.61E+00	1.21E+03
Selenium	7782-49-2	0.000024	6.01E-07	1.44E-05	2.63E-03
Sulfur dioxide	7446-09-5	0.00725	1.81E-01	4.36E+00	4.03E+02
Toluene	108-88-3	0.0034	8.51E-05	2.04E-03	3.73E-01
Vanadium	7440-62-2	0.0023	5.76E-05	1.38E-03	2.52E-01

Notes:

1) Short term emission rates are for two in-service boilers combined, annual emission rates are for one in-service boiler, each with a maximum heat input rate of 12.5 MMBtu/hr.
2) AP-42 provides a chromium emission factor for natural gas fired external combustion, but does not include guidance for partitioning emissions between the carcinogenic chromium VI (hexavalent chromium) and the chromium III (trivalent chromium). EPA's 2002 National-Scale Air Toxics Assessment (NATA) released June 2009 includes a chromium speciation profile for gas-fired process heaters, which indicates 4 percent of total chromium is chromium VI and 96 percent is chromium III. ENVIRON assumed 4 percent of total chromium emissions were emitted as chromium VI.

5.1.2.2.2 Marine Vapor Combustion Unit

Emissions of TAPs from the marine vapor combustion unit (MVCU) were calculated using emission factors from USEPA's AP-42 Section 1.4 (Natural Gas Combustion) for both the vapor displaced from the marine vessels and the assist gas. TAP emissions for compounds that are also criteria pollutants (i.e., CO, NO_2, SO_2) were calculated using the same emission factors or assumptions and methodology used to calculate criteria pollutant emission rates. Table 5.1-17 presents aggregate TAP emissions from the proposed marine vapor combustion unit.

Table 5.1-17. Marine Vapor Combustion Unit Tap Emissions

Compound	CAS #	Emission Factor ($lb/10^6$ scf)	Emission Rate[1]		
			(lb/hr)	(lb/day)	(lb/yr)
Arsenic	7440-38-2	0.0002	4.21E-05	5.29E-04	1.93E-01
Benzene	71-43-2	0.0021	4.42E-04	5.56E-03	2.03E+00
Benzo(a)anthracene	56-55-3	0.0000018	3.78E-07	4.76E-06	1.74E-03
Benzo(a)pyrene	50-32-8	0.0000012	2.52E-07	3.17E-06	1.16E-03
Benzo(b)fluoranthene	205-99-2	0.0000018	3.78E-07	4.76E-06	1.74E-03
Benzo(k)fluoranthene	207-08-9	0.0000018	3.78E-07	4.76E-06	1.74E-03
Beryllium	7440-41-7	0.000012	2.52E-06	3.17E-05	1.16E-02
Cadmium	7440-43-9	0.0011	2.31E-04	2.91E-03	1.06E+00
Carbon monoxide	630-08-0	--[2]	2.56E+00	3.16E+01	5.76E+00
Chromium, (hexavalent)[3]	18540-29-9	0.000056	1.18E-05	1.48E-04	5.41E-02
Chrysene	218-01-9	0.0000018	3.78E-07	4.76E-06	1.74E-03
Cobalt	7440-48-4	0.000084	1.77E-05	2.22E-04	8.11E-02
Copper	7440-50-8	0.00085	1.79E-04	2.25E-03	8.21E-01
Dibenzo(a,h)anthracene	53-70-3	0.0000012	2.52E-07	3.17E-06	1.16E-03
7,12-Dimethylbenz(a)anthracene	57-97-6	0.000016	3.36E-06	4.23E-05	1.54E-02
Formaldehyde	50-00-0	0.01125	2.37E-03	2.98E-02	1.09E+01
Hexane	110-54-3	1.8	3.78E-01	4.76E+00	1.74E+03
Indeno(1,2,3-cd)pyrene	193-39-5	0.0000018	3.78E-07	4.76E-06	1.74E-03
Manganese	7439-96-5	0.00038	7.99E-05	1.01E-03	3.67E-01
Mercury	7439-97-6	0.00026	5.47E-05	6.88E-04	2.51E-01
3-Methylchloranthrene	56-49-5	0.0000018	3.78E-07	4.76E-06	1.74E-03
Naphthalene	91-20-3	0.00061	1.28E-04	1.61E-03	5.89E-01
Nitrogen dioxide	10102-44-0	--[2]	5.89E+00	7.26E+01	1.33E+01
Selenium	7782-49-2	0.000024	5.05E-06	6.35E-05	2.32E-02
Sulfur dioxide	7446-09-5	--[2]	3.24E+00	3.85E+01	7.02E+00
Toluene	108-88-3	0.0034	7.15E-04	8.99E-03	3.28E+00
Vanadium	7440-62-2	0.0023	4.84E-04	6.08E-03	2.22E+00

Notes:

1) Displaced vapor volumes calculated for maximum hourly, daily, and annual averaging periods were combined with the natural gas-fired emission factors to calculate TAP emission rates; considering that, even for the worst-case hourly average scenario, which is when vessel loading is almost complete, the displaced vapor will not be 100% percent saturated by hydrocarbons. The maximum hourly assist gas flow rate (30,600 ft^3/hr) was used to calculate emission rates for TAPs that have a SQER with a 1-hour average basis. For TAPs that have a SQER with a 24-hour or annual average basis, 85% of the maximum assist gas flow rate was used.
2) The maximum hourly emission rate calculated for the criteria pollutant analysis was used. See Tables 5.1-5, 5.1-6, and 5.1-7.

3) AP-42 provides a chromium emission factor for natural gas fired external combustion, but does not include guidance for partitioning emissions between the carcinogenic chromium VI (hexavalent chromium) and the chromium III (trivalent chromium). EPA's 2002 National-Scale Air Toxics Assessment (NATA) released June 2009 includes a chromium speciation profile for gas-fired process heaters, which indicates 4 percent of total chromium is chromium VI and 96 percent is chromium III. ENVIRON assumed 4 percent of total chromium emissions were emitted as chromium VI.

5.1.2.2.3 Crude Oil Storage Tanks

Emissions of TAPs from the crude oil storage tanks were calculated using the same methodology as the criteria pollutants. The TANKS program calculated emission rates for each of the TAPs included in the provided speciation information. Table 5.1-18 presents the estimated aggregate TAP emissions from the crude oil storage tanks.

Table 5.1-18. Crude Oil Storage Tank Tap Emissions

Components	CAS #	Emission Rate		
		(lb/hr)	(lb/day)	(lb/yr)
Benzene	71-43-2	1.83E-03	4.40E-02	9.63E+01
Cyclohexane	110-82-7	3.38E-03	8.10E-02	1.77E+02
Cyclopentane	287-92-3	1.88E-03	4.50E-02	9.86E+01
Ethylbenzene	100-41-4	8.16E-04	1.96E-02	4.29E+01
Hexane	110-54-3	1.14E-02	2.74E-01	5.99E+02
Hydrogen Sulfide	7783-06-4	3.66E-04	8.78E-03	3.21E+00
Isooctane	540-84-1	1.03E-04	2.46E-03	5.39E+00
Isopentane	78-78-4	1.90E-02	4.56E-01	9.99E+02
Isopropyl benzene	98-82-8	1.03E-04	2.48E-03	5.44E+00
Pentane	109-66-0	2.54E-02	6.08E-01	1.33E+03
Toluene	108-88-3	2.60E-03	6.25E-02	1.37E+02
1,2,4-Trimethylbenzene	95-63-6	3.40E-04	8.15E-03	1.79E+01
Xylene (-m)	108-38-3	2.75E-03	6.60E-02	1.45E+02
Xylene (-o)	95-47-6	7.25E-04	1.74E-02	3.81E+01
Xylene (-p)	106-42-3	8.09E-04	1.94E-02	4.25E+01

Notes:

1) Annual emission rate is a weighted composite of 80% worst-case Bakken crude result from tanks, and 20% worst-case other crude.

5.1.2.2.4 Emergency Diesel Fire Water Pump Engines

Emissions of TAPs from the emergency fire water pump engines were calculated based on USEPA AP-42 emission factors for small internal combustion diesel engines (Section 3.3). Annual emissions were based on 34 hours of operation for maintenance and testing purposes only. TAP emissions for compounds that are also criteria pollutants were calculated using the same emission factors or assumptions and methodology used to calculate criteria pollutant emission rates. Table 5.1-19 presents the estimated aggregate TAP emissions from the emergency fire water pump engines.

Table 5.1-19. Emergency Fire Water Pump Engine Tap Emissions

CAS #	Compound	Emission Factor ($lb/10^6$ Btu)	Emission Rate[1]		
			(lb/hr)	(lb/day)	(lb/yr)
83-32-9	Acenaphthene	1.42E-06	2.30E-06	2.30E-06	7.83E-05
208-96-8	Acenaphthylene	5.06E-06	8.20E-06	8.20E-06	2.79E-04
75-07-0	Acetaldehyde	7.67E-04	1.24E-03	1.24E-03	4.23E-02
107-02-8	Acrolein	9.25E-05	1.50E-04	1.50E-04	5.10E-03
120-12-7	Anthracene	1.87E-06	3.03E-06	3.03E-06	1.03E-04
71-43-2	Benzene	9.33E-04	1.51E-03	1.51E-03	5.14E-02
56-55-3	Benzo(a)anthracene	1.68E-06	2.72E-06	2.72E-06	9.26E-05
50-32-8	Benzo(a)pyrene	1.88E-07	3.05E-07	3.05E-07	1.04E-05
205-99-2	Benzo(b)fluoranthene	9.91E-08	1.61E-07	1.61E-07	5.46E-06
191-24-2	Benzo(g,h,i)perylene	4.89E-07	7.93E-07	7.93E-07	2.70E-05
207-08-9	Benzo(k)fluoranthene	1.55E-07	2.51E-07	2.51E-07	8.54E-06
106-99-0	1,3-Butadiene	3.91E-05	6.34E-05	6.34E-05	2.16E-03
630-08-0	Carbon monoxide	--[2]	1.78E+00	1.78E+00	6.04E+01
218-01-9	Chrysene	3.53E-07	5.72E-07	5.72E-07	1.95E-05
53-70-3	Dibenz(a,h)anthracene	5.83E-07	9.45E-07	9.45E-07	3.21E-05
none	Diesel Engine Particulate	--[2]	1.89E-01	1.89E-01	6.41E+00
206-44-0	Fluoranthene	7.61E-06	1.23E-05	1.23E-05	4.20E-04
86-73-7	Fluorene	2.92E-05	4.73E-05	4.73E-05	1.61E-03
50-00-0	Formaldehyde	1.18E-03	1.91E-03	1.91E-03	6.51E-02
193-39-5	Indeno(1,2,3-cd)pyrene	3.75E-07	6.08E-07	6.08E-07	2.07E-05
91-20-3	Naphthalene	8.48E-05	1.37E-04	1.37E-04	4.67E-03
10102-44-0	Nitrogen dioxide	--[2]	3.72E-01	3.72E-01	1.26E+01
85-01-8	Phenanthrene	2.94E-05	4.77E-05	4.77E-05	1.62E-03
115-07-1	Propylene	2.58E-04	4.18E-04	4.18E-04	1.42E-02
129-00-0	Pyrene	4.78E-06	7.75E-06	7.75E-06	2.64E-04
7446-09-5	Sulfur dioxide	--[2]	5.81E-01	5.81E-01	1.97E+01
108-88-3	Toluene	4.09E-04	6.63E-04	6.63E-04	2.25E-02
108-38-3	Xylenes (m-xylene)[3]	2.85E-04	4.62E-04	4.62E-04	1.57E-02

Notes:

1) Hourly emission rates are based on maximum operation, daily emission rates are based on one hour of operation per day, and annual emission rates are based on 34 hours of operation per year.
2) The emission rates calculated for the criteria pollutant analysis were used. See Table 5.1-9.

5.1.2.2.5 Fugitive Component Leaks

TAP emissions associated with normal equipment leakage at the Facility have been estimated using USEPA fugitive emission factors for valve seals, pump seals, pressure relief valves, flanges, and similar equipment.[23] Emission estimates are based on equipment counts, which are, in turn, based on preliminary piping and instrumentation diagrams developed for the project. Estimated TAP emissions from component leakage are presented in Table 5.1-20.

Table 5.1-20. Fugitive Component Leak Tap Emissions

Pollutant	CAS #	Emission Rate		
		(lb/hr)	(lb/day)	(lb/year)
Benzene	71-43-2	5.7E-04	1.37E-02	4.99
Cyclohexane	110-82-7	1.0E-03	2.41E-02	8.81
Cyclopentane	287-92-3	5.1E-04	1.23E-02	4.50
Ethylbenzene	100-41-4	2.7E-04	6.51E-03	2.37
Hexane (-n)	110-54-3	3.1E-03	7.40E-02	26.99
Hydrogen Sulfide	7783-06-4	2.8E-05	6.62E-04	0.24
Isooctane	540-84-1	3.7E-05	8.87E-04	0.32
Isopentane	78-78-4	6.5E-03	1.56E-01	56.84
Isopropyl benzene	98-82-8	3.7E-05	8.95E-04	0.33
Pentane	109-66-0	6.6E-03	1.57E-01	57.41
Toluene	108-88-3	8.4E-04	2.02E-02	7.37
1,2,4-Trimethylbenzene	95-63-6	1.2E-04	2.94E-03	1.07
Xylene (-m)	108-38-3	9.2E-04	2.20E-02	8.04
Xylene (-o)	95-47-6	2.2E-04	5.29E-03	1.93
Xylene (-p)	106-42-3	2.5E-04	5.88E-03	2.15

Notes:
See Attachment 2 for detailed emissions calculations.

5.1.3 APPLICABLE REGULATIONS

This section discusses federal, state, and local air quality regulations and guidelines that potentially apply to the Facility.

5.1.3.1 Emission Standards

5.1.3.1.1 New Source Performance Standards

USEPA has established performance standards for a number of air pollution source categories in 40 Code of Federal Regulation (CFR) Part 60. These New Source Performance Standards (NSPS) represent a minimum level of control that is required on a new source. This section identifies those NSPS that apply to Facility emissions units.

Subpart A, General Provisions

Subpart A identifies monitoring, record-keeping, and notification requirements that apply generally to all NSPS subparts. Subpart A specifies that any performance (emissions) tests

[23] Protocol for Equipment Leak Estimates, U.S EPA 453-R95-017, November 1995

required by an NSPS must be conducted within 60 days of achieving maximum production rate at which the source will be operated, but not later than 180 days after initial startup.

Consistent with NSPS requirements, Tesoro-Savage will notify EFSEC and USEPA of commencement of construction of purpose-built facilities, the initial start-up date, the actual start-up date, and performance tests. Tesoro-Savage will also maintain records of start-ups and shutdowns, malfunctions of control equipment and periods of excess emissions if they occur.

Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

The provisions of Subpart Dc apply to steam-generating units with a maximum design heat input capacity less than 100 MMBtu/hr and greater than 10 MMBtu/hr. The boilers associated with this project all fall within this capacity range. The particulate matter (PM) and SO_2 emission standards defined in Subpart Dc do not apply to units that are solely fueled by natural gas. Therefore, only the record keeping and reporting requirements of this Subpart are applicable. The provisions of this Subpart require that Tesoro-Savage maintain a record of the volume of natural gas burned in each boiler during each calendar month.

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels

The provisions of Subpart Kb apply to the crude oil storage tanks associated with the Facility. Subpart Kb regulates VOC emissions and establishes controls based on the vapor pressure of the stored liquid.

Because Facility will receive, store, and load a range of crude oils, some of which may have true vapor pressures within the applicable ranges addressed by Subpart Kb, it is assumed that Subpart Kb will apply to the Facility tanks. Subpart Kb identifies three control options. The Facility will incorporate the option identified in §60.112b(a)(1): A fixed roof in combination with an internal floating roof that floats on the liquid surface. A series of regulations for seals and closure devices related to roof contact must be followed.

Subpart IIII--Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The provisions of Subpart IIII apply to the emergency diesel fire water pump engines associated with the Facility. Subpart IIII regulates "NMHC+NOx" and PM and requires that the engine manufacturer certify that the engine will meet the standards in the rule; emission testing by the Facility is not required. Subpart IIII limits hours of non-emergency operation, mandates the use of ULSD and states that the owner or operator must keep records of the time of operation of the engine and the reason the engine was in operation during that time. Initial notification of installation is not required for emergency engines subject to Subpart IIII.

5.1.3.1.2 National Emissions Standards for Hazardous Air Pollutants

Under the provisions of Section 112 of the 1990 Clean Air Act Amendments, EPA was required to regulate emissions of a total of 189 HAPs from stationary sources.[24] EPA does this by

[24] EPA has since removed three HAPs from the list: caprolactum, ethylene glycol monobutyl ether, and methyl ethyl ketone (MEK).

specific industry categories to tailor the controls to the major sources of emissions and the HAPs of concern from that industry. The rules promulgated under Section 112 generally specify the Maximum Achievable Control Technology (MACT) that must be applied for a given industry category. Consequently, these rules are often called MACT standards.

MACT standards can require facility owners/operators to meet emission limits, install emission control technologies, monitor emissions and/or operating parameters, and use specified work practices. In addition, the standards typically include recordkeeping and reporting provisions. MACT standards are codified in 40 CFR Parts 61 and 63.

There are two types of HAP sources, "major" sources of HAP emissions and "area" sources of HAP emissions. Major sources are facilities that have a potential to emit more than 10 tons of a single HAP, or 25 tons of all HAPs combined. Area sources are facilities that are not a major source.

As reported in Section 5.1.2.2, facility-wide HAP emissions are less than 10 tons of a single HAP and less than 25 tons of aggregate HAPs. Therefore, the Facility will be an area source of HAP emissions. MACT standards that potentially apply to the proposed project are addressed below.

Parts 61 and 63, Subpart A, General Provisions
Subpart A establishes general requirements for reporting, testing, monitoring, and record-keeping for any major source facility. The Facility must send notifications to EFSEC and EPA of anticipated and actual start-up dates as defined in §63.9 and submit reports summarizing operations, emissions, and compliance with regulations and limits as specified in the standard.

Part 61, Subpart M – National Emission Standards for Asbestos
Subpart M of 40 CFR 61 establishes requirements related to asbestos in the event of demolition or remodeling. The Facility will comply with these requirements.

Part 63, Subpart Y – National Emission Standards for Hazardous Air Pollutants for Marine Tank Vessel Loading Operations
The provisions of Subpart Y apply to new marine terminals that are major sources of HAPs or are associated with a major source of HAPs (such as a refinery). As noted above, the Facility is not in itself a major source of HAPs and is not associated with a major source of HAPs. Consequently, Subpart Y does not apply to the Facility.

Part 63, Subpart DDDDD -- National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters
The provisions of Subpart DDDDD apply to boilers and process heaters at major sources of HAPs. Because the Facility is not a major source of HAPs, Subpart DDDDD does not apply to the Facility boilers.

Part 63, Subpart JJJJJ -- National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources
The Facility will be classified as an area source of HAPs and will operate boilers. However, gas-fired boilers are not subject to Subpart JJJJJJ. The Facility boilers will combust exclusively natural gas, so Subpart JJJJJ is not applicable.

Part 63, Subpart ZZZZ -- National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The provisions of Subpart ZZZZ apply to stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. A new stationary RICE located at an area source (such as the emergency firewater pump engines) must meet the requirements of Subpart ZZZZ by meeting the requirements of NSPS Subpart IIII for compression ignition engines. No further requirements apply for such engines under Subpart ZZZZ.

5.1.3.1.3 State Emission Limits

General standards for maximum emissions from industrial air pollution sources in Washington are outlined in WAC 173-400-040. This section limits visible emissions to 20% opacity except for 3 minutes per hour; controls nuisance dust particulate matter fallout, fugitive dust, and odors; and limits SO_2 emissions to no more than 1,000 ppm (hourly average, 7% O_2, dry basis). WAC 173-400-050 identifies emission standards for combustion and incinerator units, and limits process emissions to 0.1 grains per dry standard cubic foot at 7% O_2.

Washington also requires Best Available Control Technology (BACT) for new and modified emissions units. A BACT analysis identifies pollutant-specific alternatives for emission control, and the pros and cons of each alternative. The determination of which control scenario best protects ambient air quality is made on a case-by-case basis and considers the technical, economic, energy and environmental costs. Chapter 173-460 WAC requires that BACT also be employed to control emissions of TAPs (i.e., T-BACT). Generally, the same technologies or operations that reduce criteria pollutants also reduce TAPs.

5.1.3.2 Consistency with SWCAA Regulations

In addition to the general State emissions standards addressed in the preceding section, SWCAA has other regulations that would apply if the Facility were not subject to EFSEC's jurisdiction. Although they are not directly applicable, this section evaluates SWCAA's regulations to demonstrate that the Facility will be designed and operated consistent with those local requirements.

5.1.3.2.1 SWCAA General Regulations

The SWCAA regulations generally mirror Ecology's emission limits for new sources, limiting exhaust plume opacity to 20% opacity except for 3 minutes of any hour, particulate matter emissions to 0.1 grains per dry standard cubic foot, and SO_2 emissions to 1000 ppm. The Facility will comply with all local general emissions requirements because BACT imposes more stringent requirements.

5.1.3.2.2 SWCAA VOC Standards

SWCAA has established emission standards and control requirements for sources that emit VOCs. The Facility, as a source of VOC emissions, will be subject to the provisions of SWCAA 490 if it were under the jurisdiction of SWCAA.

SWCAA 490-040(2), Petroleum liquid storage tank requirements: Requires that all fixed-roof tanks storing volatile organic petroleum liquids with a true vapor pressure as stored greater than 78 mm of Hg (1.5 psi) at actual monthly average storage temperatures and having a capacity greater than one hundred fifty thousand liters (40,000 gallons) shall comply with one of the following:

- (i) Meet the equipment specifications and maintenance requirements of the federal standards of performance for new stationary sources - Storage Vessels for Petroleum Liquids (40 CFR 60, subpart K); or

- (ii) Be retrofitted with a floating roof or internal floating cover using a metallic seal or a nonmetallic resilient seal at least meeting the equipment specifications of the federal standards referred to in SWCAA 490-040 (2)(a)(i) or its equivalent; or

- (iii) Be fitted with a floating roof or internal floating cover meeting the manufacturer's specifications in effect when installed.

490-040 also requires that all seals be maintained in good operating condition and that seal fabric shall contain no visible holes, tears, or openings.

The Facility storage tanks will employ a fixed roof and internal floating cover and will therefore comply with 490-040 if under the jurisdiction of SWCAA. The Facility would be not be subject to the provisions of SWCAA 490-201 because that rule addresses petroleum storage in external floating roof tanks only.

5.1.3.2.3 SWCAA Maintenance Plan Requirements

Portions of the Portland-Vancouver metropolitan area (including the Facility site) have exceeded ozone and carbon monoxide ambient air quality standards in the past. Although the area currently meets ambient air quality standards, industrial sources in the area are still governed by "maintenance" plans intended to ensure air quality in the area does not deteriorate to the point where ozone and CO ambient standards are exceeded again. SWCAA administers those plans in the Washington portion of the maintenance area with certain elements of the maintenance plan integrated into the SWCAA regulations. Each SWCAA requirement is presented after a bullet below, and followed by an explanation of how the Facility complies with that requirement.

- SWCAA 400-111, Requirements for New Sources in a Maintenance Plan Area: SWCAA 400-111 implements portions of the State Implementation Plan (SIP) for the Vancouver CO and ozone maintenance areas[25]. Both maintenance areas cover the same geographic area, extending over the urban and industrial regions of Vancouver. SWCAA 400-111 requires that no approval to construct a new source shall be granted unless:

  a) Emissions from all units will comply with applicable emissions standards including NSPS and MACT standards.

  b) Emissions from the new source will be minimized to comply with emissions levels and other requirements within the maintenance plan.

  c) BACT will be employed for all pollutants emitted from units associated with the new source.

[25] Vancouver, WA ozone and carbon monoxide maintenance plans are available for download from http://www.swcleanair.org/maintenanceplans.html

d) Emissions from the new source will not cause any violation of an ambient air quality standard

e) The source will employ control equipment and take measures to control emissions of TAPs to comply with WAC 173-460.

Although the EFSEC approval process supersedes SWCAA regulations, the Facility would comply with this regulation were it subject to SWCAA jurisdiction.

- SWCAA 400-111(2) indicates that a source located within the maintenance area may have to apply Lowest Achievable Emission Rate (LAER) emission limits if any ambient air quality standard is violated within the CO or O_3 maintenance areas.

According to SWCAA (2007)[26], the region has been in compliance with CO NAAQS since 1992 and future exceedance is not anticipated. Also, according to SWCAA (2006)[27], the region is in compliance with the ozone standards and future exceedance is not expected in the immediate future. Facility-wide emissions of ozone precursors and carbon monoxide are low and do not threaten compliance with the CO and ozone ambient standards. Consequently, this regulation would not apply to the Facility even if it were subject to SWCAA regulations.

- SWCAA 400-111(5) states that if a new source located within the maintenance area is designated as "major"[28] then emission offsets are required. Offsets are reductions in pollutant emissions equivalent to or greater than the proposed increases, provided by other stationary sources emitting the same pollutant.

Because the Facility is not a major source of carbon monoxide or ozone precursors, offsets would not be required even if the Facility were subject to SWCAA regulations.

- SWCAA 400-113(3) requires that allowable emissions from a proposed new source do not result in a significant increase in ambient concentrations within a maintenance area. This provision therefore requires that a source demonstrate that the project emissions will not result in exceedance of significant impact levels (1 $\mu g/m^3$ NO_2 annual average, 0.5 mg/m^3 CO 8-hour average, or 2 mg/m^3 CO 1-hour average) within the Vancouver maintenance area. If a SIL is exceeded then emission offsets must be obtained. Offsets must be sufficient enough to lower the modeled ambient concentration below the indicated impact level.

This regulation is intended to ensure that sources outside the maintenance area do not adversely affect compliance within the maintenance area. As noted above, the Facility is within the maintenance areas but its emissions are below the major source thresholds that trigger LAER and offsets.

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[26] SWCAA (2007): Vancouver Air Quality Maintenance Area Second 10-year Carbon Monoxide Maintenance Plan, Supplement to the Washington State SIP, SWCAA, March 1, 2007.

[27] SWCAA (2006): Vancouver Portion of the Portland-Vancouver AQMA Ozone Maintenance Plan, Supplement to the Washington State SIP, SWCAA, November 2, 2006.

[28] A "major" stationary source is defined in SWCAA 400-030 (62)(a) as a source located in a maintenance plan or non-attainment area that emits or has the potential to emit 100 tons per year or more of any criteria pollutant (lower thresholds apply for PM and CO in non-attainment areas).

5.1.3.3 Preconstruction Permitting

5.1.3.3.1 Notice of Construction and Application for Approval

WAC 173-400-110 requires a NOC application for the construction of new air contaminant sources in Washington. SWCAA maintains a similar regulation (SWCAA 400-109) for new or modified sources in its jurisdiction. The NOC application provides a description of the facility and an inventory of pollutant emissions and controls. The reviewing agency, EFSEC, considers whether BACT has been employed and evaluates ambient concentrations resulting from these emissions to ensure compliance with ambient air quality standards. Pollutant emissions not governed by the PSD permit process are addressed in an Order of Approval that results from the NOC application. In the case of the Facility, all pollutants except greenhouse gases are addressed in the NOC application.

5.1.3.3.2 Prevention of Significant Deterioration (PSD)

For the Facility, EFSEC and USEPA administer the PSD permit process. The PSD regulations were established by USEPA to ensure that new or expanded major stationary sources that emit Clean Air Act-regulated pollutants above a significance rate do not cause air quality in areas that currently meet the standards (i.e., attainment areas) to deteriorate significantly. These regulations require the application of BACT, and set PSD increments, which limit the increases in SO_2, NO_2 and PM concentrations that may be produced by a new source. Increments have been established for three land classifications. The most stringent increments apply to Class I areas, which include wilderness areas and national parks. The vicinity of the site is designated Class II, where less stringent PSD increments apply. There are no Class III areas in Washington so those increments are not pertinent to this analysis.

The Facility will be subject to PSD regulations because it will emit more than 100,000 tons per year of greenhouse gases (See Table 5.1-12). Once subject to the PSD process, emissions of other regulated pollutants that exceed specific significant emission rates must be evaluated. However, facility-wide emissions of all regulated air pollutants other than greenhouse gases are less than the significant emission rates established in the PSD regulations. Consequently, only greenhouse gas emissions are subject to review in the PSD process.

5.1.4 LOCAL AIR QUALITY IMPACT ASSESSMENT

This section describes the local Air Quality Impact Assessment (AQIA) that has been conducted for the Facility. Computer-based dispersion modeling techniques were applied to simulate dispersion of toxic and criteria pollutant releases from Facility emissions units to estimate pollutant concentrations in the neighboring area. The results of the modeling analyses are used to assess compliance with NAAQS, WAAQS, and Ecology's ASILs for TAPs.
The dispersion modeling techniques employed in the analysis follow the USEPA regulatory guidelines (40 CFR Part 51, Appendix W). These guidelines include recommendations for model selection, data preparation, and model application, but allow flexibility on a case-by-case basis.

Section 5.1.4.1 summarizes stack parameters used for the simulation. Section 5.1.4.2 describes the data used to characterize existing ambient air quality and discusses the meteorological data used in the dispersion modeling. Dispersion model selection and application are described in Section 5.1.4.3, followed by a summary of the model results in Section 5.1.4.4.

Typically, PSD permit applications examine whether emissions attributable to a proposed facility exceed Class II and Class I PSD increments and evaluate air quality related values in Class I areas. For the Facility, however, greenhouse gases are the only pollutant subject to PSD review, and there are no increments or air quality related values established for greenhouse gases.

5.1.4.1 Stack Parameters, Building Dimensions, and Good Engineering Practice

In addition to emission rates, the modeling analysis requires estimates of the stack heights, building dimensions, and other parameters that characterize exhaust flows and/or atmospheric release characteristics from a facility. These release characteristics have an important influence on initial dispersion of emissions. The stack parameters used in the dispersion modeling simulation of Facility operations are presented in Table 5.1-21.

The effect of building wakes (i.e., downwash) on stack plumes was evaluated in accordance with USEPA guidance. Direction-specific building data were generated for stacks below good engineering practice (GEP) stack height, using the most recent version of USEPA Building Parameter Input Program – Prime (BPIP-Prime). The AERMOD model considers direction-specific downwash using both the Huber Snyder and Schulman-Scire algorithms, as represented in the BPIP-Prime program. Figure 5.1-1 shows the major structures that were used in the BPIP-Prime analysis.

Table 5.1-21. Stack Parameters

Source	Stack Base Elevation above Sea level (m)	Stack height (m)	Temperature (K)	Exit velocity (m/s)	Stack diameter (m)
Storage Area Boiler	10	13.72	508.15	10.85	0.51
Unloading Boiler1	9	19.81	504.26	10.72	1.07
Unloading Boiler2	9	19.81	504.26	10.72	1.07
Unloading Boiler3	9	19.81	504.26	10.72	1.07
VCU1	10	7.36	1477.59	39.62	1.12
VCU2	10	7.36	1477.59	39.62	1.12
VCU3	10	7.36	1477.59	39.62	1.12
VCU4	10	7.36	1477.59	39.62	1.12
VCU5	10	7.36	1477.59	39.62	1.12
VCU6	10	7.36	1477.59	39.62	1.12
VCU7	10	7.36	1477.59	39.62	1.12
VCU8	10	7.36	1477.59	39.62	1.12
Emergency Firewater Pump 1	10	3.35	786.82	73.55	0.10
Emergency Firewater Pump 2	11	3.10	786.82	73.55	0.10
Emergency Firewater Pump 3	9	3.10	786.82	73.55	0.10

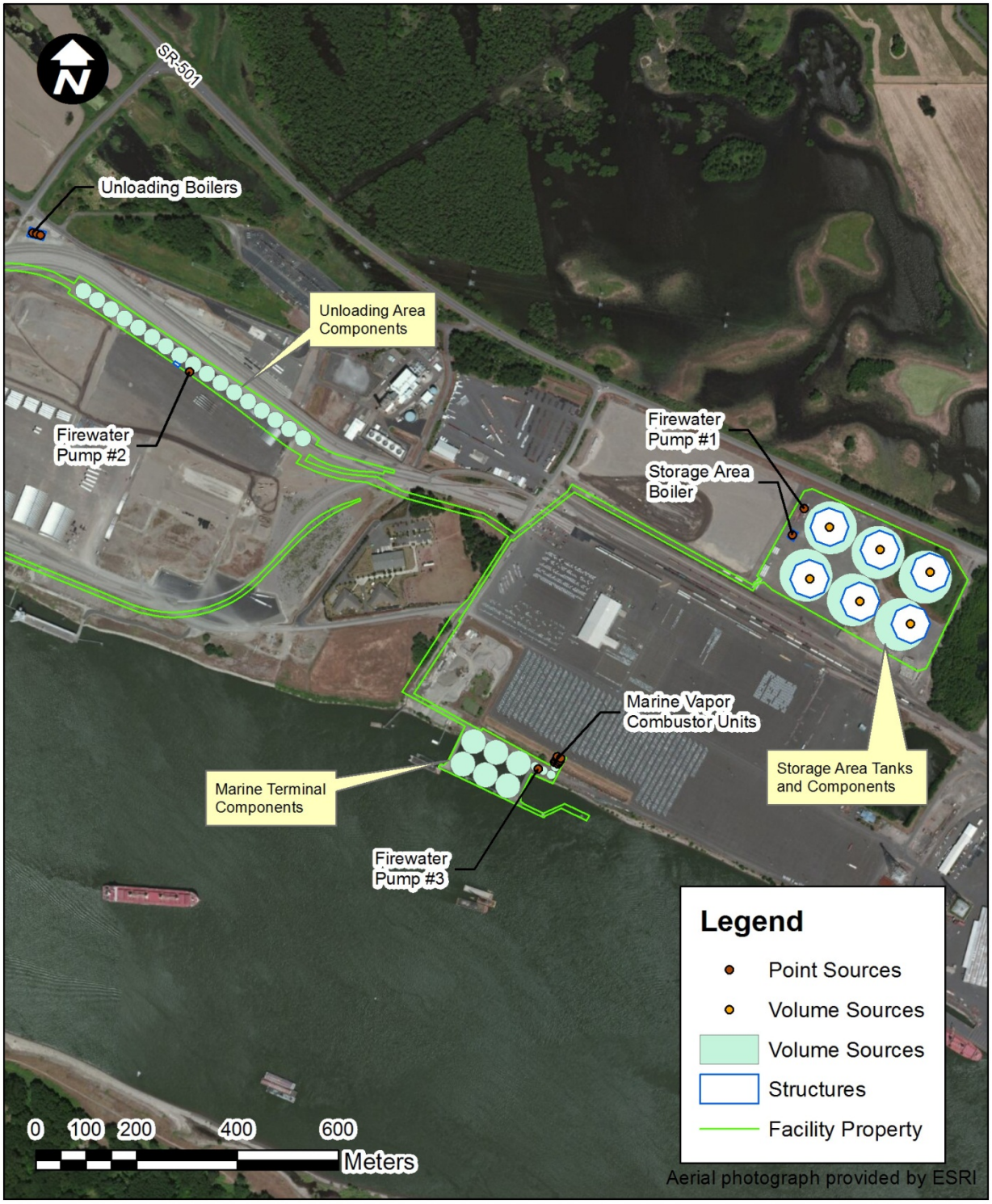

Figure 5.1-1. Site Plan with Emission Units and Property Boundary

5.1.4.2 Local Meteorology and Air Quality

5.1.4.2.1 Local Meteorology

A meteorological database for the dispersion modeling was constructed using the best available surface and upper air data. A survey of available meteorological data was conducted for use in the simulations. For surface meteorological data, the closest and most representative National Weather Service (NWS) station was Pearson Field, located in Vancouver. The most appropriate upper air data was from McNary field airport, in Salem Oregon. A five year meteorological database was created using the most recent available years of data: 2008 through 2012.

Figure 5.1-2 displays a wind rose constructed from the five years of hourly meteorological data. The average wind velocity for the five year period is 2.32 meters per second (m/s) and periods of calm winds occur 5.72 percent of the time.

Additional meteorological variables and geophysical parameters are required by the dispersion modeling analysis to estimate the surface energy fluxes and construct boundary layer profiles. Surface characteristics including the surface roughness length, albedo, and Bowen ratio were assigned on a sector-by-sector basis using land use within one kilometer of Pearson Field. The USGS 1992 National Land Cover (NLCD92) land use data set used in the analysis has a 30 m mesh size and over 30 land use categories.[29]

The NLCD92 data were processed using the utilities that accompany the AERMOD modeling system. Land use was characterized in eight upwind sectors surrounding the site. Within each sector a weighted average surface roughness length, albedo, and Bowen ratio was calculated from the characteristics recommended for each land use by the AERSURFACE program. Arithmetic averages were used for the albedo and Bowen ratio, while a geometric or logarithmic average was used for surface roughness length.

The USEPA meteorological program AERMET was used to combine the Pearson Field observations with twice daily upper air soundings from Salem and derive the necessary variables for AERMOD. The upper air data are used to estimate the temperature lapse rate aloft and subsequently by AERMET to predict the development of the mixed layer height. The Bulk-Richardson option was used to estimate dispersion variables and surface energy fluxes during nocturnal periods, while solar radiation and wind speed are used by AERMET to estimate these same variables during the day. The sigma-theta data from the Pearson Field site are passed through by AERMET to AERMOD for the lateral dispersion algorithms.

[29] The USGS NLCD92 data set is described and can be accessed at http://landcover.usgs.gov/natllandcover.php.

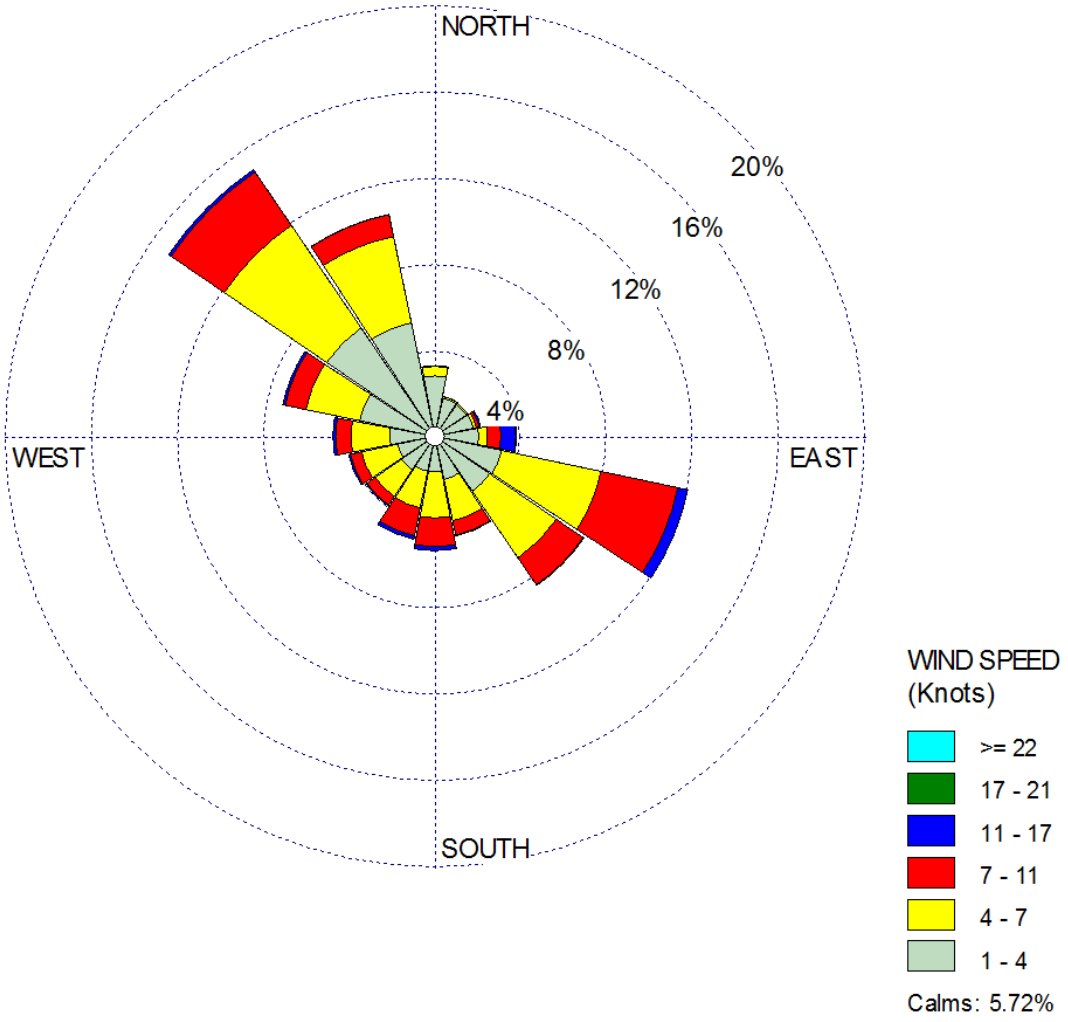

Figure 5.1-2. Pearson Field Airport Windrose from 2008-2012

5.1.4.2.2 Background Air Quality

Ecology and USEPA designate regions as being "attainment" or "nonattainment" areas for particular air pollutants based on monitoring information collected over a period of years. Attainment status is therefore a measure of whether air quality in an area complies with the health-based ambient air quality standards. The Facility is located in a region considered to be in attainment for all criteria pollutants, but it remains subject to maintenance plans that ensure continued compliance with ozone and carbon monoxide ambient standards.

Existing air quality at the Facility site can be inferred from several sources of information. First, conditions can be estimated from measurements collected by Ecology and the Oregon Department of Environmental Quality air quality monitoring networks. Current and archived air

quality data are accessible from the EPA AirData website.[30] The 2012 AirData database files for several monitoring sites near to the project site were accessed to characterize background air quality. The values reported at these sites represent the conservatively highest background air quality values in the region because monitoring sites are often specifically selected to identify the highest regional pollutant concentrations. Air quality values for each pollutant were estimated using measurements from the following monitors:

CO: SE Lafayette, Portland, Oregon, EPA AQS Site No. 41-051-0080 (about 10 miles SE of the project site), 2012 maximum and second highest maximum values.

NO_2: SE Lafayette, Portland, Oregon 2011 Annual mean, 2012 1-hour maximum and 98th percentile daily maximums.[31]

Ozone: Sauvie Island, Oregon, EPA AQS Site No. 41-009-0004 (about 8 miles north-northwest of the project site), 2011 8-hour maximum and fourth highest 8-hour maximum values.

$PM_{2.5}$: Fourth Plain Boulevard East, Vancouver, Washington, EPA AQS Site No. 53-011-0013 (about 10 miles east of the project site), 2012 24-hour maximum and 98th percentile concentrations, annual average estimated using annual average of 1-hour values.

PM_{10}: N. Roselawn Emerson Playfield, Portland, Oregon, EPA AQS Site No. 41-051-0246 (about 7 miles southeast of the project site), 2012 24-hour average maximum value and 98th percentile 24-hour average value, annual average estimated using annual average of 24-hour values.

SO_2: SE Lafayette, Portland, Oregon, EPA AQS Site No. 41-051-0080, 2012 maximum and 99th-percentile 1-, 3-, and 24-hour values. Annual average estimated using annual average of 1-hour values.

Background concentrations can also be estimated using a tool provided by Ecology. Ecology provides the 2009-2011 "design values" for background air quality throughout the state using the output from the AIRPACT-3 regional air quality model, with adjustments from assimilated monitor data. The tool is a product of the Northwest International Air Quality Environmental Science and Technology Consortium and is used to support air permitting and regulation in the State.[32] Use of this database may provide a more accurate estimate of the actual background air quality at the project site than the conservative measurements from the monitoring network. Design values were collected in July 2013 using the tool for project site coordinates (46.643 Lat., -122.705 Long.).

The background air quality values estimated from these sources of information are listed in Table 5.1-22.

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[30] U.S. EPA AirData website archive of monitoring data. http://www.epa.gov/airquality/airdata/

[31] Reported in Oregon Dept. of Environ. Quality (2012): 2011 Oregon Air Quality Data Summaries, DEQ 11-AQ-021

[32] NW-Airquest "design values" tool website: http://lar.wsu.edu/nw-airquest/index.html

Table 5.1-22. Existing Air Quality

Pollutant	Averaging Time	State Monitoring Network Maximum Value	State Monitoring Network Regulatory Value[1]	Design Value
CO	1-hour	3.8 ppm	3.1 ppm (2nd high)	2.065 ppm
	8-hour	2.3 ppm	2.2 ppm (2nd high)	1.276 ppm
NO_2	1-hour	59 ppb	36 ppb (98th %-ile.)	37 ppb
	Annual	9 ppb	9 ppb	7 ppb
O_3	1-hour	0.068 ppm	0.064 ppm (4th high)	NA[3]
	8-hour	0.057 ppm	0.053 ppm (4th high)	0.056 ppb
$PM_{2.5}$	24-hour	31.2 μg/m^3	20.5 μg/m^3 (98th %-ile)	20 μg/m^3
	Annual	7.0 μg/m^3	NA[3]	5.8 μg/m^3
PM_{10}	24-hour	36 μg/m^3	34 μg/m^3 (98th %-ile)	31 μg/m^3
	Annual	13 μg/m^3	NA[3]	NA[3]
SO_2	1-hour	9.8 ppb	4.9 ppb (99th %-ile)	9.5 ppb
	3-hour	7.0 ppb	2.7 ppb (99th %-ile)	7.1 ppb
	24-hour	2.5 ppb	1.7 ppb (99th %-ile)	3.6 ppb
	Annual	1.5 ppb	NA[3]	3 ppb

Notes:
[1] Values that are applicable for comparison to the NAAQS.
[2] Facility site Design Value obtained from NW-Airquest/ Dept. of Ecology
[3]NA: Not available

5.1.4.3 Dispersion Model Selection and Application

The most recent version (12345) of AERMOD was used for the air quality modeling. AERMOD is the preferred USEPA guideline model for near-field simulation of industrial stack releases. AERMOD was used to model concentrations of pollutants having short-term (e.g., one to 24 hour) ambient standards with the appropriate averaging time selected. Modeling of pollutants having annual standards (i.e., $PM_{2;5,}$ SO_2 and NO_2) was conducted using AERMOD with the PERIOD option.

An analysis of the land use adjacent to the Facility site was conducted in accordance with Section 7.2.3 of the Guideline on Air Quality Models (USEPA, 2005 and Auer, 1978). The land use analysis within 3 kilometers of the site was determined to be predominantly rural, such that

rural dispersion coefficients were selected for all Facility simulations. All AERMOD regulatory default settings were selected.

Concentrations attributable to Facility emissions units are calculated at simulated locations referred to as model receptors. The receptor grids used in the modeling analyses are as follows:

- 25-meter spacing along the property line and extending from the property line out to 3 km beyond the property line;
- 50-meter spacing from 3 km to 4 km from the property line;
- 200-meter spacing from 4 km to 5 km from the property line; and
- 5,000-meter spacing from 5 km to 10 km from the property line.

Actual Universal Transverse Mercator (UTM) NAD27 coordinates and digital terrain data provided by the USGS were used in all receptor grids.

Figure 5.1-3 shows the receptor grids used in the modeling overlaid on a topographic map.

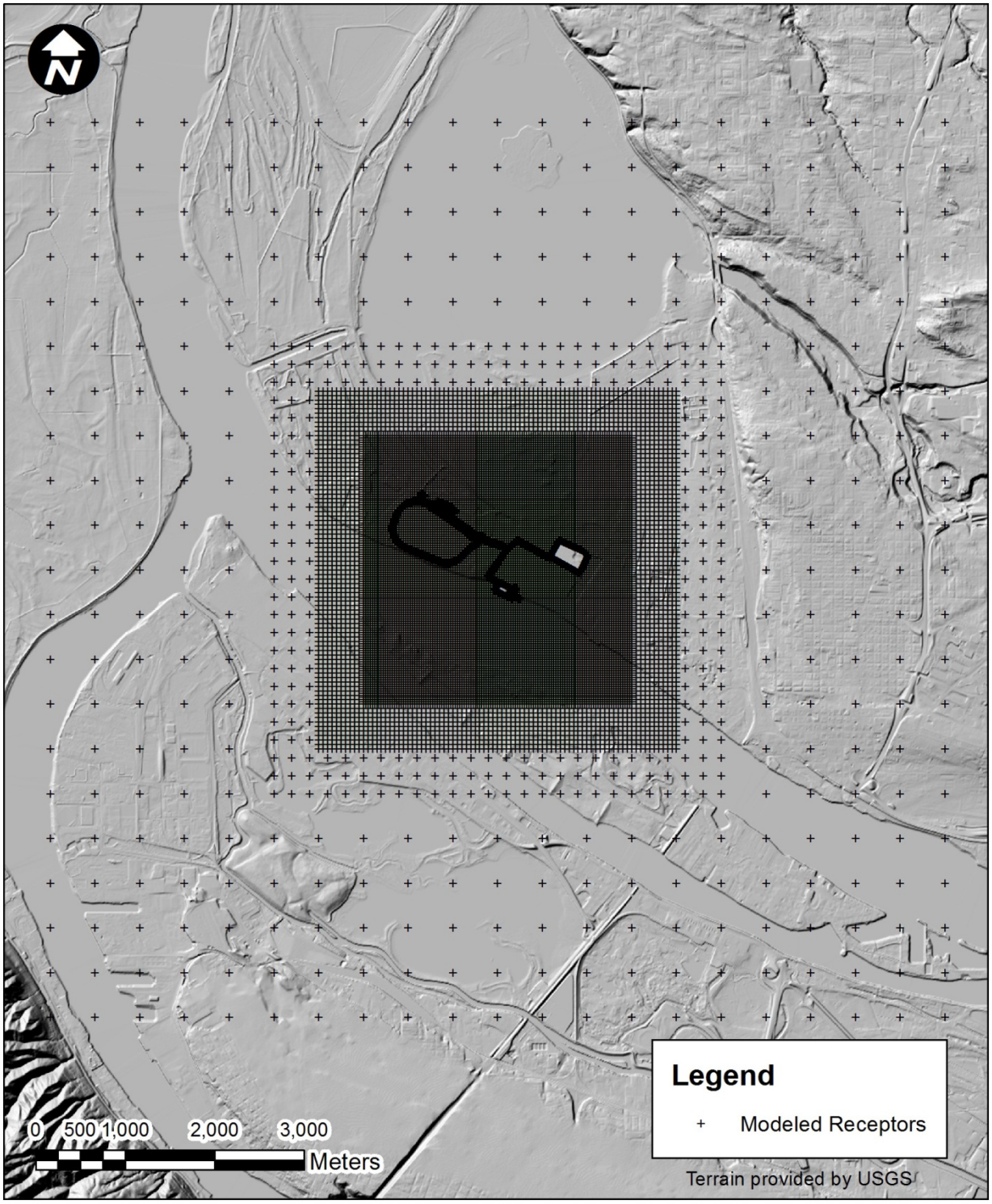

Figure 5.1-3. Modeling Receptor Grids

5.1.4.4 Dispersion Model Results

5.1.4.4.1 Criteria Pollutants

The criteria pollutant concentrations predicted using AERMOD to evaluate Facility operations are presented in Table 5.1-23. All maximum modeled concentrations occurred within one km of the Facility. In order to assess the significance of the predicted values, the maximum predicted criteria pollutant concentrations attributable to the Facility are compared with the USEPA Significant Impact Levels (SILs); concentrations below the SILs are considered to be insignificant, and these pollutants do not require cumulative modeling with other sources to demonstrate compliance with ambient air quality standards.

Table 5.1-23. Maximum predicted concentrations attributable to the facility

Pollutant	Averaging Period	Maximum Modeled Concentration				PSD SIL
		($\mu g/m^3$)	UTM X (m)	UTM Y (m)	Position Relative To Facility	(µg/m3)
PM_{10}	Annual	0.1	520700	5055505	Northwest	1
	24-hour	8.8	520698	5055495	Northwest	5
$PM_{2.5}$	Annual	0.1	520701	5055505	Northwest	0.3
	24-hour	8.8	520698	5055496	Northwest	1.2
SO_2	Annual	0.3	520701	5055505	Northwest	1
	24-hour	10.8	520698	5055496	Northwest	5
	3-hour	19.5	520698	5055496	Northwest	25
	1-hour	28.6	522367	5054940	Northeast	7.8
NO_2	Annual	0.8	520701	5055505	Northwest	1
	1-hour	19.5	521885	5054360	Southeast	7.5
CO	8-hour	50.5	520699	5055496	Northwest	500
	1-hour	87.5	520699	5055496	Northwest	2,000

Predicted SO2, CO, and annual PM and NO2 concentrations attributable to Facility emissions units are less than USEPA SILs. Based on procedures that apply to PSD permits, this finding indicates that Facility emissions of those pollutants will not significantly affect ambient air concentrations.

Short term concentrations of PM and NO2 exceed their respective SILs, and it is common to evaluate cumulative concentrations by adding existing "background" concentrations to the predicted concentrations attributable to the Facility. The air quality monitoring data from selected monitoring sites in Washington and Oregon, as summarized in Section 5.1.4.2.2, provide a conservative assessment of background air quality. Table 5.1-24 identifies cumulative concentrations based on the sum of these conservative background concentrations and the highest modeled concentrations from the Facility. The analysis indicates that when maximum predicted concentrations are added to the highest monitored values, total concentrations comply with Washington and National ambient air quality standards.

Table 5.1-24. Comparison of Cumulative Concentrations with Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Modeled Concentration	Measured Background Concentration	Maximum Total Concentration	NAAQS	WAAQS
		($\mu g/m^3$)				
NO2	1-hour	19.5	70	89.1	188	-
NO2	Annual	0.8	13	14.0	100	100
SO2	1-hour	28.6	25	53.5	196	655
SO2	3-hour	19.5	19	38.1	1300	-
SO2	24-hour	10.8	9	20.2	-	262
SO2	Annual	0.3	8	8.1	-	52
PM10	24-hour	8.8	31	39.8	150	150
PM10	Annual	0.1	13	13.1	-	50
PM2.5	24-hour	8.8	20	28.8	35	-
PM2.5	Annual	0.1	6	5.9	15	-
CO	1-hour	87.5	2364	2451.9	40,000	40,000
CO	8-hour	50.5	1461	1511.5	10,000	10,000

Note:
Although it is assumed that all PM10 emissions are PM2.5, predicted concentration differ because of the difference in the statistics used to determine compliance with the standard.

5.1.4.4.2 Toxic Air Pollutants

WAC 173-460 regulates emissions of almost 400 substances as toxic air pollutants (TAPs). When anticipated emissions of a given TAP exceed a prescribed "Small Quantity Emission Rate for that TAP, EFSEC requires permit applications to include dispersion modeling of TAP emissions and to include a comparison of calculated concentrations attributable to the project with the ASILs. If calculated concentrations are less than the ASILs, a permit can be granted without further analysis. Otherwise, the Applicant must revise the project or submit a health risk assessment demonstrating that toxic emissions from the project are sufficiently low to protect human health. Concentrations below the ASILs indicate insignificant potential for adverse health effects from these chemicals.

Table 5.1-14 identifies facility-wide TAP emissions and was used to determine whether facility-wide emissions of each TAP exceed its SQER. A dispersion modeling analysis for those TAPs emitted at rates exceeding the SQERs was conducted in the same manner as for the criteria pollutants.

Maximum predicted TAP concentrations attributable to the Facility emission units are compared with Ecology ASILs in Table 5.1-25. Predicted concentrations are less than the Ecology ASILs for all TAPs

Table 5.1-25. Maximum Predicted Tap Concentrations

CAS #	Compound	Maximum Predicted Concentration (ug/m3)	ASIL (ug/m3)
10102-44-0	Nitrogen dioxide	19.5	470
7446-09-5	Sulfur dioxide	28.6	660
57-97-6	7,12-Dimethylbenz(a)anthracene	1.20E-06	1.41E-05
7440-38-2	Arsenic	1.50E-05	3.03E-04
71-43-2	Benzene	2.36E-02	3.45E-02
7440-43-9	Cadmium	8.26E-05	2.38E-04
18540-29-9	Chromium, (hexavalent)	4.19E-06	6.67E-06
N/A	Diesel Engine Particulate	1.45E-03	3.33E-03

Attachment 1

Tesoro Savage Vancouver Energy Distribution Terminal
Vancouver, Washington

Best Available Control Technology (BACT) Analysis

29 August 2013

Prepared by: ENVIRON

Job No. A13.0267.00

Best Available Control Technology (BACT) Analysis

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1 INTRODUCTION

In Washington, Best Available Control Technology (BACT) is required for new and modified industrial sources of criteria and toxic air pollutants (TAPs). This document presents a BACT analysis for new emission units associated with the Tesoro Savage Vancouver Energy Distribution Terminal (Facility). The basis for the emissions-related analyses is a maximum design throughput of 360,000 barrels of crude oil per day and year-round operation (365 days per year). The proposed project, as currently configured, will involve the following major emission units and processes:

- Three natural gas-fired package boilers,[1] each with a nominal heat input capacity of 62 million British thermal units per hour (MMBtu/hr), that will provide steam to heat crude oil railcars before unloading;
- Two natural gas-fired package boilers[2] with a nominal heat input capacity of 13.2 MMBtu/hr that will provide steam to heat on-site storage tanks;
- Six crude oil tanks totaling approximately two million barrels of usable storage;
- Crude oil receiving and handling facilities for railcars, storage tanks, and vessels;
- Three nominal 225-hp diesel engines to power emergency fire water pumps.

1.1 Project description

The Facility will unload crude oil delivered by railcar and load crude oil to vessels. As necessary, crude oil will be stored in onsite tanks. Steam, provided by natural gas-fired boilers, will be used as needed to heat, and thereby decrease the viscosity of, certain crude oils to allow it to flow more easily from railcars or tanks. A network of pipes, and associated components (i.e., valves, pumps, etc), will be used to convey crude oil from the railcar unloading facility to the tanks, and from the tanks for the marine terminal, where crude oil will be loaded onto vessels.

1.2 BACT Review Process

BACT, as it applies to regulated pollutants not subject to major new source review, is defined in WAC 173-400-030 (and adopted by reference via WAC 463-78-005) as:

> "…an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of

[1] Only two of the three boilers in the unloading area will be operated at any given time, except occasionally for a brief period when the third boiler is started up as one shuts down.

[2] Only one of the two boilers in the tank farm area will be operated an any given time, except occasionally for a brief overlap when the second boiler is started up as the first shuts down.

> production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. "

BACT as it applies to sources located in attainment areas and subject to major new source review is almost identically defined in 40 CFR 52.21 (the PSD regulations, adopted by reference in WAC 463-78-005).

In a December 1, 1987 memorandum from the EPA Assistant Administrator for Air and Radiation, the agency provided guidance on the "top-down" methodology for determining BACT. The "top-down" process involves the identification of all applicable control technologies according to control effectiveness. Evaluation begins with the "top," or most stringent, control alternative. If the most stringent option is shown to be technically or economically infeasible, or if environmental impacts are severe enough to preclude its use, then it is eliminated from consideration and then the next most stringent control technology is similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by technical or economic considerations, energy impacts, or environmental impacts. The top control alternative that is not eliminated in this process becomes the proposed BACT basis.

This top-down BACT analysis process can be considered to contain five basic steps described below:

- Step 1: Identify all available emission reduction alternatives with practical potential for application to the specific emission unit for the regulated pollutant under evaluation;
- Step 2: Eliminate all technically infeasible alternatives;
- Step 3: Rank remaining alternatives by effectiveness;
- Step 4: Evaluate the economic, energy, and environmental impacts starting with the most effective alternative; and
- Step 5: Select BACT, which will be the most effective practical alternative not rejected in the previous steps.

Formal use of these steps is not always necessary. However, both EPA and the Washington Department of Ecology have consistently interpreted the statutory and regulatory BACT definitions as containing two core requirements, which EPA believes must be met by any BACT determination, irrespective of whether it is conducted in a "top-down" manner. First, the BACT analysis must include consideration of the most stringent available technologies: i.e., those that provide the "maximum degree of emissions reduction." Second, any decision to require a lesser degree of emissions reduction must be justified by an objective analysis of "energy, environmental, and economic impacts" contained in the record of the permit decisions.

Additionally, the minimum control efficiency to be considered in a BACT analysis must result in an emission rate no less stringent than the applicable New Source Performance Standard (NSPS) emission rate, if any NSPS standard for that pollutant is applicable to the source.

This BACT analysis was conducted in a manner consistent with this stepwise approach. Control options for potential reductions in criteria pollution emissions were identified for each emission unit. These options were identified by researching the EPA database known as the RACT/BACT/LAER Clearinghouse (RBLC), drawing upon previous environmental permitting experience for similar units and surveying available literature. Available controls that are judged

to be technically feasible are further evaluated based on an analysis of economic, environmental, and energy impacts.

Assessing the technical feasibility of emission control alternatives is discussed in EPA's draft "New Source Review Workshop Manual." Using terminology from this manual, if a control technology has been "demonstrated" successfully for the type of emission unit under review, then it would normally be considered technically feasible. For an undemonstrated technology, “availability” and “applicability” determine technical feasibility. An available technology is one that is commercially available; meaning that it has advanced through the following steps:

- Concept stage;
- Research and patenting;
- Bench scale or laboratory testing;
- Pilot scale testing;
- Licensing and commercial demonstration; and
- Commercial sales.

Suitability for consideration as a BACT measure involves not only commercial availability (as evidenced by past or expected near-term deployment on the same or similar type of emission unit), but also involves consideration of the physical and chemical characteristics of the gas stream to be controlled. A control method applicable to one emission unit may not be applicable to a similar unit, depending on differences in the gas streams’ physical and chemical characteristics.

1.3 GHG BACT Review Process

On May 13, 2010, USEPA issued the final “Tailoring Rule” with the stated intent of establishing a “common sense approach” to addressing GHG emissions from stationary sources, by “tailoring” the major source applicability thresholds under the PSD and Title V air operating permit programs and providing a phased implementation for GHG permitting requirements. The Tailoring Rule defines GHGs as an aggregate of: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Under the second phase of the Tailoring Rule, which began on July 1, 2011, a new source of GHG emissions with the potential to emit 100,000 tpy of carbon dioxide equivalent (CO_2e) or more is subject to PSD review for GHGs, even if it will not significantly increase emissions of any other PSD pollutant. Because there is no ambient standard or increment for GHGs, the only PSD requirement that applies to GHGs is that BACT must be employed to reduce GHG emissions from the proposed project.

In preparing this BACT analysis, available information in the USEPA’s RACT/BACT/LAER Clearinghouse, GHG BACT analyses and permits that include GHG limits, USEPA comments on GHG BACT determinations and permit limits, guidance documents posted on USEPA’s GHG permitting webpage, and other available information was reviewed. There were no prior GHG BACT determinations for a marine vessel loading terminals located.

In November 2010, USEPA issued guidance for conducting BACT analyses for GHGs, which was updated in March 2011 (hereafter referred to as “the March 2011 Guidance”). USEPA recommended (but does not require) that permitting agencies apply to GHGs the same “top down” process applied to determine criteria pollutant BACT.

2 NATURAL GAS-FIRED BOILER BACT ANALYSIS

Five natural gas-fired package boilers will provide steam to heat certain crude oil to facilitate transfer by reducing the viscosity of the oil. Three of the boilers, each with a nameplate firing rate of 62 MMBtu/hr, will be used to heat railcars (hereafter, the "unloading boilers"), and two other units, each with a nameplate firing rate of 13.2 MMBtu/hr will be used to heat two of the six onsite crude oil storage tanks (hereafter, the "tank farm boilers"). Tesoro-Savage expects to operate only two of the unloading boilers and one of the tank farm boilers at a given time; there would be one redundant boiler of each type.

Utilization of the boilers will be dependent upon the quantity of crude oil that must be heated to achieve a viscosity conducive to transfer operations. The boilers could operate throughout the year (i.e., 8,760 hours per year), but at varying loads dictated by railcar arrival schedules and the viscosity of the crude oil contained in the railcars.

Pollutant emissions from the natural gas boilers are expected to include NO_X, PM (including PM_{10} and $PM_{2.5}$), CO, SO_2, VOCs, and TAPs.

2.1 Identify Commercially-Available Emission Reduction Alternatives

Review of the federal RBLC database and selected state permit information indicates that several emission reduction alternatives have been identified in BACT determinations. Table A-1 lists a number of recent BACT determinations associated with natural gas-fired boilers with capacities less than 100 MMBtu/hr. The RBLC database survey results indicate that available BACT options for the pollutants emitted from natural gas-fired boilers include:

- Good Combustion Practices (GCP)
- Low-NO_X burners (LNB)
- Ultra-Low-NO_X burners (ULNB)
- Oxidation Catalysts
- Flue Gas Recirculation (FGR)
- Selective Catalytic Reduction (SCR)
- Low sulfur fuels

2.2 Eliminate Technically Infeasible Alternatives

All emission reduction alternatives identified in the previous section are considered technically feasible for natural gas-fired boilers, except SCR, which is not technically feasible because of the inconsistent operating schedule of the proposed boilers. SCR systems utilize a catalyst to promote the reduction reaction between NO_X and ammonia (NH_3) at a lower temperature than it would otherwise occur. While catalysts are available that promote the reaction over a range of temperatures, a consistent temperature is required. For boilers that operate at a given load for extended periods, such a system can provide a reduction in NO_X emissions. Boilers with fluctuating steam demands, such as those proposed for this project, variations in flue gas temperature can lead to ineffective NO_X reduction, and unacceptably high emissions of unreacted NH_3. For this reason, SCR is removed from consideration as BACT for reducing NO_X emissions from the proposed natural gas-fired boilers.

In the following sections, these controls will be ranked and evaluated for each pollutant for which BACT is required.

2.3 NO_X BACT

Several of the identified alternatives are commercially available combustion and post-combustion control technologies which are capable of reducing NO_X emission from a natural gas-fired boiler. These controls include low-NO_X burners and flue gas recirculation.

2.3.1 Ranking of Remaining Alternatives

In top-down order of decreasing stringency, the feasible NO_X controls are listed with the approximate emission factor achieved by each technology:

- Ultra-Low-NO_X Burners – 0.011 lb/MMBtu[3]
- Low-NO_X Burners with FGR – 0.032 lb/MMBtu[4]
- Low-NO_X Burners with GCP – 0.050 lb/MMBtu[4]
- Conventional Burners with GCP, Conventional Burners – 0.10 lb/MMBtu[4]

2.3.2 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to meet the most stringent emission rate, no evaluation of energy, environmental, or cost was conducted. However, were an environmental and/or energy evaluation performed, utilizing low-NO_X burners with SCR would be identified as having greater impacts than utilizing ultra-low-NO_X burners.

2.3.3 Proposed BACT Limits and Control Option

Tesoro-Savage proposes an emission factor of 0.011 lb/MMBtu as BACT for NO_X emitted by all 5 of the proposed natural gas-fired boilers, achieved using ultra-low NO_X burners.

2.4 CO and VOC BACT

The only post-combustion control available for reducing emissions of CO and VOCs emitted by the proposed boilers is an oxidation catalyst module. Based on the RBLC review presented in Table A-1, the range of BACT CO emission limits for recently permitted natural gas-fired boilers (since 2004) is from 0.037 lb/MMBtu to 0.08 lb/MMBtu, and the range for VOCs is 0.0044 lb/MMBtu to 0.0054 lb/MMBtu. BACT for CO and VOCs on most units in the RBLC is GCP.

2.4.1 Ranking of Available Control Technologies

The identified control technologies, GCP and oxidation catalyst, are considered technically feasible for gaseous fuel fired boilers. In top-down order of decreasing stringency, the feasible CO and VOC controls are listed with the approximate level of control that could be achieved:

- Oxidation Catalyst and GCP – CO - 0.0036 lb/MMBtu, VOC - 0.0025 lb/MMBtu
- GCP – CO - 0.036 lb/MMBtu, VOC - 0.005 lb/MMBtu

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[3] Provided by Cleaver Brooks; equivalent to 9 parts per million by volume.

[4] From EPA's AP-42, Section 1.4 (Natural Gas Combustion), Table 1.4-1.

2.4.2 Consideration of Energy, Environmental and Cost Factors

The use of oxidation catalyst modules as add-on emission control is available and technically feasible for reduction in CO emissions from natural gas-fired boilers. These are in addition to combustion controls (i.e., GCP) in combination with Low-NO_X burners.

With respect to energy considerations, add-on post-combustion controls on boilers of the capacity range proposed will noticeably reduce the thermal efficiency of the unit. Catalyst modules increase the back-pressure downstream of the combustion chamber by between 0.05 and 0.5 in H_2O per inch of catalyst bed depth, depending upon design.[5] Secondary environmental impact issues associated with spent catalyst module disposal are common among boiler installations that employ post-combustion catalytic systems. While landfill disposal fees for spent catalyst are not expensive, the potential liability associated with disposal is difficult to assess from a monetary perspective. Catalyst recycling options are not fully developed, and have their own specific liabilities associated with transport, processing, and disposal of by-products.[6]

Prohibitively high annualized cost is the primary factor that argues against costly add-on control technologies for natural gas-fired boilers. Because the proposed boilers will not be operated at a consistent load, it is likely that the catalyst performance will be uneven (i.e., the maximum reduction of CO and VOCs may not be achieved at all times).

As demonstrated in the attached cost effectiveness calculations, add-on CO and VOC control technology for the proposed boilers would be cost-prohibitive in terms of cost per ton abated. Assuming an oxidation catalyst could provide 90 percent reduction of CO and 50 percent reduction of VOCs consistently throughout the year (highly unlikely given the planned method of operation), implementation of a catalytic oxidizer on one of the unloading boilers has an estimated annualized cost of over $138,000, and provides a combined CO and VOC reduction of 9.4 tons per year, compared with GCP. From these results, the cost effectiveness of the catalytic oxidizer option is conservatively estimated to be just less than $15,000 per ton reduced. The cost effectiveness of implementing a catalytic oxidizer on a tank farm boiler, assuming the same levels of control is over $45,000 per ton reduced. These costs are excessive, and so catalytic oxidation is eliminated as a BACT alternative.

2.4.3 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for CO and VOCs from the proposed natural gas-fired boiler is 0.036 lb/MMBtu (approximately 50 ppm) for CO, and 0.005 lb/MMBtu for VOC, both achieved by employing GCP.

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[5] Cooper, C.D. and F.C. Alley, "Air Pollution Control: A Design Approach," Waveland Press, 1994. Page 359.

[6] Electric Power Research Institute (EPRI), "Recycling and Disposal of Spent Selective Catalytic Reduction Catalyst," Report No. 1004888, October 2003.

2.5 PM and SO_2 BACT

This BACT analysis assumes that all PM emissions from the proposed boilers are $PM_{2.5}$, and that the PM, PM_{10}, and $PM_{2.5}$ emission rates are all equivalent. Any reference to PM emissions in this BACT analysis represents all definitions of particulate matter emissions: PM, PM_{10}, and $PM_{2.5}$.

2.5.1 Ranking of Available Control Technologies

For these pollutants, the commercially-available control measures that are identified in the most-stringent BACT determinations are use of low-sulfur, pipeline natural gas, and GCP. Based on review of the RBLC database, a summary of which is presented in Table A-1, add-on controls were not implemented to achieve BACT limits for these pollutants. The ranges of BACT emission limits for these pollutants are:

- SO_2 – 0.0006 lb/MMBtu to 0.082 lb/MMBtu
- PM – 0.0044 lb/MMBtu to 0.0075 lb/MMBtu

The two most-stringent available technologies are to be adopted for the proposed boilers, so further evaluation is unnecessary.

2.5.2 Proposed BACT Limits and Control Option

The use of pipeline natural gas and GCP are proposed as BACT for PM and SO_2 emissions from the natural gas-fired boilers. Boiler vendor information indicates that the hourly average PM emission factor will be 0.0075 lb/MMBtu, and mass balance calculations based on the sulfur content of the expected source of natural gas indicates that the daily average SO_2 emission factor will be approximately 0.00725 lb/MMBtu. However, Tesoro-Savage does not propose that these emission factors be used as numeric permit limits. Instead, BACT should be considered the use of pipeline natural gas and GCP.

2.6 Toxic Air Pollutant BACT

Toxic air pollutant (TAP) compounds emitted by a natural gas-fired boiler are, in general, either volatiles (VOCs) or particles (PM). The proposed BACT for VOC and PM are also proposed to be BACT for VOC and PM TAPs, respectively. BACT for TAPs that contain chlorine (e.g., hydrogen chloride) and sulfur (e.g., sulfuric acid) is proposed to be the same as that proposed for SO_2. For nitrogen-containing compounds (e.g., nitric oxide), BACT for is proposed to be the same as that proposed for NO_X.

2.7 GHG BACT

The boilers associated with the proposed facility would combust exclusively natural gas and emit only the three combustion GHG gases (CO_2, CH_4, and N_2O).

2.7.1 Identify Commercially-Available Emission Reduction Alternatives

The first step of a top-down BACT analysis is to identify all available pollutant reduction options. Options typically fall into three categories: inherently low-emitting processes, clean fuels, and add-on control technologies. While Step 1 is intended to include all possibilities, there are limits to the scope of the first two option categories (i.e., inherently low-emitting processes and clean fuels). As discussed in Section 1, the list of options in Step 1 need not include those that fundamentally redefine the nature of the proposed source or modification.

2.7.1.1 Carbon Dioxide

CO_2 is a by-product of complete combustion. Maximizing the overall efficiency of a combustion unit minimizes the fuel combusted per unit of steam generated or energy provided, which minimizes the quantity of CO_2 generated per unit of steam or energy. In the case of GHGs, a "clean fuel," or "low-carbon fuel" is one that generates the least amount of CO_2 when combusted. The fuel that produces the least CO_2 while allowing the operational flexibility needed to fulfill the boiler's role at the facility is natural gas. No other alternative fuels will be considered in the BACT analysis.

An inherently lower-emitting production process is one that maximizes product (in this case steam) yield and thermal efficiency while minimizing pollutant emissions. This is typically achieved by utilizing state-of-the-art equipment design that recovers as much energy as possible or minimizes fuel and energy use. Energy efficiency is the term typically used to encompass these concepts.

The only potential add-on control technology for removing CO_2 (which constitutes greater than 99 percent of the GHG emissions from the proposed facility) from a gas stream is typically referred to as "carbon capture and sequestration" (CCS), which consists of three stages: (1) removing or segregating CO_2 from the gas stream, (2) compressing and transporting the CO_2, and (3) storing the CO_2 on a permanent or long-term basis (e.g., until a practical and economic use is identified), or using the CO_2 in some beneficial way (i.e., industrial use).

The fundamental physical processes and engineering aspects of CCS are well understood, and portions of a CCS system are technically mature. However, CCS is a developing technology that is not yet fully commercially available. Nevertheless, in the March 2011 Guidance, USEPA classified CCS as an add-on control technology that is "available" for purposes of the Step 1 listing in GHG BACT analyses for facilities emitting CO_2 in large amounts, such as fossil fuel-fired power plants, and for certain industrial facilities with high-purity CO_2 streams. The proposed facility will not emit CO_2 in amounts comparable to a large fossil fuel-fired power plant.

2.7.1.2 Methane and Nitrous Oxide

Methane emissions from a natural gas-fired boiler are the result of fuel that is not combusted through low combustion temperatures or improper mixing of fuel and air. Low combustion temperatures also promote creation of N_2O. Proper combustion practices and properly designed equipment can minimize CH_4 and N_2O emissions by ensuring a sufficient combustion temperature and adequate mixing of fuel with combustion air.

Add-on technologies to remove CH_4 and N_2O exist (e.g., thermal and catalytic oxidation, non-selective catalytic reduction), but none have been employed to remove these GHG compounds from natural gas-fired boilers, or from combustion sources in general. Furthermore, CH_4 and N_2O emissions comprise only approximately 0.1 percent of the total projected GHG emissions increase; thus, application of add-on technology to reduce these pollutants would not have a practical effect on the overall GHG emission rate, even if such controls were found to be technically feasible. Therefore, no add-on technologies for removal of CH_4 or N_2O will be considered in the BACT analysis.

2.7.2 Eliminate Technically Infeasible Alternatives

In the second step of a top-down BACT analysis, the available pollutant reduction options listed in Step 1 are considered, and, if found to be technically infeasible for the specific emission unit under review, eliminated.

In Step 1, energy-efficient design and operation of equipment, and CCS were identified as potential control technologies.

2.7.2.1 Energy Efficient Design and Operation

Maximizing the quantity of steam or heat generated per unit of fuel combusted is the goal of all boiler and heater designers and operators. Striving for energy efficiency is technically feasible within the limitations of the second law of thermodynamics.

2.7.2.2 Carbon Capture and Sequestration/Storage

The first technical challenge related to CCS application for industrial combustion sources is the separation and capture of CO_2 in a form that can be compressed, transported and either stored permanently or used for commercial purposes. USEPA's Industry Sector White Paper, "Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from the Petroleum Refining Industry", lists three potential technologies for the separation and capture of CO_2 for post-combustion gas streams. These include: pre-combustion systems designed oxy-combustion, post-combustion solvent capture, and post-combustion membrane. According to USEPA, neither oxy-combustion nor post-combustion membrane technologies have been demonstrated in practice for this application. Post-combustion solvent capture technology to separate acid gases, including CO_2, from process gas streams, is currently utilized at industrial facilities, and has been demonstrated on combustion exhaust streams. The captured CO_2 gas would have to be dried and compressed to pipeline pressure (1,200 to 2,000 pounds per square inch), which would require additional on-site fuel combustion or electricity purchases, resulting in additional GHG emissions. Transport of compressed CO_2 is a mature technology and is considered technically feasible.

While there are currently successful projects demonstrating geological storage of CO_2, it is not yet a commercially available alternative.[7] Enhanced oil recovery (EOR) uses CO_2 to extract additional crude oil from producing wells. The majority of EOR activity is in the Permian Basin covering west Texas and southeastern New Mexico, and almost all of the CO_2 used there comes from large, high purity, geological CO_2 reservoirs in the same area. Projects that use anthropogenic CO_2 for EOR exist, or are under development, in Wyoming, Saskatchewan, and west Texas.[8] The best candidates for using captured CO_2 industrially include:

- Feedstock for urea yield-boosting

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[7] International Energy Agency (IEA, "Technology Roadmap: Carbon Capture and Storage," 2013. Pages 16-17.

[8] NETL, "Carbon Dioxide Enhanced Oil Recovery: Untapped Domestic Energy Supply and Long Term Carbon Storage Solution," March 2010.

- Working fluid for enhanced geothermal systems (EGS)
- Feedstock for polymer processing
- Algae cultivation
- Feedstock for carbonate mineralization
- Concrete curing
- Bauxite residue carbonation
- Feedstock for liquid fuel production
- Enhanced coal bed methane recovery (ECBM)

Of these, only urea yield-boosting is considered a mature technology that is already applied on a large scale, and has the potential for significant growth in the short term.[9]

In summary, CO_2 capture, transporting captured CO_2 by pipeline, and using captured CO_2 industrially for EOR or urea yield-boosting are considered technically feasible. Geological storage of captured CO_2 is considered technically infeasible based on the lack of viable commercial availability.

2.7.3 Rank Technically Feasible Alternatives

In Step 3, the remaining alternatives that have not been removed from consideration due to technical infeasibility are ranked, starting with the most effective. The March 2011 Guidance says that "to best reflect the impact on the environment, the ranking of control options should be based on the total CO_2e rather than the total mass or mass for the individual GHGs. Before ranking all feasible control alternatives from the previous section, the effectiveness of each on a CO_2e basis is discussed.

2.7.3.1 Energy Efficient Design and Operation

The proposed project would operate in a manner that minimizes emissions of all pollutants, and maximizes the energy derived from the fuel consumed. Thus, these measures, in combination, are considered the baseline from which all other alternatives will be evaluated, and it is assumed that all other options would be applied in addition to these measures.

2.7.3.2 Carbon Capture and Sequestration

A CCS system is comprised of three parts: (1) capturing CO_2, (2) transporting the captured CO_2, and (3) using the CO_2 for EOR or in some other viable industrial process. The effectiveness of the system to reduce CO_2 emissions is determined by the removal rate of CO_2 from the flue gas, and degree to which the CO_2 is retained while being transported and stored. Currently available technology can capture approximately 90 percent of the post-combustion CO_2 in flue gas. However, due to the considerable energy requirements for the capture and compression of the CO_2, additional electrical power, generated either on- or off-site, would be needed. Assuming 90 percent of the additional CO_2 created to generate that electricity would also be captured, the net CO_2 reduction would be less than 90 percent.

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[9] Global CCS Institute, "Accelerating the Uptake of CCS: Industrial Use of Captured Carbon Dioxide," March 2011.

Transport of CO_2 by pipeline is a mature technology, and expected losses of CO_2 in a pipeline would be minimal. Monitoring of closed wells that used EOR suggests that all injected CO_2 is retained within the subsurface formation, so no reduction in the effectiveness of the CCS system would be expected.[10] A study of a urea yield-boosting operation that used captured CO_2, was found to emit approximately 2.27 tons CO_2e for each ton of CO_2 used.[11]

2.7.3.3 Ranking GHG Control Alternatives by Effectiveness

Below is a ranking of the technically feasible GHG control alternatives, starting with the most effective, on a CO_2e basis:

•Carbon Capture and Sequestration – 80-90 percent reduction in emitted CO_2e

•Energy Efficient Design and Operation – Baseline

2.7.4 Evaluate Economic, Energy, and Environmental Impacts

CCS is the only control alternative not considered a baseline control strategy.

As discussed in Step 3, CCS systems require additional energy to remove CO_2 from the boiler flue gas, as well as to compress it for transport and storage. The additional energy required to compress the captured CO_2 would necessitate increasing the energy footprint of the proposed project by between 40 and 60 percent, which would increase criteria and GHG emissions.

Most cost information related to CCS technology focuses on fossil fuel (particularly coal) combustion, natural gas processing, and syngas production operations. U.S. Department of Energy analyses indicate that application of post-combustion CO_2 capture technology to a new 550 MWe net output coal-fired power plant would cost approximately $86 per ton of CO_2 avoided.[12] A study by the Global CCS Institute estimates that cost of avoided CO_2 emitted by a pulverized coal power plant with a first-of-its-kind CCS system would range between $62 and $81 per tonne.[13] For comparison, the cost of naturally-sourced CO_2 used for EOR is between $10 and $15 per tonne.[14] There is no existing or planned EOR market in the vicinity of the project, and no existing pipeline to deliver captured CO_2 to such a market. Even if such a market or

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[10] NETL, "Carbon Dioxide Enhanced Oil Recovery: Untapped Domestic Energy Supply and Long Term Carbon Storage Solution," March 2010.

[11] Global CCS Institute, "Accelerating the Uptake of CCS: Industrial Use of Captured Carbon Dioxide," March 2011.

[12] National Energy Technology Laboratory (NETL), "Cost and Performance Baseline for Fossil Energy Plants – Volume 1: Bituminous Coal and Natural Gas to Electricity, Revision 2," November 2010. DOE/NETL-2010/1397. Page 300.

[13] Global CCS Institute, "Economic Assessment of Carbon Capture and Storage Technologies," 2011.

[14] NETL, "Carbon Dioxide Enhanced Oil Recovery: Untapped Domestic Energy Supply and Long Term Carbon Storage Solution," March 2010.

pipeline were available to receive CO_2 captured from the proposed boilers, the captured CO_2 could not compete with naturally-available CO_2.

The considerable monetary and energy requirements of a CCS system suggest unacceptable economic, energy, and environmental impacts. The increased energy requirements would result in additional emissions of all pollutants other than CO_2, and, therefore, CCS systems have an negative collateral environmental impact as well. As a result, CCS systems are removed from consideration as BACT for GHGs emitted by the proposed boilers.

Utilizing efficient boiler design, and operating the boilers to produce the most steam or heat per unit of fuel combusted are control techniques that have been incorporated into the Facility design. As stated previously, these options are considered the baseline for the BACT analysis, and all have a positive energy, environmental, and, most likely, economic impact. All other GHG reduction options were considered to be applied over and above these baseline options. To date, the vast majority of, if not all, projects that involve combustion have considered these baseline options to be BACT for GHG emissions.

2.7.5 Selection of BACT for GHGs

Based on the analysis presented above, Tesoro-Savage proposes that BACT for GHGs from the natural gas-fired boilers and process heaters is energy-efficient system design and operation, and proper combustion practices.

3 MARINE VESSEL LOADING BACT ANALYSIS

Crude oil will be transferred from the facility to vessels. During the loading process, vapors present in the tank before loading began will be displaced by the crude oil entering the tank, and some of the crude oil will volatilize as it is being loaded. To comply with US Coast Guard regulations (33 CFR 154 Subpart E), these vapors must be captured and diluted, enriched, or inerted.

Dilution is seldom used because the quantity of air that must be added to the vapors to achieve a mixture that is below 30 percent of the lower flammability limit is so large that the total flow is unreasonably large. Inerting systems will be used on each vessel loaded at the facility.

Pollutant emissions from marine vessel loading are expected to include VOCs, TAPs, and a single GHG, CH_4.

3.1 Identify Commercially-Available Emission Reduction Alternatives

The federal RBLC database, facility permits, and other sources were reviewed to identify commercially-available alternatives to reduce emissions from marine vessel loading operations. indicates that emission reduction alternatives include:

- Volatility reduction
- Vapor balancing
- Vapor recovery units (VRU)
- Marine vapor combustion units (MVCU)

3.2 Eliminate Technically Infeasible Alternatives

Reducing the volatility of crude oil is simple in concept, but difficult in practice. It would involve heating the oil to remove volatile components at some point prior to loading, then storing and transporting the oil in pressure vessels. Even if the facility (or any other upstream entity) were to employ such a system, the various vessels arriving to transport the crude oil would not be equipped with pressure vessels to receive the oil. Volatility reduction is technically infeasible, and is removed from consideration.

Vapor balancing is frequently used when tank trucks are loading underground tanks, where the vapors displaced from the underground tank are retrieved by the tank truck and returned to the loading terminal. However, vapor balancing is typically not used for marine loading because the on-shore source of the crude (i.e., railcars or tanks equipped with floating roofs) is not able to accept vapors from the vessel. Even if the shore-side vessel were properly equipped to receive the vapors, the temperatures of the supplying and receiving vessels may be different, which could pressurize or create a vacuum in one or both of the vessels. Also, vapors that remain from the previous contents of the marine vessel could potentially contaminate the on-shore vessel. For these reasons, vapor balancing is technically infeasible, and is removed from consideration.

Vapor combustion units and vapor recovery units are frequently used for various types of petroleum product loading to marine vessels, and are considered technically feasible.

3.3 Ranking of Remaining Alternatives

In top-down order of decreasing stringency, the feasible VOC,TAP, and CH_4 controls are listed with the approximate control efficiency achieved by each technology:

- MVCU – 99 percent control or greater
- VRU – 99 percent control or greater (less than 50 percent control of CH_4)

3.4 Consideration of Energy, Environmental and Cost Factors

Although a VRU was investigated, this technology provides less than 50 percent control of CH4, a greenhouse gas. Furthermore, the technology relies on carbon to reduce hydrocarbon emissions; the carbon must be replaced periodically at considerable expense.

The Facility is designed to employ a MVCU system to reduce VOC, TAP, and CH_4 emissions. Because this is the most effective alternative, no additional evaluation of energy, environmental, or cost is necessary.

Combustion of CH_4 produces CO_2, also a GHG, but the increase in mass (the molecular weight of CO_2 is approximately 44, versus 16 for CH_4) is outweighed by the greater global warming potential (GWP) of CH_4 (21) versus CO_2 (1). Thus, destruction of CH_4 in favor of CO_2 results in a net reduction in GHG emissions on a CO_2e basis.

3.5 Proposed BACT Limits and Control Option

Based on the analysis presented above, Tesoro-Savage proposes that BACT for reducing VOC, TAP, and GHG emissions from the proposed marine vessel loading operations is the use of a MVCU system, designed and operated to achieve maximum destruction of VOCs, TAPs, and CH_4.

4 MARINE VAPOR COMBUSTION UNIT BACT ANALYSIS

Vapors displaced from vessels as they are filled with crude oil will consist primarily of hydrocarbons. Assist-gas is added to the vapor as needed to ensure good combustion efficiency during certain times that the vessels are being loaded . All vapors, including any additional gas, will be collected and routed to a marine vapor combustor unit (MVCU) for safe disposal. Pollutant emissions from the MVCU are expected to include NO_X, PM (including PM_{10} and $PM_{2.5}$), CO, SO_2, VOCs, TAPs, and GHGs. GHG emissions are limited to the three GHG gases associated with combustion (CO_2, CH_4, and N_2O).

4.1 Identify Commercially-Available Emission Reduction Alternatives

A broad review of permitted MVCUs, thermal oxidizers (TOs), and flares included in the federal RBLC database indicates that emission reduction alternatives are limited to:

- Good combustion practices
- Proper design and operation
- Use of gaseous fuels and/or pipeline natural gas

The MVCU is primarily a safety device, and secondarily a pollution control device. By combusting the displaced vapors using a MVCU, loading operations will comply with US Coast Guard safety requirements in 33 CFR 154 Subpart E. Pollutant emissions from the MVCU fall into two categories: 1) vapors, typically VOCs, that escape the MVCU without being destroyed as intended; and 2) combustion products of the destroyed vapors and any supplemental fuel used to ensure sufficient flame temperature. Proper design and operation of the MVCU are intended to minimize the quantity of vapors that escape destruction. Good combustion practices, and the use of clean, gaseous fuel, are intended to minimize the production of criteria pollutant emissions and N_2O, and to minimize net GHG emissions (i.e., on a CO_2e basis) by ensuring complete conversion of all CH_4 to CO_2.

In most cases, the VOC stream that a given MVCU, TO, or flare controls is of variable composition and concentration. As a result, the associated burner must be designed to handle a wide range of combustion conditions, and cannot be optimized. In contrast, gas-fired burners associated with boilers or process heaters can be designed to minimize specific pollutants, such as NO_X or CO. While NO_X emissions vary among MVCU, TO, and flare combustor designs, none can utilize a true "Low-NO_X burner" design similar to a boiler or process heater.

NO_X emissions associated with MVCU, TO, and flare designs are typically in the range of 20 to 40 ppmvd. BACT for current Low-NO_X burner designs associated with small (i.e., less than 100 MMBtu/hr) natural gas-fired boilers is typically in the range of 9 to 11 ppmvd. When a MVCU, TO, or flare manufacturer or vendor says their product incorporates a "Low-NO_X burner," the burner in question does not incorporate the same technology as a burner intended for use in a boiler, and will not achieve the same NO_X emission rate. For purposes of this BACT analysis, minimizing NO_X emissions while maintaining an acceptable destruction efficiency is considered part of "good combustion practices, and "Low-NO_X burner" is not considered an available technology for the proposed MVCU.

4.2 Eliminate Technically Infeasible Alternatives

Because no pollutant-specific emission reduction alternatives were identified, all pollutants will be considered together in this and the following sections.

The emission reduction alternatives identified in the previous section are all considered technically feasible for MVCUs.

4.3 Ranking of Remaining Alternatives

Good combustion practices, proper design and operation, and use of pipeline natural gas are all considered baseline controls for MVCUs; therefore, it is not possible to rank the remaining alternatives.

4.4 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to use the most effective alternatives, no evaluation of energy, environmental, or cost was conducted.

4.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for reducing criteria pollutant, TAP, and GHG emissions from the proposed MVCU is achieved by implementing good combustion practices, proper design and operation, and use of pipeline natural gas as an assist gas and for pilot flames.

5 CRUDE OIL STORAGE TANK BACT ANALYSIS

The proposed project will include an onsite tank farm, which will store crude oil delivered by railcar when a ship or barge is not available for loading. The tank farm will consist of up to six storage tanks, each approximately 240 feet in diameter, 48 feet tall, and with a maximum storage capacity of approximately 360,000 barrels. Two of the six tanks will be heated with steam from an onsite boiler, as needed, to control the viscosity of certain crude oil during loading and unloading.

Fugitive emissions are expected to occur due to evaporative loss of crude oil during storage and as a result of changes in the level of oil in the tanks. Pollutant emissions from the tanks are expected to include VOCs, TAPs, and a single GHG, CH_4. For purposes of this BACT analysis, a maximum annual throughput of 131.4 million barrels per year was assumed.

5.1 Identify Commercially-Available Emission Reduction Alternatives

Tanks constructed after July 23, 1984 are subject to the requirements of the NSPS for Volatile Organic Liquid Storage Vessels (40 CFR Part 60 Subpart Kb). As stated in Section 1.3, EPA guidance indicates that a BACT determination can be no less stringent than the applicable NSPS requirements. A review of NSPS Subpart Kb and of permitted oil storage tanks included in the federal RBLC database indicates that emission reduction alternatives for petroleum storage tanks include:

- Fixed-roof tank operated under pressure
- Fixed-roof tank with an internal floating roof with primary and secondary seals, and a closed vent system routed to a process or fuel gas system or a control device (e.g.,

thermal oxidizer or carbon adsorber assumed to be at least 95 percent effective at reducing VOCs and no more than 50 percent effective at reducing CH_4)

- Fixed-roof tank with an internal floating roof with primary and secondary seals
- External floating roof tank with primary and secondary seals
- Fixed-roof tank

The RBLC findings are summarized in Table 5-1.

Table 5-1 Summary of VOC BACT Determinations for Crude Oil Tanks from the RBLC

Facility	State	Date Permitted	Equipment	BACT
ConocoPhillips Wood River Refinery	IL	8/5/2008	2 crude oil tanks - 11,000,000 gal ea.	Internal floating-roof tanks with secondary seals to comply with 40 CFR 60 Subpart Kb & 40 CFR 63 Subpart CC
Marathon Petroleum Garyville Refinery	LA	9/23/2006	12 crude oil tanks - 21,000,000 gal ea.	External floating-roof tanks that comply with 40 CFR 63 Subpart CC
Arizona Clean Fuels Yuma	AZ	9/15/2006	7 crude oil tanks - 7,560,000 gal ea.	Internal floating-roof tanks with closed-vent system routed to thermal oxidizer
Valero Refining - St. Charles Refinery	LA	2/5/2005	51 heavy materials tanks - 2,100 to 425,000 bbl ea.	Fixed-roof tanks, comply with 40 CFR 63 Subpart CC

5.2 Eliminate Technically Infeasible Alternatives

While some petroleum products (i.e., those that are gases at atmospheric pressure) are stored in pressure vessels, crude oil typically is not; a fixed-roof tank operated under pressure is considered technically infeasible, and is removed from further consideration. The facility will not include a process or fuel gas system, therefore, a closed vent system could not be routed to such a system, and that alternative is removed from consideration. While use of a fixed-roof tank is technically feasible, BACT cannot be less stringent than the applicable NSPS, and 40 CFR 60 Subpart Kb (Standards for Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984) does not include the use of fixed-roof tanks as an alternative. All other emission reduction alternatives identified in the previous section are considered technically feasible for controlling emissions from oil storage tanks.

5.3 Ranking of Remaining Alternatives

In top-down order of decreasing stringency, the feasible VOC control alternatives are listed:

- Fixed-roof tank with an internal floating roof with primary and secondary seals and vapor collection system routed to a control device (e.g., thermal oxidizer or carbon adsorber system assumed to be at least 95 percent effective at reducing VOCs, and no more than 50 percent effective at reducing CH_4) – 95.3 percent reduction
- Fixed-roof tank with an internal floating roof with primary and secondary seals – 5.4 percent reduction

- External floating roof tank with primary and secondary seals – baseline

Emission reductions were calculated using USEPA's TANKS 4.0.9d program.

5.4 Consideration of Energy, Environmental and Cost Factors

The most stringent alternative is a fixed-roof tank with an internal floating roof with primary and secondary seals and vapor collection system routed to a control device (e.g., thermal oxidizer or carbon adsorber system assumed to be at least 95 percent effective at reducing VOCs). Based on review of the RBLC and other issued permits, it appears that this alternative has been determined to be BACT for a single permitted facility, Arizona Clean Fuels Yuma, which was first permitted in April 2005, and then again in September 2006. The facility has never been constructed.

The Arizona Department of Environmental Quality (ADEQ), which issued the permits to Arizona Clean Fuels Yuma, determined that the adverse economic impacts associated with a thermal oxidizer would be less than those of a recovery-based control device (e.g., carbon adsorber). ADEQ also determined that energy impacts associated with a thermal oxidizer system were quantifiable but insignificant, environmental impacts involved increases in NO_X and CO emissions in exchange for greater VOC reductions, and economic impacts were calculated to be a cost-effectiveness of approximately $17,000 per ton of VOC emission reduction. Because crude oil emits a relatively small amount of CH_4, adding CH_4 emissions to the cost-effectiveness calculations will not appreciably change the result.

In summary, the control of crude oil storage tanks with a thermal oxidizer has not been achieved in practice, no other BACT determination since the Arizona Clean Fuels Yuma permits were issued has concluded that such a system represents BACT for crude oil storage tanks, and $17,000 per ton of VOC and GHG controlled is cost-prohibitive in terms of cost per ton abated. In light of these facts, the use of a thermal oxidizer to control VOC emissions from the proposed tanks is removed from consideration.

5.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that BACT for VOC, TAP, and GHG emissions from the proposed crude oil storage tanks is the use of properly designed and operated internal floating-roof tanks with primary and secondary seals. Tesoro-Savage believes that emission rate limits are not appropriate for a fugitive source, and, therefore, does not propose any such limits as BACT.

6 COMPONENT LOSSES BACT ANALYSIS

The Facility will include piping, valves, connectors, pumps, and other components to transfer crude oil from railcars to tanks, and from tanks to vessels. All components are subject to minute vapor leakage, and fugitive VOC, TAP, and GHG (only CH_4) emissions are expected to occur when components are in service.

6.1 Identify Commercially-Available Emission Reduction Alternatives

A broad review of permitted operations included in the federal RBLC database and other permitted sources indicates that fugitive emissions from leaking petroleum service components are reduced through a combination of proper equipment selection and a leak detection and repair (LDAR) program. Identified alternatives include:

- Use of components using leakless technology
- Implementation of an LDAR program

LDAR programs involve periodic monitoring of components with a hydrocarbon analyzer, identification of components that leak above the leak definition levels specified in the equipment leak standard, and subsequent repair of the leaking components. LDAR programs are frequently defined by regulations; those deemed to represent BACT for other facilities permitted in the past ten years that were found in the RBLC include:

- 40 CFR 63 Subpart H (National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks)
- 40 CFR 63 Subpart CC (National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries)
- 40 CFR 63 Subpart UU (National Emission Standards for Equipment Leaks—Control Level 2 Standards)
- 40 CFR 60 Subpart VVa (Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006)
- 40 CFR 60 Subpart GGGa (Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006)
- 40 CFR 61 Subpart V (National Emission Standard for Equipment Leaks (Fugitive Emission Sources))
- Louisiana Refinery MACT (Louisiana Administrative Code §2121, §2122, and Chapter 51)

The RBLC findings are summarized in Table 6-1.

Table 6-1 Summary of BACT Determinations for Component Losses from the RBLC

Facility	State	Date Permitted	BACT Determination
Valero Refining - St. Charles Refinery	Louisiana	11/17/2009	LA Refinery MACT, 40 CFR 63 Subpart H, 40 CFR 61 Subpart V
Sunoco Toledo Refinery	Ohio	2/23/2009	40 CFR 63 Subpart CC, 40 CFR 60 Subparts VV & GGG
Marathon Petroleum Garyville Refinery	Louisiana	12/27/2006	40 CFR 63 Subpart CC, 40 CFR 60 Subpart GGG, LA Refinery MACT
ConocoPhillips Wood River Refinery	Illinois	8/5/2008	40 CFR 63 Subpart H
Arizona Clean Fuels Yuma	Arizona	4/14/2005	40 CFR 63 Subpart H[1]

1 In addition, the following leak definitions have been included: 100 ppmv for valves and connectors in gas/vapor and light liquid service and 500 ppmv for all other components. All pumps must be equipped with a shaft sealing system that prevents or detects emissions of VOC from the seal. All compressors must be equipped with a seal system that includes a barrier fluid system that prevents leakage of process fluid to the atmosphere. Other requirements exist for other connector types and valves. The percent of leaking components cannot exceed the following: 1.0% for pumps in light liquid service and compressors on a source-wide basis, 1.0% for the total number of pressure relief devices on a source-wide basis, 0.3% for total number of connectors in gas/vapor service and connectors in light liquid service on a source-wide basis, 0.3% of the total number of valves in gas/vapor service and valves in light liquid service on a source-wide basis, and not more than 0.025% of valves in gas/vapor service and valves in light liquid service shall be leaking with a concentration in excess of 10,000 ppmv.

6.2 Eliminate Technically Infeasible Alternatives

Proper equipment selection and implementing an LDAR program based on any of the regulations identified in the previous section are considered technically feasible for reducing fugitive VOC, TAP and GHG emissions from component leaks.

6.3 Ranking of Remaining Alternatives

There are many LDAR programs available, some codified in regulations (e.g., NSPS, NESHAP, etc.), some developed by state agencies for consent decrees, and others developed by industry groups. Some of the non-regulatory alternatives include:

- Remote sensing technology
- Enhanced LDAR standards
- Audio/visual/olfactory methods

The effectiveness of these alternative programs have not been quantified, but none are thought to be any more effective than a regulatory LDAR program which includes implementation of EPA Method 21 (Determination of Volatile Organic Compound Leaks). All of the regulations identified in the previous section that require implementation of a formal LDAR program include Method 21.

A comparison of fugitive component emissions regulations compiled by the Louisiana Department of Environmental Quality (LDEQ) is provided in Table A-2. Taken as a whole, the requirements of 40 CFR 63 Subpart H are the most stringent. Implementation of an LDAR program and proper equipment selection are considered baseline alternatives, so there is no ranking.

6.4 Consideration of Energy, Environmental and Cost Factors

Because Tesoro-Savage proposes to use the most effective alternatives, no evaluation of energy, environmental, or cost was conducted.

6.5 Proposed BACT Limits and Control Option

Tesoro-Savage proposes that implementation of an LDAR program that meets the requirements of 40 CFR 63 Subpart H represents BACT for VOC, TAP, and GHG component leaks at the Facility. Tesoro-Savage believes that emission rate limits are not appropriate for a fugitive source, and, therefore, does not propose any such limits as BACT. It should be noted that the proposed facility is not subject to the requirements of Subpart H as a result of the regulatory applicability criteria, but would meet the requirements of the rule, as appropriate, because it represents the most stringent implementation of an LDAR program.

7 EMERGENCY FIRE WATER PUMP ENGINE BACT ANALYSIS

7.1 Process Description

Three pumps powered by nominal 225 hp diesel engines will be installed to provide water for fire suppression . Other than plant emergency situations, the engine will be operated less than 100 hours per year for routine testing, maintenance, and inspection purposes.

The fire pump engines will emit criteria and GHG pollutants associated with diesel engines. Although the engine make and model have not yet been specified, the engines will comply with the emission standards for stationary fire pump engines in 40 CFR Part 60 Subpart IIII (Stationary Compression Ignition Reciprocating Engine NSPS).

7.2 NO_X BACT

7.2.1 Available Control Technologies and Technical Feasibility

There are a limited number of technically-feasible NO_X control technologies that are commercially available for internal combustion engines. Two general types of control options have emerged as technically feasible: combustion process modifications, and post combustion controls. In practice, the high temperature and relatively low volumetric flow of the engine exhaust eliminates post-combustion controls from consideration. Table A-3 summarizes recent BACT determinations for internal combustion engines.

7.2.1.1 Combustion Process Modifications

This option is incorporated in the engine design. Typical design features include electronic fuel/air ratio and timing controllers, pre-chamber ignition, intercoolers, and lean-burn fuel mix. Currently available new engines include these features as standard equipment; accordingly this measure is deemed the baseline case for purposes of the BACT analysis.

7.2.1.2 Selective Catalytic Reduction (SCR)

In this technology, nitrogen oxides are reduced to gaseous nitrogen by reaction with ammonia in the presence of a supported precious metal catalyst. The SCR system includes a catalyst module downstream of the engine exhaust. Just upstream of the catalyst, a reagent liquid (typically ammonia or urea solution) is injected directly into the exhaust stream. The method is considered feasible with lean-burn internal combustion engines.

7.2.1.3 Non-Selective Catalytic Reduction (NSCR)

Similar to automobile catalytic converters, this method employs noble metal catalysts to oxidize nitrogen oxides to molecular nitrogen. It operates in regimes with less than four percent oxygen in the exhaust, which corresponds to fuel-rich operation. The method is not feasible with lean-burn internal combustion engines.

7.2.2 Energy and Environmental Considerations

There are several distinguishing factors between the two technically-feasible options with regard to energy and environmental impacts. One drawback associated with SCR systems is the environmental risk of handling and using ammonia reagent solutions. Most SCR catalyst modules can operate well without excess reagent. However, this requires particular attention to the controlled injection of the reagent in response to changes in load, temperature, and other parameters. Absent an emergency situation, the proposed fire pump engines will only operate infrequently for brief testing and maintenance checks (Subpart IIII limits these checks to 100 hours per year). These short, transient operating periods significantly reduce the effectiveness of the post-combustion controls.

Further, it should be assumed that ammonia emissions associated with SCR operation will occur under some or all operating conditions. This represents an additional air pollutant that is not emitted when SCR is not used for these engines. Also, the handling and storage of substantial volumes of the required ammonia or urea reagent solutions can pose an additional safety risk to facility personnel, and the risk of environmental harm in the event of an accidental release.

The SCR catalyst requires periodic cleaning due to fouling of the surfaces due to the presence of trace contaminants, such as sulfur compounds, particulate, and organic species. This requirement generates a secondary waste stream of contaminated cleaning solutions that must be disposed as hazardous waste.

When SCR or any add-on emission control technology is used, additional auxiliary equipment such as pumps and motors must be added. Also, the presence of the catalyst module adds an increment of pressure drop to the exhaust train. To avoid a substantial drop-off in engine performance, the SCR modules must be designed to minimize the increase in back pressure. However, the energy requirements of auxiliary equipment and even minor back-pressure increases reduce the net energy efficiency of the plant. In contrast, the implementation of combustion process controls does not require an add-on system with increased energy use by auxiliary equipment, or the use of catalyst and ammonia materials. There is some additional complexity in the engine controls for this option. Proper engine tuning and fuel/air ratio is needed across the full load range to achieve reduced emissions while avoiding a reduction in engine efficiency. The automatic fuel/air ratio controller helps accomplish this objective.

7.2.3 Ranking of Control Options

With regard to NO_X emission abatement, the ranking of the technically-feasible options is straightforward. The use of SCR offers the highest potential level of control for the proposed diesel-fired emergency engines. Up to 90 percent reduction in NO_X mass emission at all load levels is claimed for typical internal combustion engines.

The option offering the next highest control level is combustion process modifications, as would be implemented as standard equipment (i.e. no additional cost) in the selected engines. Advanced combustion design allows the engines to operate at rated horsepower, while burning an optimized fuel mix. This feature includes ignition timing retard to reduce cylinder temperatures for lean mixtures. The controls are also designed to optimize the air/fuel ratio and ignition timing in response to actual operating conditions.

7.2.4 Economic Analysis for Controls

Since advanced NO_X controls is a standard feature of the currently available new engines, the emissions reported by vendors for this package are taken as the base case in this BACT analysis. Addition of SCR is then analyzed as the next incremental control technology, in terms of both control level and cost.

The annualized operating costs for addition of SCR to the fire water pump engine would be about $44,000 per year. The estimated total capital investment is almost $127,000, based on purchased equipment cost estimates. Capital recovery is the single largest annual expense, based on 7 percent prevailing interest rate, and 10-year service period. Additional maintenance charges are also encountered for operation of the systems and annual catalyst cleaning. This investment would provide about 0.11 tons of NO_X reduction per year, assuming 90 percent emission control

efficiency. Cost-effectiveness is more than $385,000 per ton, which represents a prohibitively high cost for this BACT option (see attached calculations).

7.2.5 Proposed BACT

A cost effectiveness analysis has shown that use of SCR is cost prohibitive as a more-stringent control for the proposed fire water pump engines. The proposed BACT for these engines is the suite of combustion modifications supplied as standard equipment with the candidate types of engines which enable the manufacturer to certify the engine under Subpart IIII. As required by Subpart IIII, non-emergency hours of operation would be limited to 100 hours per year.

7.3 CO and VOC BACT

As for NO_X, CO and VOC emissions for the proposed fire water pump engines would be certified by the manufacturer to achieve the applicable standards in Subpart IIII, and would be operated no more than 100 hours per year in a non-emergency mode, as required by Subpart IIII.

7.3.1 Technically-Feasible Controls

For CO emissions, the commercially available control means for IC engines are:

Combustion Process Modifications - This option is implemented in the design of the internal combustion engine. Typical design features include an electronic fuel/air ratio control and ignition retard, turbocharging, intercoolers, and lean-burn fuel mix. Currently available engines include these features as standard equipment, so these measures are used as the base case for the BACT cost-effectiveness analysis.

Catalytic Oxidation – This control technology employs a module containing an oxidation catalyst that is located in the exhaust path of the engines. In the catalyst module, CO and VOCs diffuse through the surfaces of a ceramic honeycomb structure coated with noble metal catalyst particles. Oxidation reactions on the catalyst surface forms carbon dioxide and water. Typical vendor indications are that 95 percent reduction in CO and 50 percent reduction in VOC emissions should be achieved.

7.3.2 Cost Effectiveness Analysis

Given the low number of routine operating hours per year, the cost of catalytic oxidation for CO and VOC control will be prohibitive. The estimated annualized cost to add catalytic oxidation to the fire water pump engines is approximately $30,300. This investment would reduce CO and VOC emissions by 0.013 and 0.0017 tons per year, respectively, assuming a 95 percent reduction in emissions and 100 hours per year of non-emergency operation. Cost effectiveness for this equipment would be more than $2,100,000 per ton of CO and VOC abated for the fire pump engines, which represents a prohibitively high cost for this BACT option.

7.3.3 Proposed BACT

Based on the cost effectiveness analysis for application of catalytic oxidation as a more-stringent increment of control, the proposed BACT for the fire pump engines is the suite of combustion modifications supplied by the manufacturer as standard equipment that enable the engine to meet the emission standards in Subpart IIII. Annual emissions would be limited by restricting non-emergency hours of operation to 100 hours per year as required by Subpart IIII.

7.4 SO_2 and PM BACT

The proposed fire pump engines will use ultra-low sulfur diesel (ULSD) fuel which has a sulfur content of no more than 0.0015 percent (15 ppm) by weight. Given the low emission rates expected as a result of using ULSD fuel, there are no available technologies beyond good combustion controls that are considered to provide feasible or cost effective emission control. Use of engines certified by manufacturers to meet Subpart IIII emission standards, use of ULSD fuel, and limitation of non-emergency operation to no more than 100 hours per year (as required by Subpart IIII) will provide low emissions of SO_2 and PM, and are proposed as BACT measures for these pollutants.

7.5 GHG BACT

The proposed facility design includes a diesel-fueled air compressor, emergency generator, and firewater pump. These three units are emergency equipment, and, therefore, planned operation will be restricted to 34 hours per year testing and maintenance.

7.5.1 Identify Available Control Alternatives

The first step of a top-down BACT analysis is to identify all available pollutant reduction options. Options typically fall into three categories: inherently low-emitting processes, clean fuels, and add-on control technologies.

The purpose of the three diesel-fueled engines associated with the project is to provide quickly deployable sources of power that rely on an immediately available fuel source for use during emergency situations. The limited operation proposed for the engines under non-emergency conditions is solely intended to maintain the engines in proper working order to enable them to fulfill their emergency role should that become necessary.

Diesel engines are a well-developed technology with a long-standing reputation for reliability, and diesel fuel is a stable, easily stored source of energy. These qualities make a diesel engine the ideal candidate to supply the critical power needs of a facility when grid power is unavailable. While lower emitting processes and cleaner (i.e., lower carbon-containing) fuels undoubtedly exist, none offer the unique qualities that a diesel engine can provide for emergency power services. For this reason, no alternative processes or fuels are considered for this analysis. However, within the category of reliable diesel engines that provide sufficient power for the assigned task, use of the most efficient available model will result in the least GHG emissions.

GHG-reducing add-on technologies exist, and have been discussed at length in this document for application to natural gas-fired combustion units and process vents. Because the engines must be available quickly and reliably, add-on controls that complicate operation and potentially reduce engine readiness compromise the emergency role of the engines, and are therefore unacceptable for consideration as GHG-reducing technologies for emergency diesel engines.

7.5.2 Eliminate Technically Infeasible Alternatives

In the second step of a top-down BACT analysis, the available pollutant reduction options listed in Step 1 are considered, and, if found to be technically infeasible for the specific emission unit under review, eliminated.

Use of the most efficient diesel engine that is capable of reliably providing sufficient power in timely manner is a technically feasible means of limiting GHG emissions from the emergency diesel engines.

7.5.3 Rank Technically Feasible Alternatives

In Step 3, the remaining alternatives that have not been removed from consideration due to technical infeasibility, are ranked, starting with the most effective.

The only alternative considered is the use of the most efficient diesel engines that do not compromise the availability and rapid deployment of the engines for emergency duty.

7.5.4 Evaluate Economic, Energy, and Environmental Impacts

Because only one alternative is considered, there is no opportunity to compare and contrast the collateral impacts of competing technologies.

7.5.5 Selection of BACT

Based on the analysis presented here, Tesoro-Savage proposes that BACT for GHGs from the diesel-fueled engines used to power the emergency fire water pumps is the use of the most efficient engines capable of providing reliable and timely operation to fulfill the assigned emergency roles. At this evolutionary stage of the project, specific units have not yet been identified, but they will have a nominal maximum power output of approximately 225 hp or less.

TABLE 1
COST EFFECTIVENESS CALCULATIONS
Catalytic Oxidation System
Natural Gas-Fired 62 MMBtu/hr Boiler

Cost Item	Factor	Cost
Direct Costs		
Purchased Equipment Costs		
Catalytic Oxidizer[1,2]	A	265,105
Sales Tax[1]	0.03A	7,953
Purchased Equipment Cost (PEC)	B	273,058
Direct Installation Costs[1]		
Foundations & Supports	0.08B	21,845
Handling & Erection	0.14B	38,228
Electrical	0.04B	10,922
Piping	0.02B	5,461
Insulation for Ductwork	0.01B	2,731
Painting	0.01B	2,731
Direct Installation Cost		81,917
Total Direct Costs (DC)		354,975
Indirect Costs		
Installation[1]		
Engineering	0.10B	27,306
Construction & Field Expenses	0.05B	13,653
Contractor Fees	0.10B	27,306
Start-Up	0.02B	5,461
Performance Test	0.01B	2,731
Contingencies	0.03B	2,731
Indirect Installation		79,187
Total Indirect Costs (IC)		79,187
TOTAL CAPITAL INVESTMENT = DC + IC		**434,162**
Direct Annual Costs		
Operating Labor[1,4]		
Operator	0.25 hours/shift	9,661
Supervisor	15% of operator	1,449
Total Operating Labor		11,110
Maintenance[1,4]		
Labor	0.25 hours/shift	9,661
Materials	100% of maintenance labor	9,661
Replacement Catalyst Cost	1 catalyst bed every 4 years	16,533
Total Maintenance		19,321
Utilities[5]		
Electricity	23.8 kWh @ $0.05/kWh	10,405
Total Utilities		10,405
Total Direct Annual Costs (DAC)		**40,836**
Indirect Annual Costs		
Overhead[1]	60% of operating, supervisor, maintenance labor & materials	18,259
Administrative Charges[1]	0.02TCI	8,683
Property Taxes[1]	0.01TCI	4,342
Insurance[1]	0.01TCI	4,342
Capital Recovery Factor[6]	-----	0.1424
Capital Recovery1	(CRF)(TCI)	61,825
Total Indirect Annual Costs (IAC)		**97,450**
TOTAL ANNUAL COST = DAC + IAC		**138,286**
Total of CO & VOC emissions with good combustion practices	tons/yr	11.1
Total of CO & VOC emissions with catalytic oxidizer	tons/yr	1.6
Percent reduction from baseline		85%
Total emissions reduction	tons/yr	9.4
Cost per Ton Controlled	**$/ton**	**14,651**

[1] Costs were assumed using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001). The costs used were based on estimates for a Fixed-Bed Catalytic Oxidizer assuming no energy recovery

[2] The costs were also adjusted for inflation using an inflation rate of 40 percent (1999 to 2013), which was determined using a Consumer Price Index (CPI) Inflation Calculator provided by the Bureau of Labor Statistics (http://www.bls.gov/data/inflation_calculator.htm)

[3] Calalyst Replacement was assumed to take place every four years; cost was calcluated using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001), Section 3.2 (VOC Destruction Controls), Chapter 2 (Incineration), pages 2-34, 35, and 46; assumed a space velocity of 10,000 1/hr, and a catalyst cost of $650/ft3.

[4] Calculations assume 2,190 hours of operation per year, 8 hours per shift, assuming 0.5 hours per shift related to catalytic oxidizer with employees paid at the rate of $35.29 per hour (which is comparable to the wages paid for similar control equipment).

[5] The total utilities cost was caclulated using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001), Section 3.2 (VOC Destruction Controls), Chapter 2 (Incineration), pages 2-43 and 46. Assumed a pressure drop of 6 in H2O, and an electricity cost of $0.05/kWh

[6] The capital recovery factor was calculated assuming a 10-year equipment life and a 7% interest rate

TABLE 2
COST EFFECTIVENESS CALCULATIONS
Catalytic Oxidation System
Natural Gas-Fired 12.5 MMBtu/hr Boiler

Cost Item	Factor	Cost
Direct Costs		
Purchased Equipment Costs		
Catalytic Oxidizer[1,2]	A	118,012
Sales Tax[1]	0.03A	3,540
Purchased Equipment Cost (PEC)	B	121,552
Direct Installation Costs[1]		
Foundations & Supports	0.08B	9,724
Handling & Erection	0.14B	17,017
Electrical	0.04B	4,862
Piping	0.02B	2,431
Insulation for Ductwork	0.01B	1,216
Painting	0.01B	1,216
Direct Installation Cost		36,466
Total Direct Costs (DC)		158,018
Indirect Costs		
Installation[1]		
Engineering	0.10B	12,155
Construction & Field Expenses	0.05B	6,078
Contractor Fees	0.10B	12,155
Start-Up	0.02B	2,431
Performance Test	0.01B	1,216
Contingencies	0.03B	1,216
Indirect Installation		35,250
Total Indirect Costs (IC)		35,250
TOTAL CAPITAL INVESTMENT = DC + IC		**193,268**
Direct Annual Costs		
Operating Labor[1,4]		
Operator	0.25 hours/shift	9,661
Supervisor	15% of operator	1,449
Total Operating Labor		11,110
Maintenance[1,4]		
Labor	0.25 hours/shift	9,661
Materials	100% of maintenance labor	9,661
Replacement Catalyst Cost[3]	1 new catalyst bed every 4 years	3,766
Total Maintenance		19,321
Utilities[5]		
Electricity	5.45 kWh @ $0.05/kWh	2,389
Total Utilities		2,389
Total Direct Annual Costs (DAC)		**32,820**
Indirect Annual Costs		
Overhead[1]	60% of operating, supervisor, maintenance labor & materials	18,259
Administrative Charges[1]	0.02TCI	3,865
Property Taxes[1]	0.01TCI	1,933
Insurance[1]	0.01TCI	1,933
Capital Recovery Factor[6]	-----	0.1424
Capital Recovery1	(CRF)(TCI)	27,521
Total Indirect Annual Costs (IAC)		**53,511**
TOTAL ANNUAL COST = DAC + IAC		**86,331**
Total of CO & VOC emissions with good combustion practices	tons/yr	2.2
Total of CO & VOC emissions with catalytic oxidizer	tons/yr	0.3
Percent reduction from baseline		85%
Total emissions reduction	tons/yr	1.9
Cost per Ton Controlled	**$/ton**	**45,112**

[1] Costs were assumed using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001), Section 3.2 (VOC Destruction Controls), Chapter 2 (Incineration), page 2-38. The costs used were based on estimates for a fixed-bed catalytic oxidizer assuming no energy recovery

[2] The costs were also adjusted for inflation using an inflation rate of 40 percent (1999 to 2013), which was determined using a Consumer Price Index (CPI) Inflation Calculator provided by the Bureau of Labor Statistics (http://www.bls.gov/data/inflation_calculator.htm)

[3] Calalyst Replacement was assumed to take place every four years; cost was calcluated using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001), Section 3.2 (VOC Destruction Controls), Chapter 2 (Incineration), pages 2-34, 35, and 46; assumed a space velocity of 10,000 1/hr, and a catalyst cost of $650/ft3.

[4] Calculations assume 8.760 hours of operation per year, 8 hours per shift, assuming 0.25 hours per shift related to catalytic oxidizer with employees paid at the rate of $35.29 per hour (which is comparable to the wages paid for similar control equipment).

[5] The total utilities cost was caclulated using EPA Air Pollution Control Cost Manual - 6th Edition (EPA-452/B-02-001), Section 3.2 (VOC Destruction Controls), Chapter 2 (Incineration), pages 2-43 and 46. Assumed a pressure drop of 6 in H2O, and an electricity cost of $0.05/kWh

[6] The capital recovery factor was calculated assuming a 10-year equipment life and a 7% interest rate

TABLE 3
COST EFFECTIVENESS CALCULATIONS
Selective Catalytic Reduction System
Emergency Diesel Fire Pump 225 hp

Cost Item	Factor	Cost
Direct Costs		
Purchased Equipment Costs		
Selective Catalyst Reduction[1]	A	85,000
Sales Tax	0.03A	2,550
Purchased Equipment Cost (PEC)	B	87,550
Direct Installation Costs[2]		
Foundations & Supports	-----	-----
Handling & Erection	-----	-----
Electrical	-----	-----
Piping	-----	-----
Insulation for Ductwork	-----	-----
Painting	-----	-----
Direct Installation Cost	0.25B	21,888
Total Direct Costs (DC)		109,438
Indirect Costs		
Installation[2]		
Engineering	-----	-----
Construction & Field Expenses	-----	-----
Contractor Fees	-----	-----
Start-Up	-----	-----
Contingencies	-----	-----
Indirect Installation	0.20B	17,510
Total Indirect Costs (IC)		17,510
TOTAL CAPITAL INVESTMENT = DC + IC		**126,948**
Direct Annual Costs		
Operating Labor[3]		
Operator	34 hours/yr	1,200
Supervisor	15% of operator	180
Total Operating Labor		1,380
Maintenance[3]		
Labor	-----	-----
Materials	-----	-----
Total Maintenance	0.10B	8,755
Utilities[4]		
Electricity	1 kWh @ $0.05/kWh	2
Total Utilities		2
Catalyst Cost[5]		
Catalyst Replacement	Catalyst life > SCR Service Life	Negligible
Total Catalyst Cost	-----	-----
Miscellaneous[6]		
Performance Tests	-----	3,190
Record Keeping & Reporting	-----	1,039
Total Miscellaneous Costs		4,229
Total Direct Annual Costs (DAC)		**14,366**
Indirect Annual Costs		
Overhead[2]	60% of operating, supervisor, maintenance labor & materials	6,081
Administrative Charges[2]	0.02TCI	2,539
Property Taxes[2]	0.01TCI	1,269
Insurance[2]	0.01TCI	1,269
Capital Recovery Factor[7]	-----	0.1424
Capital Recovery[2]	(CRF)(TCI)	18,077
Total Indirect Annual Costs (IAC)		**29,236**
TOTAL ANNUAL COST = DAC + IAC		**43,602**
Total NOx emissions with good combustion practices	tons/yr	0.126
Total NOx emissions with SCR	tons/yr	0.0126
Percent reduction from baseline		90%
Total emissions reduction	tons/yr	0.113
Cost per Ton Controlled	**$/ton**	**385,217**

[1] Captial cost of equipment was taken from a quote for an SCR system to be applied to a diesel-fired engine from Johnson-Matthey.

[2] These factors were taken from Table 6-2 of the Alternative Control Techniques (ACT) Document - Internal Combustion NOx Part 1 & 2 dated 7-21-1997 (EPA-453/R-93-032)

[3] Calculations assume 34 hours of non-emergency operation per year, with employees paid at the rate of $35.29 per hour (which is comparable to the wages paid for similar control equipment).

[4] The total utilities cost was caclulated assuming 1 kWh electricity usage at a cost of $0.05/kWh to operate the ammonia pump.

[5] Because of the limited operation schedule for the generator, the initial catalyst charge would last for the projected service life of the unit.

[6] These miscellaneous costs are comparable to costs for similar functions for comparable control equipment.

[7] The capital recovery factor was calculated assuming a 10-year equipment life and a 7% interest rate

Table A-1 Recent RBLC Entries for Natural Gas-Fired Boilers Less Than 100 MMBtu/hr

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
FL-0335	09-05-12	Klauser Holding USA, Inc.	Suwannee County, FL	Boiler	46 MMBtu/hr	NO_X – 0.036 lb/MMBtu CO – 0.039 lb/MMBtu $PM_{10}/PM_{2.5}$ – 2 gr of s/100 scf SO_2 – 2 gr of s/100 scf VOC – 0.003 lb/MMBtu	LNB, FGR, GCP	BACT-PSD, Other Case-by-Case
NJ-0079	07-25-12	CPV Shore, LLC	Middlesex, NJ	Boiler	91.6 MMBtu/hr	NO_X – 0.01 lb/MMBtu CO – 0.038 lb/MMBtu $PM_{10}/PM_{2.5}$ – 0.005 lb/MMBtu SO_2 – 0.0018 lb/MMBtu VOC – 0.0015 lb/MMBtu	LSF, LNB, GCP	LAER, Other Case-by-Case, BACT-PSD
OH-0350	07-18-12	Republic Steel	Lorain, OH	Boiler	65 MMBtu/hr	NO_X – 0.07 lb/MMBtu CO – 0.04 lb/MMBtu PM_{10} – 0.0074 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC – 0.0054 lb/MMBtu	GCP	BACT-PSD
CA-1189	01-24-12	Petrorock – Tunnell Lease	Santa Barbara, CA	Boiler	2 MMBtu/hr	NO_X – 20 ppmvd @ 3% O_2	LNB	Other Case-by-Case
CA-1192	06-21-11	Avenal Power Center, LLC	Kings, CA	Auxiliary Boilers	37.4 MMBtu/hr	NO_X – 9 ppmvd CO – 50 ppmvd PM_{10} – 0.0034 gr/dscf	ULNB, LSF, Operational Restriction of 46,675 MMBtu/yr	BACT-PSD
CA-1185	06-07-11	Santa Barbara Airport	Santa Barbara, CA	Boiler	3 MMBtu/hr	NO_X – 12 ppmvd @ 3% O_2 CO – 100 ppmvd @ 3% O_2	GCP, FGR	Other Case-by-Case

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
LA-0246	12-31-10	Valero Refining – New Orleans, LLC	St. Charles, LA	Boiler	99 MMBtu/hr	NO_X – 0.04 lb/MMBtu CO – 0.082 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.026 lb/MMBtu VOC – 0.0054 lb/MMBtu	GCP	BACT-PSD
OR-0048	12-29-10	Portland General Electric	Morrow, OR	Boiler	91 MMBtu/hr	NO_X – 0.05 lb/MMBtu PM_{10} – 2.5 lb/MMcf	LNB, CF	BACT-PSD
MO-0082	10-05-10	Archer Daniels Midland	Audrain County, MO	Boiler	85.6 MMBtu/hr	VOC – 0.0055 lb/MMBtu	GCP	BACT-PSD
LA-0240	06-14-10	Flopam, Inc.	Iberville Parish, LA	Boiler	25.1 MMBtu/hr	NO_X – 9 ppmv CO – 0.037 lb/MMBtu PM_{10} – 0.005 lb/MMBtu VOC – 0.008 lb/MMBtu	ULNB, LSF, GCP	LAER (NO_X, VOC), BACT-PSD
CA-1191	03-11-10	City of Victorville	Victorville, CA	Auxiliary Boilers	35 MMBtu/hr	NO_X – 9 ppmvd CO – 50 ppmvd $PM_{2.5}$ – 0.2 gr/100 dscf	Restricted Hours of Operation (500), LSF	BACT-PSD
NV-0049	08-20-09	Harrah's Operating Company, Inc.	Clark County, NV	Boilers	14.3, 16.8, 24, 31.4, 33.5, and 35.4 MMBtu/hr	NO_X – 0.0353, 0.03, 0.0108, 0.0306, 0.0367, and 0.035 lb/MMBtu CO – 0.0705, 0.0173, 0.037, 0.0172, 0.0075, and 0.0073 lb/MMBtu PM_{10} – 0.0075, 0.0077, 0.0075, 0.0076, 0.0075, and 0.0076 lb/MMBtu SO_2 – 0.0006, 0.0042, 0.0006, 0.0006, 0.0006, and 0.0006 lb/MMBtu VOC – 0.0054 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD (NO_X, SO_2), Other Case-by-Case
NH-0015	02-27-09	Concord Steam Corp.	Merrimack County, NH	Auxiliary Boiler	76.8 MMBtu/hr	NO_X – 0.049 lb/MMBtu	LNB, FGR, Restricted Hours of Operation (700)	LAER

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
OK-0135	02-23-09	Pryor Plant Chemical Co.	Mayes County, OK	Boilers	80 MMBtu/hr	NO_X – 0.05 lb/MMBtu CO – 0.0825 lb/MMBtu PM_{10} – 0.00625 lb/MMBtu SO_2 – 0.0025 lb/MMBtu VOC 0.00625 lb/MMBtu	LNB, GCP	BACT - PSD
OK-0137	02-09-09	ConocoPhillips	Kay County, OK	Boilers	95 MMBtu/hr	NO_X – 0.036 lb/MMBtu CO – 0.04 lb/MMBtu	ULNB, GCP	BACT-PSD
OK-0129	01-23-09	AEC, Inc.	Mayes County, OK	Auxiliary Boiler	33.5 MMBtu/hr	NO_X – 0.07 lb/MMBtu CO – 0.15 lb/MMBtu SO_2 – 0.0009 lb/MMBtu VOC – 0.016 lb/MMBtu	LNB, LSF, GCP	BACT-PSD
MD-0040	11-12-08	Competitive Power Ventures, Inc.	Charles County, MD	Boiler	93 MMBtu/hr	NO_X – 0.011 lb/MMBtu CO – 0.02 lb/MMBtu $PM_{10}/PM_{2.5}$ – 0.005 lb/MMBtu VOC – 0.002 lb/MMBtu	LNB, FGR, LSF	LAER ($PM_{2.5}$, VOC), BACT-PSD
OH-0323	06-05-08	Titan Tire Corp.	Williams County, OH	Boiler	50.4 MMBtu/hr	NO_X – 0.049 lb/MMBtu CO – 0.082 lb/MMBtu PM_{10} – 0.0019 lb/MMBtu VOC – 0.0054 lb/MMBtu	None	BACT-PSD (NO_X, CO, VOC)
NV-0047	02-26-08	Nellis AFB	Clark County, NV	Boilers	6.5 MMBtu/hr (representative of 125 regulated units)	NO_X – 25 ppmvd @ 3% O_2 CO – 50 ppmvd @ 3% O_2 PM_{10} – 0.0077 lb/MMBtu SO_2 – 0.0015 lb/MMBtu VOC – 0.0062 lb/MMBtu	LNB, FGR, LSF	BACT-PSD (SO_2), Other Case-by-Case
MD-0037	01-28-08	Medimmune, Inc.	Frederick County, MD	Boilers/Heaters	29.4 MMBtu/hr	NO_X – 0.011 lb/MMBtu	ULNB	LAER
MN-0070	09-07-07	Minnesota Steel Industries, Inc.	Itasca County, MN	Boilers/Heaters	99 MMBtu/hr	NO_X – 0.0035 lb/MMBtu CO – 0.08 lb/MMBtu PM_{10} – 0.0025 gr/dscf	None	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
AL-0230	08-17-07	Thyssen-Krupp Steel and Stainless USA, LLC	Mobile County, AL	Boilers	64.9 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.04 lb/MMBtu PM_{10} – 0.0076 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0055 lb/MMBtu	ULNB, FGR	BACT-PSD
GA-0130	07-27-07	Kia Motors	Troup County, GA	Boilers	30 MMBtu/hr	NO_X – 30 ppm @ 3% O_2	LNB	BACT-PSD
AL-0231	06-12-07	Nucor Corp.	Morgan County, AL	Boiler	95 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.061 lb/MMBtu PM_{10} – 0.0076 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0026 lb/MMBtu	ULNB	BACT-PSD
OH-0309	05-03-07	Daimler Chrysler Corp.	Lucas County, OH	Boiler	20.4 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.083 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.0006 lb/MMBtu VOC -0.0054 lb/MMBtu	LNB, FGR	LAER (NO_X, VOC), BACT-PSD
MS-0085	01-31-07	Dart Container Corp., LLC	Clarke County, MS	Boiler	33.5 MMBtu/hr	VOC – 0.0055 lb/MMBtu	None	BACT-PSD
FL-0285	01-26-07	Progress Energy Florida (PEF)	Pinnellas County, FL	Auxiliary Boiler	99 MMBtu/hr	CO – 0.08 lb/MMBtu	LSF	BACT-PSD
FL-0286	01-10-07	Florida Power And Light Company	West Palm Beach County, FL	Auxiliary Boiler	99.8 MMBtu/hr	NO_X – 0.05 lb/MMBtu CO – 0.08 lb/MMBtu PM_{10}/SO_2 – 2 gr/100 scf	LSF	BACT-PSD
NV-0044	01-04-07	Harrah's Operating Company, Inc.	Clark County, NV	Boilers	35.4 MMBtu/hr	NO_X – 0.035 lb/MMBtu CO – 0.036 lb/MMBtu PM_{10} – 0.0075 lb/MMBtu SO_2 – 0.001 lb/MMBtu VOC -0.005 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	System Description	Maximum Production Rate	Limit(s)	Control Option	Basis
TX-0501	07-11-06	Texstar FS, LP	Henderson County, TX	Boiler	93 MMBtu/hr	NO_X – 0.090 lb/MMBtu CO – 0.076 lb/MMBtu PM_{10} – 0.0069 lb/MMBtu SO_2 – 0.00054 lb/MMBtu VOC -0.0049 lb/MMBtu	None	BACT-PSD
WA-0316	06-14-06	Northwest Pipeline Co.	Skagit County, WA	Boiler	4.19 MMBtu/hr	NO_X – 0.04 lb/MMBtu	GCP	BACT-PSD
CA-1128	05-16-06	Cottage Health Care	Santa Barbara County, CA	Boiler	25 MMBtu/hr	NO_X – 9 ppmv @ 3% O_2 CO – 50 ppmv @ 3% O_2	ULNB	BACT-PSD
NV-0048	05-16-06	Kern River Gas Transmission Co.	Clark County, NV	Boiler	3.85 MMBtu/hr	NO_X – 0.1 lb/MMBtu CO – 0.083 lb/MMBtu PM_{10} – 0.0078 lb/MMBtu SO_2 – 0.0015 lb/MMBtu VOC -0.005 lb/MMBtu	LSF, GCP	BACT-PSD (SO_2), Other Case-by-Case
NY-0095	05-10-06	Caithness Bellport, LLC	Suffolk County, NY	Auxiliary Boiler	29.4 MMBtu/hr	NO_X – 0.011 lb/MMBtu CO – 0.036 lb/MMBtu PM_{10} – 0.0033 lb/MMBtu SO_2 – 0.0005 lb/MMBtu	LNB, FGR, LSF, GCP	BACT-PSD
AR-0090	04-03-06	Nucor Steel	Mississippi, AR	Boilers	12.6 MMBtu/hr	NO_X – 0.075 lb/MMBtu CO – 0.084 lb/MMBtu PM_{10} - SO_2 - VOC -	LNB, GCP	BACT-PSD (except SO_2)
CA-1127	09-27-05	Genentech, Inc.	San Mateo County, CA	Boiler	97 MMBtu/hr	NO_X - CO -	ULNB	BACT-PSD
AK-0062	08-19-05	BP Exploration Alaska	North Slope Borough, AK	Reboiler	1.34 MMBtu/hr	NO_X - CO - SO_2 -	LSF, GCP	BACT-PSD

TABLE A-2. FUGITIVE EMISSIONS REGULATIONS COMPARISON TABLE

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Stream Applicability	> 5% VHAP by weight In organic HAP service > 300 hrs	> 5% VHAP by weight or as defined in the referencing Subpart	Elastomer Product Process Units	> 5% VHAP by weight In organic HAP service > 300 hrs	5% wt of the sum of Class I and II organics TAPs or >10% wt of the sum of Class I, II and III organic TAPs	> 10% VOC by weight	> 5% VHAP by weight In organic HAP service > 300 hrs	5% wt of the sum of Class I and II organics TAPs or >10% wt of the sum of Class I, II and III organic TAPs	>10% VOC by weight For sources in non-attainment areas for ozone	>10% wt VTAP (vinyl chloride or benzene)	> 10% VOC by weight	> 5% VHAP by weight or as defined in the referencing Subpart	> 10% by weight	>10% VOC by volume (2121)	"In Gasoline Service" (R) or "In Hydrogen Fluoride Service", as defined
Leak Definition	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 1,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:** 500 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 5,000 – polymers 2,000 – food/med 1,000 – other **HL:** 5,000 – polymers 2,000 – food/med 2,000 – other **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:**500 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** 1,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:**500 **Liquid:** 500 **Connectors:** 500 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/500 **Pumps-LL:** No visual/2,000 **HL:** No visual/2,000 **Compressors:** 500 **CVS:** 500 **PRVs-Gas:**500 **Liquid:** No visual/ 500 **Connectors:** 500 **Agitators:** No visual/10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 200 / 500 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** No visual/2,000 **Compressors:** 5,000 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 1,000 **Connectors:** 1,000 **Agitators-HL:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 500 **HL:** No visual/10,000 **Pumps-LL:** 5,000 – monomer 2,000 – other **HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors-Gas/ LL:** 500 **HL:** No visual/10,000 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** Reciprocating pumps exempt **Compressors:** 500 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 500 **Connectors:** 1,000 **Agitators:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 2,000 **HL:** No visual/2,000 **Compressors:** 5,000 **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 1,000 **Connectors:** 1,000 **Agitators-HL:** 10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 1,000 **HL:** No visual/1,000 **Pumps-LL:** 5,000 **HL:** No visual/5,000 **Compressors:** 5,000 **CVS:** No visual **PRVs-Gas:** 1,000 **Liquid:** No visual/ 1,000 **Connectors:** No visual /1,000 **Agitators:** 10,000 **Process Drains:** 1,000 **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual /10,000 **Pumps-LL:** 10,000 **HL:** No visual /10,000 **Compressors:** No visual leak **CVS:** 500 **PRVs-Gas**:500 **Liquid**: 10,000 **(HH)All:** 10,000 **Connectors:** No visual leak **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors:** No visual/10,000 **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **Pumps-HL:** No visual/10,000 **Compressors:** Seal system failure **CVS:** 500 **PRVs-Gas:** 500 **Liquid:** No visual/ 10,000 **Connectors:** No visual/10,000 **Agitators:** No visual leak/10,000 **Process Drains:** No visual leak **Sampling Points:** No visual leak	**Valves-Gas/LL:** 10,000 **HL:** No visual/10,000 **Pumps-LL:** 10,000 **HL:** No visual/10,000 **Compressors:** 10,000 **CVS:** 10,000 **PRVs-Gas:** 10,000 **Liquid:** 10,000 **Connectors:** Visual **Agitators:** No visual leak **Process Drains:** No visual leak **Sampling Points:** No visual leak	**All equipment:** 10,000 Subpart III – annually or after reinstallation	**All equipment:** Evidence of potential leak detected by visual, audible, or olfactory means.
Leak Definition	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** 500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/500 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** 1,000	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual/1,000 **Open-ended lines:** 1,000	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**SurgeCtrlVessel:** No visual leak **Instrument Systems:** No visual leak **Open-ended lines:** No visual leak	**All equipment:** 10,000	

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Light Liquid valves	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking Every 2 years if <0.25%	Monthly if > 4% Quarterly if < 4%	Monthly If ND leak for 2 successive months = quarterly	**Monthly:** ->5% (with connectors) ->4%(without) **Quarterly:** - <5% (with connectors) - <4% (without) **Semiannual:** - <4% (with) - <3% (without) **Annual:** - <3% (with) - <2% (without)	Monthly if > 4% Quarterly if < 4%	Quarterly	Monthly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Quarterly Annually (pipeline valves)	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Gas Valves	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking	Monthly if >2% leaking Quarterly if <2% leaking Every 2 qtrs if < 1% leaking Every 4 qtrs if <0.5% leaking Every 2 years if <0.25%	Monthly if > 4% Quarterly if < 4%	Monthly If ND leak for 2 successive months = quarterly	**Monthly:** ->5% (with connectors) ->4%(without) **Quarterly:** - <5% (with connectors) - <4% (without) **Semiannual:** - <4% (with) - <3% (without) **Annual:** - <3% (with) - <2% (without)	Monthly if > 4% Quarterly if < 4%	Quarterly	Monthly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Monthly If ND leak for 2 successive months = quarterly	Quarterly	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Gas Pressure Relief Valves	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of a release	Monitor within 5 days of release	Monitor within 5 days of a release	Monitor within 5 days of a release	Quarterly and within 24 hours of an atmospheric release	Monitor within 5 days of release	Monitor within 5 days of release	Monitor within 5 days of release	Monitor within 5 days of release	Quarterly and within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, sound, or smell
Monitoring Frequency: Liquid Pressure Relief Valves	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of a release or detection by sight, smell, or sound	Monitor within 5 days of a release or detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 24 hours of an atmospheric release	Monitor within 5 days of detection by sight, smell, or sound
Monitoring Frequency: Light Liquid Pumps	Monthly monitor & weekly visual Pump repair not required unless leak > 2000 ppm	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Quarterly if <3% leaking Monthly if <10% or 3 leaking, whichever is greater	Quarterly monitor & weekly visual	Quarterly monitor & weekly visual (seals)	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Quarterly monitor & weekly visual Pump seals (annually)	Monthly (63 R) -or- Once per shift (63 YY)

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51- Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51- Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Compressors	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly Or Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly Or Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly monitor (seals)	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Requires a seal system including barrier fluid, sensor, & alarm with zero emissions to atmosphere Check sensor daily	Quarterly monitor & weekly visual (seals)	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Flanges/ Connectors	Initial monitor Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Initial monitor Monitor annually if >0.5% leaking Monitor every 4 years if <0.5% and >0.25% Monitor at least 50% of connectors within four years if <0.25% HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years	Initial monitor Monitor annually if >0.5% leaking Monitor biennially if <0.5% leaking Monitor every 4 years if <0.5% leaking for 2 years HL connectors: Monitor within 5 days of detection by sight, smell, or sound	Annually (random 200 or 10% by unit) If <2% leaking = annually If >2% leaking = quarterly until <2% obtained for 4 qrts otherwise monitor all connectors Monitor within 90 days after welding (xray, etc.) or breaking the seal (OVA)	Monitor within 5 days of detection by sight, smell, or sound	**2 Option**s(if monitoring connectors): **Random 200** - monitor within 1st 12months after Phs III date - every 6 mos. if >2% - annual if <2% and >1% - biannaul if <1% and >.5% - every 4 years if <0.5% **Inspection Alternative** - monitor all gas/ vapor connctors within 12 months after Phs III date - inspect all light liquid connectors (> 3 drops/minute) - annual if >2% leaking - biannual if ,2% and >1% leaking - every 4 years if <1% leaking	Annually (random 200 or 10% by unit) If <2% leaking = annually If >2% leaking = quarterly until <2% obtained for 4 qrts otherwise monitor all connectors Monitor within 90 days after welding (xray, etc.) or breaking the seal (OVA)	Weekly visual (no records) Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monthly (63 R) -or- Once per shift (63 YY)
Monitoring Frequency: Process Drains	NA	NA	NA	NA	NA	NA	NA	NA	Annually monitor	NA	NA	NA	NA	Annually monitor	NA
Monitoring Frequency: Heavy Liquid Equipment	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound. Repaired systems do not require monitoring	Monitor within 5 days of detection by sight, smell, or sound	Monitor if leak suspected by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor if leak suspected by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Monitoring Frequency: Closed Vent Systems	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Hard Piping: Annual visual Duct Work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Annually monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor	Annually monitor	NA	Annually monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual Duct work: Annual monitor	Hard piping: Initial monitoring Annual visual	Monitor if leak suspected by sight, smell, or sound	Hard piping: Initial monitoring Annual visual Duct Work: Annual monitor
Monitoring Frequency: Open-ended valves/lines	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve Monitor annually	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve	Requires cap, plug, blind flange, or 2nd valve Monitor if leak suspected by sight, smell, or sound	Requires cap, plug, blind flange, or 2nd valve
Monitoring Frequency: Sampling Points/ Connections	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed loop system	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed vent system Return or recycle purge Zero emissions to atm	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge, closed loop, or closed vent system Return or recycle purge	Requires closed purge, or closed vent system Return or recycle purge Zero emissions to atm	NA	Requires closed purge, closed vent system Return or recycle purge Zero purge to atm	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge system, or closed vent system Return or recycle purge	Requires closed purge system, or closed vent system Return or recycle purge	Monitor within 5 days of detection by sight, smell, or sound	Requires closed purge, closed loop, or closed vent system Return or recycle purge
Monitoring Frequency: Agitators	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Monthly monitor & weekly visual	Within 5 days of detection by sight, smell, or sound	NA	Monthly monitor & weekly visual	Within 5 days of detection by sight, smell, or sound	NA	NA	NA	Monthly monitor & weekly visual	NA	Monitor within 5 days of detection by sight, smell, or sound	Monthly monitor & weekly visual
Monitoring Frequency: Surge Control Vessels and Bottoms Receivers	Requires closed vent system	NA	Requires closed vent system Exempt from requirements if contains a latex and located downstream of stripping operation.	Requires closed vent system	Requires closed vent system	NA	Requires closed vent system	Requires closed vent system	NA	Requires closed vent system	NA	NA	NA	Monitor within 5 days of detection by sight, smell, or sound	Requires closed vent system
Monitoring Frequency: Visual Leaks	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound			Monitor within 5 days of detection by sight, smell, or sound		Monitor immediately any component leaking based on sight, smell, or sound			Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor immediately any component leaking based on sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound
Monitoring Frequency: Instrument-ation Systems	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound	NA	NA	NA	Monitor within 5 days of detection by sight, smell, or sound	NA	Monitor within 5 days of detection by sight, smell, or sound	Monitor within 5 days of detection by sight, smell, or sound

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Skip periods	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring Historical performance acceptable without prior approval	**Valves only:** Monthly if >2% Quarterly if <2% Semiannually if <1% Annually if <0.5% Biennally if <0.25% **Pumps only:** No skip period only avoid QIP requirements	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring	**Valves only:** Initial performance of 2% leaks = quarterly Initial performance of 1% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Batch process monitoring Historical performance acceptable without prior approval	**Valves only:** Not Allowed	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves (with connectors):** Initial performance of 5% leaks = quarterly Initial performance of 4% leaks = semi-annually **Valves (without connectors):** Initial performance of 4% leaks = quarterly Initial performance of 3% leaks = semi-annually **Pumps only:** No skip period only avoid QIP requirements Historical performance acceptable without prior approval	**Valves only:** 2 consecutive quarters <2% = semi-annual 2 consecutive semi-annual < 2% = annual >2% leaking = increase monitoring Historical performance acceptable without prior approval	**Valves only:** 2 consecutive quarters < 2% = skip 1 quarter 5 consecutive quarters < 2% = skip 3 quarters Total leaking FECs cannot be > 4% Historical performance acceptable without prior approval	**Valves only:** 2 successive months ND = first month of every qtr until leak detected 2 consecutive qtrs < 2% = skip 1 qtr 5 consecutive qtrs < 2% = skip 3 qtrs Vinyl Chloride NESHAP allows 200 or 90% valves if <2%	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters Monthly if >2%	**Valves only:** 2 consecutive quarters <2% = skip 1 quarter 5 consecutive quarters <2% = skip 3 quarters	**Valves only:** 2 consecutive quarters <2% = skip 1 qtr for valves and pumps (LL) 5 consecutive quarters <2% = skip 3 qtrs	None for 63 R
Light/heavy liquid definition and exemptions	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.2 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86		Light liquid has VP >0.3 kPa @ 20 degC or a 10% evaporation point > 150 degC using ASTM D-86	Light liquid has VP > 0.3 kPa @ 20 degC & is 20%w of total process stream	Light liquid has VP > 0.3 kPa @ 20 degC	Light liquid has VP > 0.3 kPa @ 20 degC	NA	
Liquid dripping definition										Visible leakage including spraying, misting, clouding and ice formation				Per HON	
Materials included in VOC definition					Consistent with LAC 33:III.2117	TOC excluding methane, ethane, 1-1-1-TCE, methylene chloride, and various CFCs		Consistent with LAC 33:III.2117			TOC excluding methane, ethane, 1-1-1-TCE, methylene chloride, and various CFCs		Consistent with LAC 33:III.2117		
Monitoring Method	Method 21 Calibrate within 2000 ppm	Method 21 Calibrate within 2000 ppm	Method 21	Method 21 Calibrate within 2000 ppm	LAC 33:III.6077	Method 21	LAC 33:III Chapter 60, 61 or 63	LAC 33:III.6077	Method 21	Method 21	Method 21	40 CFR 264.1063 (b)	Method 21	Visual, audible, or olfactory	
Monitoring Distance	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Consistent with EPA protocol	Not specified	NA	

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Comments			Comply with Subpart H of SOCMI HON This table outlines HON requirements for Elastomer MACT	Comply with HON except for specific deviations These two regulations are carbon copies of each other											
Post repair inspection	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Valves, after repair, monitored at least once within 3 months Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Valves, after repair, monitored at least once within 3 months If monitoring connectors, monitor repaired connector within 2st 3 months after repair. Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Valves, after repair, monitored at least once within 3 months	Not specified, but assumed to be required immediately after repair to confirm a repair was successful	Not specific, but required to maintain date component rechecked after maintenance and instrument reading upon check	No visible leak or holds a test pressure
Repair periods (1st/Final Attempt)	5 day/15 days	5 day/15 days	5 days/15 days	5 days/15 days	5 days*/15 days *Includes monitoring	5 days/15 days	5 day/15 days	5 days/15 days	15 days	5 days/15 days	5 days/15 days	5 days/15 days	5 days/15 days	15 days	5 days/15 days
Calibration gas	Zero air, and mixtures dependent on phase monitored	Zero air, methane or n-hexane and air at a concentration of approximately 2,000 ppm	Zero air, air mixtures dependent of phase monitored	Zero air, methane or n-hexane and air at a concentration of approximately 2,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration no more than 2,000 ppm above leak definition and highest scale with a calibration gas of approximately 10,000 ppm	Zero air, and mixtures dependent on phase monitored	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Not specified in rule	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Zero air, methane or n-hexane and air at a concentration of about but less than 10,000 ppm	Not specified in rule	NA
Calibration Frequency	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Before use on each day	Not specified in rule	Before use each day	Before use on each day	Before use on each day	Before use on each day	Not specified in rule	NA
Criteria for unsafe to monitor exemption	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves, connectors & CVS:** Immediate danger Follow written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves, connectors & CVS:** Immediate danger Follow written plan to monitor when safe	No criteria, but monitor when safe	**Valves:** Immediate danger Follows written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe	**Valves:** Immediate danger Follow written plan to monitor when safe	No criteria, but monitor when safe	**Valves & connectors:** Immediate danger Follow written plan to monitor when safe

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Criteria for inaccessible components exemption	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)	**Random 200 option** - only accessible connectors **Inspection Alternative** - only accessible connectors	**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)				**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)			**Connector:** Buried, insulated, obstructed, >25 ft scaffold & >2m support surface (referred to as inaccessible)
Criteria for difficult to monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor	Cannot monitor without elevating >2m above support surface Follow written plan to annually monitor
Exemptions	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor <.75" FECs in instrumentation systems PRVs equipped with rupture disk	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor <.75" FECs in instrumentation systems PRVs equipped with rupture disk	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals Vapor pressure <0.0435 psia R&D facilities (< 100 FEC) Insulated components	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor Equipment in service <300 hours per year	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system No detectable emissions Difficult to monitor	Vacuum service Unsafe to monitor Dual Mechanical seals Vapor pressure <0.0435 psia R&D facilities (< 100 FEC) Check valves	Vacuum service Unsafe to monitor Dual Mechanical seals with barrier fluid and alarm Closed vent system Difficult to monitor Open ended lines for emergency PRVs equipped with rupture disk
Exemptions (Continued)	Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk	Open ended lines for emergency PRVs equipped with rupture disk		Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU	Open ended lines for emergency PRVs equipped with rupture disk	Components of shutdown repair list						Unmanned sites: Monthly visual inspections allowed Compressors operated <300 hrs or tied to CVS or VRU

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Delay of repair	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connector, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOTAP service **Valves, connectors & agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device Drill and tap required on non-control valves, if feasible, before placing on delay of repair All components on delay of repair must be monitored per routine monitoring **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOTAP service **Valves, connectors & agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Requires a PU shutdown Isolated or bypassed to reduce leakage Shutdown would create more emissions than repair would eliminate	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VHAP service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of VOC service **Valves:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)	**All equipment:** Requires a PU shutdown Isolated or bypassed to reduce leakage Shutdown would create more emissions than repair would eliminate	**All equipment:** Technically infeasible w/o PU shutdown; Isolated and out of HAP service **Valves, Connectors, Agitators:** Purged material from repair causes greater emissions than fugitive leak; recover and destroy in control device **Pumps:** Replacing with DMS (within 6 months)
Delay of repair beyond PU shutdown	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion		**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion	**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion		**Valves:** Assembly replacement is necessary during PU shutdown, valve assemblies are depleted, and assemblies were sufficiently stocked before depletion.
Tagging	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components	Leaking components and affected components	Leaking components	Leaking components	Physical tag required	Leaking components	None
Use of background concentration data	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance	Not specified in rule	Subtract for determining compliance	Subtract for determining compliance	Subtract for determining compliance		Not specified in rule	NA

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Recordkeeping	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data Batch Process Monitoring HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule Valves records Exemption data CVS system design and operation DORs must be signed within 30 days of leak identifcation	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory Connector monitoring schedule DMS records Valves records Exemption data HL determinations Visual inspection dates Compliance tests CVS system design and operation QIP	Leak and repair records Component Inventory Connector monitoring schedule Valves records Exemption data CVS system design and operation	Leak and repair records Component inventory Calibration records	Leak and repair records CVS design and operation records Component Inventory Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data	Leak and repair records Component Inventory CVS design and operation records Valve records Exemption data Compliance Test Results	Leak and repair records Component inventory Calibration records	Maintain log book of inspections, and leaking components, with summary descriptions.
Recordkeeping Period	2 years	Per referencing Subpart	2 years	5 years	5 years	2 years	2 years	5 years	2 years	2 years	2 years	Per referencing Subpart (5 years)	2 years	2 years	5 years
Reporting	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR performance report semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	Initial notification Quarterly LDAR Performance reports 3 months after initial report	Initial report LDAR Performance reports semi-annually	LDAR Performance reports semi-annually after Not. of Comp. Initial Notification Initial Notification of Compliance	Initial notification Quarterly LDAR Performance reports 3 months after initial report	Quarterly LDAR Performance reports, including repair data	Initial report Semi-annual reports starting 6 months after initial	Initial report LDAR Performance reports semi-annually	Per referencing Subpart	LDAR Performance reports semi-annually	Quarterly LDAR Performance reports, including repair data	63 Subpart R: Quarterly 63 Subpart YY: Records only

Item of Comparison	40 CFR 63 Subpart H - SOCMI HON MACT	40 CFR 63 Subpart UU – Equipment Leaks Control Level 2	40 CFR 63 Subpart U - Polymers and Resins I, Elastomer MACT	40 CFR 63 Subparts GGG and MMM – Pharmaceuticals MACT and Pesticide Active Ingredient MACT	LAC 33:III.Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT With NSR Consent Decree Enhancements	40 CFR 60 Subparts VVa (SOCMI) & GGGa (Refinery)	40 CFR 63 Subpart CC - Refinery MACT Modified HON Option	LAC 33:III Chapter 51-Louisiana Refinery MACT and Louisiana Non-HON MACT	LAC 33:III.2122 Louisiana Fugitive Emission Control for Nonattainment	40 CFR 61 Subparts F, J and V and 40 CFR 63 Subpart HH – PVC, Benzene, and Oil & Natural Gas Production MACT	40 CFR 60 Subparts VV (SOCMI), GGG (Refinery) & KKK (Gas Processing Plants)	40 CFR 63 Subpart TT – Equipment Leaks Control Level 1	RCRA 40 CFR 264 Subpart BB & 40 CFR 265 Subpart BB	LAC 33:III.2121 Louisiana Fugitive Emission Control and 40 CFR 63 Subpart III	40 CFR 63 Subparts R (Gasoline Distribution) and YY (Hydrogen Fluoride Production)
Effective dates	Group I Oct 24, 1994 Oct 24, 1995 Apr 24, 1997 Group II Jan 23, 1995 Jan 23, 1996 Jul 23, 1997 Group III Apr 24, 1995 Apr 24, 1996 Oct 24, 1997 Group IV Jul 24, 1995 July 24, 1996 Dec 24, 1997 Group V Oct 23, 1995 Oct 23, 1996 Apr 23, 1997		One year after promulgation for compressors 6 months after promulgation for other equipment		Jan 1, 1995, unlessotherwise specified in Air Toxics Compliance Plan, but no later than Dec 20, 1996	Nov. 16, 2007	New Sources - upon startup Existing Sources - Phase I- Aug 18, 1998 Phase II - Aug 18, 1999 Phase III - Feb 18, 2001	Jan 1, 1995, unlessotherwise specified in Air Toxics Compliance Plan, but no later than Dec 20, 1996	Jan1, 1996	June 6, 1984 Vinyl Chloride NESHAP Oct 21, 1976	Jan 5, 1981		As required by permit		

Note: For this table –

CVS = closed vent systems; DMS = dual mechanical seal system; Gas = in gas/vapor service; HL = in heavy liquid service; Liquid = in liquid service;
LL = in light liquid service; ND = no leak is detected; PRVs = pressure relief valves/devices; PU = process unit; QIP = quality improve program;
SurgeCtrlVessel = surge control vessel; TOC = total volatil organic compounds; VRU = vapor recovery unit.

Table A-3. Recent BACT Determinations For Internal Combustion Emergency Fire Pump Engines ≤ 500 HP

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
OH-0352	06-18-13	Arcadis, US, Inc.	Lucas County, OH	Emergency Fire Pump	300 HP	NO_x – 1.7 lb/hr CO – 1.7 lb/hr PM_{10} – 0.1 lb/hr SO_2 – 0.003 lb/hr VOC – 0.25 lb/hr CO_2e – 87 ton/yr	Purchased certified to the standards in NSPS Subpart IIII	BACT-PSD
PA-0286	01-31-13	Moxie Energy, LLC	Lycoming County, PA	Fire Pump	Not Provided	NO_x – 2.6 g/HP-hr CO – 0.5 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.09 g/HP-hr VOC – 0.1 g/HP-hr	Not provided	Other Case-by-Case
IN-0158	12-03-12	St. Joseph Energy Center, LLC	St. Joseph County, IN	Diesel Fire Water Pumps	371 BHP	NO_x – 3 g/HP-hr CO – 2.6 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr SO_2 – 0.0015% S diesel fuel VOC – 0.16 lb/hr CO_2e – 172 ton/yr	GCP, ULSD	BACT-PSD
IA-0105	10-26-12	Iowa Fertilizer Company	Lee County, IA	Fire Pump	14 gal/hr	NO_x – 3.75 g/kW-hr CO – 3.5 g/kW-hr PM_{10}/ $PM_{2.5}$ – 0.2 g/kW-hr VOC – 0.25 g/kW-hr VE – 5% CO_2e – 91 ton/yr	GCP	BACT-PSD
WY-0070	08-28-12	Black Hills Power, Inc.	Laramie County, WY	Diesel Fire Pump	327 HP	NO_x – not provided CO – not provided SO_2 – not provided	EPA Tier 3 rated, ULSD	BACT-PSD
VA-0319	08-27-12	Gateway Green Energy	Prince George County, VA	Firewater Pump	1.86 MMBtu/hr	PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr CO_2e – 30.5 ton/yr	GCP, ULSD	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
SC-0113	02-08-12	Pyramax Ceramics, LLC	Allendale County, SC	Fire Pump	500 HP	NO_x – 4 g/kW-hr CO – 3.5 g/kW-hr SO_2 – not provided VOC – 4 g/kW-hr	Purchase of certified engine based on NSPS, Subpart IIII, ULSD, Sulfur content less than 0.0015%, operating hours less than 100 hr/yr for maintenance and testing	BACT-PSD
TX-0612	11-10-11	Lower Colorado River Authority	Llano County, TX	Diesel Fire Water Pumps	617 HP	CO_2e – 7027.8 lb/hr	Best work practice	BACT-PSD
LA-0254	08-16-11	Entergy Louisiana, LLC	Jefferson Parish, LA	Emergency Fire Pump	350 HP	CO – 2.6 g/HP-hr PM_{10}/ $PM_{2.5}$ – 0.15 g/HP-hr VOC – 1 g/HP-hr	ULSD, GCP	BACT-PSD
CA-1192	06-21-11	Avenal Power Center, LLC	Kings County, CA	Emergency Firewater Pump	288 HP	NO_x – 3.4 g/HP-hr CO – 0.447 g/HP-hr PM_{10} – not provided	Equipped with a turbocharger and an intercooler/ aftercooler, ULSF not to exceed 15 ppmvd fuel sulfur, operational limit of 50 hr/yr	BACT-PSD
LA-0251	04-26-11	Flopam, Inc.	Iberville Parish, LA	Fire Pump	444 HP	NO_x – 5.82 lb/hr CO – 0.65 lb/hr PM_{10} – 0.01 lb/hr	GCP	BACT-PSD
FL-0322	12-23-10	Southeast Renewable Fuels (SRF), LLC	Hendry County, FL	Emergency Diesel Fire Pump	Not Provided	CO – 2.6 g/HP-hr PM – 0.15 g/HP-hr	Not provided	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
MI-0399	12-21-10	Detroit Edison	Monroe County, MI	Diesel Quench Pump	252 HP	NO_x – 7.8 g/HP-hr CO – 2.6 g/HP-hr $PM_{10}/PM_{2.5}$ – 0.4 g/HP-hr VE – 20% opacity	GCP	BACT-PSD, Each – Test Protocol
NH-0018	07-26-10	Laidlaw Berlin BioPower, LLC	Coos County, NH	Fire Pump	2.27 MMBtu/hr	PM_F – 0.3e-5 lb/MMBtu	Not provided	MACT
ID-0018	06-25-10	Idaho Power Company	Payette County, ID	Fire Pump	235 kW	NO_x – 4 g/kW-hr CO – not provided PM – 0.2 g/kW-hr VOC – 4 g/kW-hr	Tier 3 engine-based	BACT-PSD
CA-1191	03-11-10	City of Victorville	San Bernardino County, CA	Emergency Firewater Pump	135 kW	NO_x – 3.8 g/kW-hr CO – 3.5 g/kW-hr $PM_{2.5}$ – 0.2 g/kW-hr	Operational restriction of 50 hr/yr, operate as required for fire safety testing	BACT-PSD
MI-0389	12-29-09	Consumers Energy	Bay County, MI	Fire Pump	525 HP	CO – 2.6 g/HP-hr PM_{10} – 0.31 lb/MMBtu	Engine design and operation 15 ppm sulfur fuel	BACT-PSD
				Fire Booster Pump	40 kW	CO – 5 g/kW-hr PM_{10} – 0.31 lb/MMBtu	Engine design and operation 15 ppm sulfur fuel	BACT-PSD
OK-0129	01-23-09	Associated Electric Cooperative, Inc.	Mayes County, OK	Emergency Diesel Fire Pump	267 HP	NO_x – 4.59 lb/hr CO – 2.6 g/HP-hr PM_{10} – 0.24 lb/hr SO_2 – 0.11 lb/hr VOC – 0.66 lb/hr	GCP, LSDF	BACT-PSD
OH-0317	11-20-08	Ohio River Clean Fuels, LLC	Columbiana County, OH	Fire Pump	300 HP	NO_x – 4.89 lb/hr CO – 1.72 lb/hr PM_{10} – 0.27 lb/hr VOC – 0.26 lb/hr VE – 20%	GCP, Turbocharger, Low temperature aftercooler	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
MD-0040	11-12-08	Competitive Power Ventures, Inc./CPV Maryland, LLC	Charles County, MD	Emergency Firewater Pump	300 HP	NO_x – 3 g/HP-hr CO – 2.6 g/HP-hr $PM_{10}/PM_{2.5}$ – 0.15 g/HP-hr SO_2 – not provided VOC – 0.66 lb/hr	Not provided	BACT-PSD
FL-0304	09-08-08	Florida Municipal Power Agency (FMPA)	Osceola County, FL	Emergency Fire Pump	> 300 HP	NO_X – 3 g/bhp-hr CO – 2.6 g/bhp-hr PM – 0.15 g/bhp-hr	Not provided	BACT-PSD
LA-0224	03-20-08	Southwest Electric Power Co.	Caddo Parish, LA	Diesel Fire Pump	310 HP	NO_x – 9.61 lb/hr CO – 2.07 lb/hr PM_{10} – 0.68 lb/hr SO_2 – 0.64 lb/hr VOC – 0.77 lb/hr	Low-Sulfur fuel, limited operation hours, and proper engine maintenance	BACT-PSD
MN-0070	09-07-07	Minnesota Steel Industries, LLC	Itasca County, MN	Diesel Fire Water Pumps	Not Provided	SO_2 – 0.05% in fuel VE – 5%	Limited Sulfur in fuel, limited hours	BACT-PSD
CA-1144	04-25-07	Caithness Blythe II, LLC	Riverside County, CA	Fire Pump	303 HP	NO_x – 7.5 lb/hr CO – 0.7 lb/hr PM_{10} – 0.1 lb/hr	Fuel with less than 0.05% sulfur by weight	BACT-PSD
IA-0084	11-30-06	ADM Corn Processing	Clinton County, IA	Fire Pump Engine	500 HP	VOC – 3 g/HP-hr	GCP	BACT-PSD
NC-0101	09-29-05	Forsyth Energy Projects, LLC	Forsyth County, NC	Emergency Firewater Pump	11.40 MMBtu/hr	NO_x – 36.48 lb/hr CO – 9.69 lb/hr PM_{10} – 1.14 lb/hr SO_2 – 0.58 lb/hr VOC – 1.04 lb/hr	Emergency use only	BACT-PSD
LA-0192	06-06-05	Cresent City Power, LLC	Orleans County, LA	Firewater Pump	425 HP	NO_x – 8.9 lb/hr CO – 1.88 lb/hr PM_{10} – 0.14 lb/hr SO_2 – 0.61 lb/hr VOC – 0.05 lb/hr	Good engine design and proper operating practices	BACT-PSD

Permit or RBLC ID	Permit Issuance Date	Company	Location	Unit Description	Maximum Power Output	Limit(s)	Control Option	Basis
OH-0252	12-28-04	Duke Energy Hanging Rock ,LLC	Lawrence County, OH	Firewater Pump	265 HP	NO_x – 8.2 lb/hr CO – 1.8 lb/hr PM – 0.66 lb/hr SO_2 – 0.10 lb/hr VOC – 0.66 lb/hr	500 hr/yr	BACT-PSD

Attachment 2: Emissions Calculations

Storage Area Boiler Emissions

Maximum heat input:	12.519 10^6 Btu/hr, HHV	2 Total Boilers	2 Active ST	24 hours/day
	208.65 scf/min	1 Active at a time		8760 hours/year

Emission factors

Pollutant	Emission Factor (lb/MMBtu)	Basis
NO_X	0.0110	Low NO_X burner, BACT
CO	0.0360	Proper combustion, BACT
SO_2	0.00725	2.59 gr S/100 scf NG daily max plus 25% saftey factor
SO_2	0.00367	1.31 gr S/100 scf NG annual average plus 25% saftey factor
PM_{10}	0.0075	BACT
$PM_{2.5}$	0.0075	Assumed equal to PM_{10}, BACT
VOC	0.005	Proper combustion, BACT
CO2e	117	

Emission calulations

Averging Period	Units	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO2e
1-Hour	lb/hr	0.275	0.90	0.181	0.188	0.188	0.125	2,929.4
24-hour	lb/day	6.610	21.63	4.355	4.507	4.507	3.005	70,306.7
Annual[1]	tpy	0.603	1.97	0.201	0.411	0.411	0.274	6,415.5

Stack Parameters

Stack height, above grade	45 ft	13.7 m
Stack diameter	1.67 ft	0.508 m
Stack outlet temp	455 F	508 K
Stack exit flow	4,662 acfm	7921 m3/hr
Stack exit flow velocity	35.6 ft/s	10.9 m/s

Unloading Area Boiler Emissions

Maximum heat input:	61.745	10^6 Btu/hr, HHV	3 Total Boilers	3 Active ST	24 hours/day
	1029	scf/min	2 Active at a time		8760 hours/year

Emission factors

Pollutant	Emission Factor (lb/MMBtu)	Basis
NO_X	0.011	Low NO_X burner, BACT
CO	0.036	Proper combustion, BACT
SO_2	0.00725	2.59 gr S/100 scf NG daily max plus 25% saftey factor
SO_2	0.00367	1.31 gr S/100 scf NG annual average plus 25% saftey factor
PM_{10}	0.0075	BACT
$PM_{2.5}$	0.0075	Assumed equal to PM_{10}, BACT
VOC	0.005	Proper combustion, BACT
CO2e	117	

Emission calulations

Averging Period	Units	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO2e
1-Hour	lb/hr	2.038	6.67	1.343	1.389	1.389	0.926	21,672.5
24-hour	lb/day	48.902	160.04	32.222	33.342	33.342	22.228	520,139.9
Annual[1]	tpy	5.950	19.47	1.987	4.057	4.057	2.704	63,283.7

Stack Parameters

Stack height, above grade	65 ft	19.8 m
Stack diameter	3.50 ft	1.067 m
Stack outlet temp	448 F	504 K
Stack exit flow	20,304 acfm	34497 m3/hr
Stack exit flow velocity	35.2 ft/s	10.7 m/s

VCU Emissions Summary

Vapor Emissions

Hourly

32,000	bbl/hr (maximum hourly)
1,344,000	gal/hr (maximum hourly)
179,665	ft3/hr (maximum hourly)
225.273714	MMBtu/hr (maximum hourly)

Daily/Annual

		100	ppm H2S in fuel (maximum)	
360000	bbl/day	0.01%		
15120000	gal/day	pv=mrt		
2021230.946	ft3/day	m= pv/rt		
105.5970535	MMBtu/hr	P	0.986923267	atm
2534.329283	MMBtu/day	R	1.31443	ft^3*atm/lb-mol/K
24	hours/day	T	285.9614444	K
84217.95607	ft3/hr	SO2 MM	64	
365	days/year			
925,030	MMBtu/yr			
737749295.2	ft3/yr			
82%	assumed fraction of displaced air that is exhaust			
12%	assumed fraction of ship exhaust that is CO2			

Vapor Emissions

Pollutant	Emission factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (lb/day)	Emissions (tons/year)
NO_X	0.02	5.18	58.29	10.64
CO	0.01	2.25	25.34	4.63
SO_2	-	3.02	33.97	6.20
PM_{10}	0.01	1.68	18.88	3.45
$PM_{2.5}$	0.01	1.68	18.88	3.45
VOC	-	4.21	100.98	8.64
CO2e	136	30,547	343,655	62,717

Assist gas

30,600	cf/hr	(natural gas)	
624,240	cf/day		85% assist gas usage (annual)
1,000	Btu/cf	(heating value of gas)	
31	MMBtu/hr		
624	MMBtu/day		
227,848	MMBtu/yr		
227847600	cf/yr		

Assist Gas Emissions

Pollutant	Emission factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (lb/day)	Emissions (tons/year)
NO_X	0.02	0.70	14.36	2.62
CO	0.01	0.31	6.24	1.14
SO_2	0.00725	0.22	4.52	0.83
PM_{10}	0.01	0.23	4.65	0.85
$PM_{2.5}$	0.01	0.23	4.65	0.85
VOC	0.00	0.00	0.00	0.00
CO2e	117	3,580	73,036	13,329

Inerting Gas CO2e Emissions

4,145	tons per year of CO2
22,712	lbs CO2 / day
2,019	lbs CO2 / hr (max)

Total

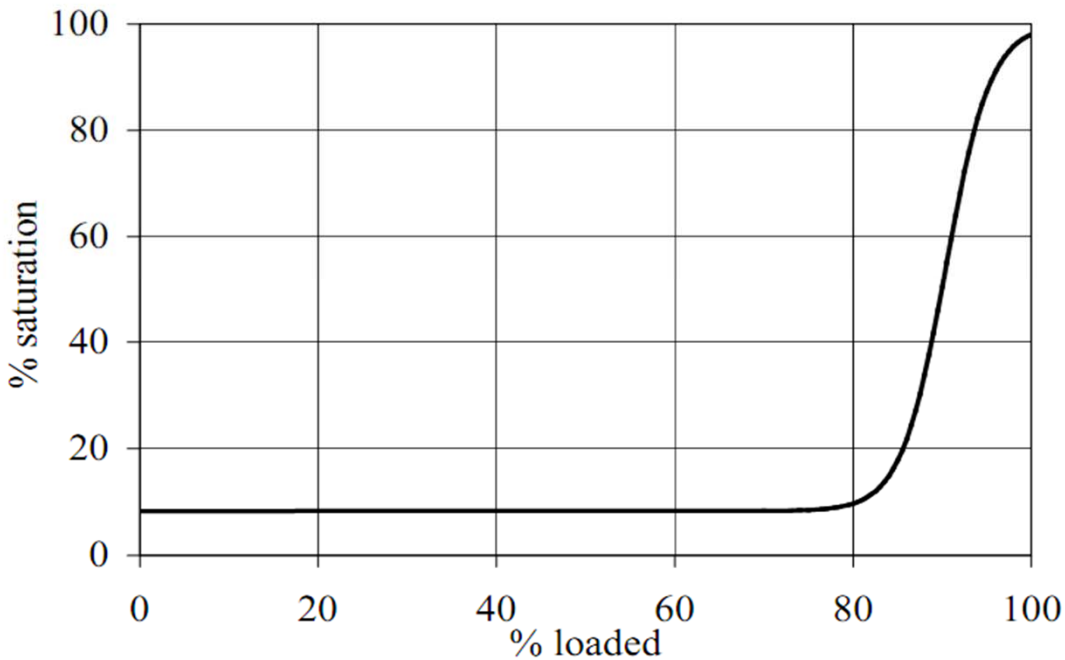
Pollutant	Emission factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (lb/day)	Emissions (tons/year)
NO_X	-	5.89	72.65	13.26
CO	-	2.56	31.59	5.76
SO_2	-	3.24	38.49	7.02
PM_{10}	-	1.91	23.53	4.30
$PM_{2.5}$	-	1.91	23.53	4.30
VOC	-	4.21	100.98	8.64
CO2e	-	36,146	439,403	80,191

Stack Height	24.14583333	ft	7.35965	m
Exit Velocity	130	ft/s	39.624	m/s
Stack Temp	2200	F	1477.594444	K
Stack Diameter	3.666666667	ft	1.1176	m

VCU Inerting Gas Air Calculations and VOC Profile Claculations

A theoretical profile of the fraction of VOC in the gases displaced while loading ships.

Figure 4 - concentration of hydrocarbon in vent gas as a function of % loaded (Courtesy John Zink Ltd)



20% VOC content required to stop assist gas
85% fraction of time that assist gas will be used (based on figure above)

Jordan Technologies VOC Profile

		HHV Btu/cf	HHV Btu/cf
Methane	1.41%	1,006	14.2
Ethane	10.87%	1,763	191.6
Propane	30.64%	2,507	768.2
Butane	11.66%	3,227	376.3
Pentane	2.09%	3,893	81.4
Hexane	0.35%	4,650	16.3
Heptane	0.08%	5,446	4.4
Air	42.90%	0	0
Total	100.00%	---	1452

Estimated VOC concentration profile would hold for other VOC/air combinations
and calculated VOC profiles and heat values for 90% air and 50% air:

	90% air	50% air
Methane	0.25%	1.23%
Ethane	1.90%	9.52%
Propane	5.37%	26.83%
Butane	2.04%	10.21%
Pentane	0.37%	1.83%
Hexane	0.06%	0.31%
Heptane	0.01%	0.07%
Air	90%	50%
Total	100.00%	100.00%

	90% air HHV Btu/cf	50% air HHV Btu/cf
Methane	2.5	12.4
Ethane	33.6	167.8
Propane	134.5	672.7
Butane	65.9	329.5
Pentane	14.2	71.2
Hexane	2.9	14.3
Heptane	0.8	3.8
Air	0	0
Total	254.3	1271.7

	Average Air %
Methane	0.44%
Ethane	3.43%
Propane	9.66%
Butane	3.68%
Pentane	0.66%
Hexane	0.11%
Heptane	0.03%
Air	82.00%
Total	100.00%

These were selected to construct an approximation of the figure above: 0% to 80% filled - constant 90% air, 80% to 100% filled - average of 50% air.

Estimated that the "air" portion of the displaced gases are actually ship exhaust, and that 12% of that gas is CO_2.
Using the assumption that during 80% of the loading operation, the displaced gases were 90% "air,"
and an average of 50% "air" during the last 20% of the loading operation:

Fraction of the displaced gases that are ship exhaust: 82%

			hourly max	
Total daily volume displaced	2,021,231	cf/day	179,665	cf/hr
Fraction that is ship exhaust	82%		82%	
Daily volume of ship exhaust emitted	1,657,409	cf/day	147,325	cf/hr
Assumed CO_2 fraction of ship exhaust	12%		12%	
Daily volume of CO_2 emitted	198,889	cf/day	17,679	cf/hr

Use ideal gas law to convert the volume of CO_2 to a mass:

$m = MPV/RuT$

V	5,632	m3 CO_2/day	500.6145	m3 CO_2/hr
M	44	kg/kmol	44	kg/kmol
P	101.325	kPa	101.325	kPa
Ru	8.314	kJ/kmolK	8.314	kJ/kmolK
T	293.15	K	293.15	K
m	10302.09	kg/day	915.7412	kg/hr

Additional mass of CO_2 attributable to the inerting gas present in the tanks:

4,145 tons CO_2/yr 22711.985 lbs CO_2/day 2018.843 lbs CO_2/hr

Estimating CO2e emissions from VCU Vapor Combustion

Loading Crude Oil Into Ships and Ocean Barges
AP-42 Section 5.2 (Transporation and Marketing of Petroleum Liquids

CL = total loading loss (lb/1000 gal loaded)
Ca = 0.86 (Arrival EF, From AP-42, Table 5.2-3 - assume previous cargo was volatile and tank arrived uncleaned)
Cg = 1.84 (0.44*P -0.42) * (M*G)/T
where
P = true vapor pressure, psia
M = molecular weight of vapors
G = vapor growth factor = 1.02
T = temperature of liquid, degrees F = 68, degrees R = 527.67 °R

$$C_L = C_a + C_g = 0.86 + \left(1.84 * (0.44 * \mathrm{P} - 0.42) * \frac{M * G}{T}\right)$$

	P (psia)	M (lb/lb-mole)	CL (lb/1000 gal)	Throughput (bbl/hr)	Throughput (bbl/day)	PTE (lb/hr)	PTE (ton/yr)	Control Efficiency	PTE, controlled (lb/hr)	PTE, controlled (ton/yr)	Combusted (tpy)	CO2e (tpy)
Crude oil	11	44.868	1.5654	32,000	360000	2,104	4,319	99.8%	4.2	8.6	4,311	12,944

Tanks Operating Information	
6	Tanks
360,000	tank capacity (bbl)
15,120,000	tank capacity (gallons)
340,000	bbl/day (working volume)
20,683,333	bbl/yr/tank
868,700,000	gal/yr/tank
24	hours/day
365	days/year

Assumed		
100	ppm H2S	
50	Vapor molecular weight of crude	
34	molecular weight of H2S	

Components	CAS #	Per tank Annual Losses (lbs)	Total Hourly Losses (lbs/hr)	Total Daily Losses (lbs/day)	Total Annual Losses (lbs/yr)
Crude oil		7,858.84	5.38E+00	1.29E+02	4.72E+04
Hexane	110-54-3	99.86	1.14E-02	2.74E-01	5.99E+02
Benzene	71-43-2	16.04	1.83E-03	4.40E-02	9.63E+01
Isooctane	540-84-1	0.90	1.03E-04	2.46E-03	5.39E+00
Toluene	108-88-3	22.81	2.60E-03	6.25E-02	1.37E+02
Ethylbenzene	100-41-4	7.15	8.16E-04	1.96E-02	4.29E+01
Xylene (-m)	108-38-3	24.09	2.75E-03	6.60E-02	1.45E+02
Isopropyl benzene	98-82-8	0.91	1.03E-04	2.48E-03	5.44E+00
1,2,4-Trimethylbenzene	95-63-6	2.98	3.40E-04	8.15E-03	1.79E+01
Cyclohexane	110-82-7	29.58	3.38E-03	8.10E-02	1.77E+02
Unidentified Components		7,263.07	8.29E-01	1.99E+01	4.36E+04
Isopentane	78-78-4	166.56	1.90E-02	4.56E-01	9.99E+02
Pentane	109-66-0	222.08	2.54E-02	6.08E-01	1.33E+03
Cyclopentane	287-92-3	16.44	1.88E-03	4.50E-02	9.86E+01
Xylene (-p)	106-42-3	7.09	8.09E-04	1.94E-02	4.25E+01
Xylene (-o)	95-47-6	6.35	7.25E-04	1.74E-02	3.81E+01
Hydrogen Sulfide	7783-06-4	0.53	3.66E-04	8.78E-03	3.21E+00

Methane Emissions

Note: While crude oil that reaches the facility will likely be stabalized, it can be considered unstabilized for conservative CH4 emissions estimations. CH4 emissions were estimated using equation Y-22 from Federal GHGMRR 40 CFR 98 Y - Petroleum Refineries.

EQ Y-22:
CH4 = (0.1 * Qref)
where
CH4 = Annual methane emissions from storage tanks (metric tons/year)
Qref = Quantity of crude oil (MMbbl/year)

12.41	**Tons of Methane per year (total)**	2.068333333	per tank
260.61	**Tons of CO2e per year (total)**	43.435	per tank

Release Height	48	feet	14.6304	meters
Diameter	240	feet	76.77846378	meters

Fugitive Emissions due to Leaking Components

Summary of Fugitive Components by Type

Fugitive Component Type	Service	Total Number of Components	Number of Components Estimated to be Leakers (1.5% of Total)	Number of Components Estimated to be Pegged Leakers	Components Distribution: Unloading Area Components	Components Distribution: Tank Area Components	Components Distribution: Dock Area Components
Valves	All	2,753	42	1	2,050	509	194
Pump Seals	All	61	1	1	50	10	1
Connectors	All	360	6	1	270	90	0
Flanges	All	2,630	40	1	2,253	316	61
Others	All	1,486	23	1	1,185	172	129

Summary of Fugitive Component Emission Factors

		Non-Leakers		Screening Value Leakers				Pegged Leakers	
Fugitive Component Type	Service	Zero Emission Factor (lb/hr/source)	Non-Leaking Hours (hr/yr)	Leak Rate/Screening Correlation	Screening Value (SV) (ppmv)	Screening Value Emission Factor (lb/hr/source)	Screening Value Leaking Hours (hr/yr)	10,000 ppmv Pegged Emission Factor (lb/hr/source)	Pegged Leaking Hours (hr/yr)
Valves	All	1.7E-05	8,760	(kg/hr/source) = 2.29E-06 x $(SV)^{0.746}$	250	0.00031	8,760	0.14112	730
Pump Seals	All	5.3E-05	8,760	(kg/hr/source) = 5.03E-05 x $(SV)^{0.610}$	1,000	0.00750	8,760	0.16317	730
Connectors	All	1.7E-05	8,760	(kg/hr/source) = 1.53E-06 x $(SV)^{0.735}$	250	0.00020	8,760	0.06174	730
Flanges	All	6.8E-07	8,760	(kg/hr/source) = 4.61E-06 x $(SV)^{0.703}$	250	0.00049	8,760	0.18743	730
Others	All	8.8E-06	8,760	(kg/hr/source) = 1.36E-05 x $(SV)^{0.589}$	250	0.00078	8,760	0.16097	730

Summary of Fugitive Component Emissions

Fugitive Component Type	Service	Non-Leaker Emissions (lb/yr)	Screening Value Leaker Emissions (lb/yr)	Pegged Leaker Emissions (lb/yr)	Total Emissions (lb/yr)	Total Emissions (ton/yr)	Emissions Distribution: Unloading Area Emissions (ton/yr)	Emissions Distribution: Tank Area Emissions (ton/yr)	Emissions Distribution: Dock Area Emissions (ton/yr)
Valves	All	408.45	114.02	103.02	625.49	0.31	0.233	0.058	0.022
Pump Seals	All	27.81	65.69	119.11	212.62	0.11	0.087	0.017	0.002
Connectors	All	51.28	10.26	45.07	106.62	0.05	0.040	0.013	0.000
Flanges	All	15.51	172.75	136.82	325.08	0.16	0.139	0.020	0.004
Others	All	113.04	143.15	117.50	373.69	0.19	0.149	0.022	0.016
Total		**616.09**	**505.87**	**521.53**	**1,643.49**	**0.82**	**0.65**	**0.13**	**0.04**
					0.19				

Summary of Toxic Emissions

Pollutant	CAS #	Weight Fraction	Hourly Emissions (lb/hr)	Total Emissions (ton/yr)	Emissions Distribution: Unloading Area Emissions (ton/yr)	Emissions Distribution: Tank Area Emissions (ton/yr)	Emissions Distribution: Dock Area Emissions (ton/yr)
Hexane (-n)	110-54-3	0.01643	3.1E-03	0.0135	0.0106	0.0021	0.0007
Benzene	71-43-2	0.00304	5.7E-04	0.0025	0.0020	0.0004	0.0001
Isooctane	540-84-1	0.00020	3.7E-05	0.0002	0.0001	0.0000	0.0000
Toluene	108-88-3	0.00448	8.4E-04	0.0037	0.0029	0.0006	0.0002
Ethylbenzene	100-41-4	0.00145	2.7E-04	0.0012	0.0009	0.0002	0.0001
Xylene (-m)	108-38-3	0.00489	9.2E-04	0.0040	0.0032	0.0006	0.0002
Isopropyl benzene	98-82-8	0.00020	3.7E-05	0.0002	0.0001	0.0000	0.0000
1,2,4-Trimethylbenzene	95-63-6	0.00065	1.2E-04	0.0005	0.0004	0.0001	0.0000
Cyclohexane	110-82-7	0.00536	1.0E-03	0.0044	0.0035	0.0007	0.0002
Isopentane	78-78-4	0.03458	6.5E-03	0.0284	0.0224	0.0045	0.0015
Pentane	109-66-0	0.03493	6.6E-03	0.0287	0.0226	0.0045	0.0015
Cyclopentane	287-92-3	0.00274	5.1E-04	0.0023	0.0018	0.0004	0.0001
Xylene (-p)	106-42-3	0.00131	2.5E-04	0.0011	0.0008	0.0002	0.0001
Xylene (-o)	95-47-6	0.00117	2.2E-04	0.0010	0.0008	0.0002	0.0001
Toluene	108-88-3	0.00448	8.4E-04	0.0037	0.0029	0.0006	0.0002
Hydrogen Sulfide	7783-06-4	0.00015	2.8E-05	0.0001	0.0001	0.0000	0.0000

Non-Leaker Emissions = Petroleum Zero Emission Factor x (Total Number of Components - Number of Components Estimated to be Leakers) x Non-Leaking Hours

Screening Value Leaker Emissions = Petroleum Screening Value Emission Factor x [Number of Components Estimated to be Leakers - (Number of Components Estimated to be Pegged Leakers x Pegged Leaking Hours / 8,760)] x Screening Value Leaking Hours

Pegged Leaker Emissions = 10,000 ppmv Petroleum Pegged Emission Factor x Number of Components Estimated to be Pegged Leakers x Pegged Leaking Hours

CO2e Estimates	
0.046	Ratio of lowest molecular weight pollutant (Cyclopentane) emissions from components to emissions from tanks
11.892	Tons CO2e per year from components (scaled from tanks emissions)

Emissions Estimation Basis

The key assumptions for this calculation are:

1) Each component in VOC service will be included in a leak detection and repair (LDAR) program requiring weekly visual inpsections and monthly inspections with portable instrument.
2) 1.5% of the total components in VOC service are assumed to be leakers.
3) The screening values are assumed to be one half the Phase II regulatory leak definition (2,000 ppm [pumps] and 500 ppm [valves, connectors, instrumentation, pressure valves], 40 CFR 63, Subpart H), which is considered BACT for this project.
4) The durations of pegged leakers for the remaining equipment types are assumed to be one month for all equipment.
5) Toxic emissions are based on the average composition of TAPs in crude oil.
6) Component counts for valves, pumps, connectors, flanges, and others were provided by Savage.
7) Zero emission rates, screening correlation equations, and pegged emission rates are from Tables 2-12, 2-10, and 2-14 (Petroleum Industries), Protocol for Equipment Leak Emission Estimates (EPA, November 1995).

Emergency Diesel Firewater Pumps Emission Calculations

Operating Information					
225	hp	167.7824712	kw/hr	1.6214	MMBtu/hr
12.1	gal/hr	134000	BTU/gal		
34	hours/year				
1	hr/day				
3	Engines				

SO2 Calcs

15	ppm SO2	
pv=mrt		
m= pv/rt		
P	0.986923267	atm
R	1.31443	ft^3*atm/lb-mol/K
T	285.9614444	K
SO2 MM	64	

Emissions

Pollutant	Emission factor (g/kW-hr)	Emission Factor Description	Emissions (lb/hr)	Emissions (lb/day)	Emissions (tons/year)	*Single Engine* Emissions (lb/hr)	Emissions (lb/day)	Emissions (tons/year)
NO_X	0.34	Manufacturer	0.37	0.37	0.01	0.124	0.124	0.002
CO	1.60	Manufacturer	1.78	1.78	0.03	0.592	0.592	0.010
SO_2	-	15 ppm ULSD fuel	0.58	0.58	0.01	0.194	0.194	0.00329
PM_{10}	0.17	Manufacturer	0.19	0.19	0.00	0.063	0.063	0.00107
$PM_{2.5}$	0.17	Manufacturer	0.19	0.19	0.00	0.063	0.063	0.00107
VOC	0.37	Manufacturer	0.41	0.41	0.01	0.137	0.137	0.00233
CO2e	717.13	40 CFR Part 98	795.80	795.80	13.53	265	265	4.5

CO2 Emission Factor Conversion From 40 CFR Part 98							
74.21	kg/MMBtu	163.603366	lb/MMBtu	74208.8508	g/Mmbtu	717.1323	g/kw-hr

Stack Parameters

Stack height, above grade	11 ft	3.4 m	note - (10 feet for 2, 11 feet for 1)
Stack diameter	0.34 ft	0.102 m	
Stack outlet temp	956.6 F	787 K	
Stack exit flow	1,280 acfm	2175 m3/hr	
Stack exit flow velocity	241.3 ft/s	73.6 m/s	

Crude Oil Speciation Summary

Annual Emissions

		Losses(lbs)												
Components	CAS #	RVP 0.98 Total Emissions	RVP 3.25 Total Emissions	RVP 3.27 Total Emissions	RVP 3.59 Total Emissions	RVP 3.96 Total Emissions	RVP 8.41 Total Emissions	Bakken 423 Total Emissions	Bakken 430 Total Emissions	Bakken 413 Total Emissions	Bakken 413 11psi Total Emissions	Max	Max case	Max 80% Bakken 20% Other
Crude oil		4,556.27	4,808.84	4,406.24	4,325.40	4,924.54	5,473.22	6,002.88	4,816.23	5,395.92	8,455.24	8,455.24	Bakken 413 High RVP Total Emissions	7,858.84
Hexane	110-54-3	24.54	24.66	23.04	22.56	24.76	23.64	0	0	103.52	118.63	118.63	Bakken 413 High RVP Total Emissions	99.86
Benzene	71-43-2	32.92	32.94	30.51	29.75	33.02	30.67	0	0	10.73	11.8	33.02	RVP 3.96	16.04
Isooctane	540-84-1	4.49	4.45	4.05	3.91	4.45	3.89	0	0	0	0	4.49	RVP 0.98	0.90
Toluene	108-88-3	47.69	47.42	43.37	42.05	47.42	42.28	0	0	16.11	16.59	47.69	RVP 0.98	22.81
Ethylbenzene	100-41-4	18.33	18.19	16.57	16.03	18.17	15.99	0	0	4.32	4.35	18.33	RVP 0.98	7.15
Xylene (-m)	108-38-3	63.94	63.44	57.76	55.9	63.39	55.71	0	0	14.06	14.13	63.94	RVP 0.98	24.09
Isopropyl benzene	98-82-8	4.53	4.5	4.09	3.96	4.49	3.94	0	0	0	0	4.53	RVP 0.98	0.91
1,2,4-Trimethylbenzene	95-63-6	14.88	14.76	13.42	12.98	14.74	12.9	0	0	0	0	14.88	RVP 0.98	2.98
Cyclohexane	110-82-7	38.69	38.73	35.89	35.01	38.82	36.13	0	0	24.72	27.27	38.82	RVP 3.96	29.58
Unidentified Components		4,306.27	4,559.75	4,177.55	4,103.26	4,675.29	5,248.08	5,647.82	4,381.87	4,836.90	7,766.82	7,766.82	Bakken 413 High RVP Total Emissions	7,263.07
Isopentane	78-78-4	0.00	0.00	0.00	0.00	0.00	0.00	124.89	208.2	139.66	184.76	208.20	Bakken 430	166.56
Pentane	109-66-0	0.00	0.00	0.00	0.00	0.00	0.00	209.61	210.3	215.8	277.6	277.60	Bakken 413 High RVP Total Emissions	222.08
Cyclopentane	287-92-3	0.00	0.00	0.00	0.00	0.00	0.00	20.55	15.86	13.37	16.49	20.55	Bakken 423	16.44
Xylene (-p)	106-42-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.81	8.86	8.86	Bakken 413 High RVP Total Emissions	7.09
Xylene (-o)	95-47-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.92	7.94	7.94	Bakken 413 High RVP Total Emissions	6.35

Vapor Pressure and Liquid Density Values

Vapor Pressure Constants[1]

$$A = 12.82 - 0.962 \times \ln(RVP)$$

$$B = 7261 - 1216 \times \ln(RVP)$$

True Stock Vapor Pressure Equation (from AP42, Clausius-Clapeyron derivation)[1]

$$P = exp\ \ A - \frac{B}{(T + 459.7)}$$

True Stock Vapor Pressure (psi at 55.06°F) at Given RVP

RVP (psi)	0.98	3.25	3.27	3.59	3.96	6.1	8.05	8.41	9.8	13.9
Vapor Pressure (psi)	0.269	1.44	1.45	1.66	1.90	3.48	5.13	5.45	6.76	11.0

Liquid Density at Given RVP and Specific Gravity

RVP (psi)	**0.98**	**3.25**	**3.27**	**3.59**	**3.96**	**6.1**	**8.05**	**8.41**	**9.8**[2]
Specific Gravity (at 60°F)	0.937	0.929	0.844	0.816	0.928	0.811	0.819	0.811	0.814
Liquid Density (lb/gal at 60°F)	7.81	7.74	7.04	6.80	7.73	6.76	6.83	6.76	6.79

[1] Manual of Petroleum Measurement Standards Chapter 19.4 – Recommended Practice for Speciation of Evaporative Losses, second edition, September 2005
[2] Due to limited information, the specific gravity and liquid density associated with the 9.8 RVP was used for the 13.9 RVP tank run

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Tank Parameters and Speciation Profiles

Tank Parameters[1]	
Diameter (ft)	240
Volume (gal)	15,120,000
Turnovers per year	60
Net Throughput (gal/yr)	868,700,000
Number of Columns	37
External Shell and Roof Color	White

Speciation Profiles for RVPs	
Chemical Name	**Percent of Total Liquid Weight**
Hexane (-n)	0.4
Benzene	0.6
Isooctane	0.1
Toluene	1
Ethylbenzene	0.4
Xylene (-m)	1.4
Isopropyl benzene	0.1
1,2,4-Trimethylbenzene	0.33
Cyclohexane	0.7

[1] Parameters for RVP 0.98, 3.25, 3.27, 3.59, 3.96, 8.41, Bakken 423, Bakken 430, Bakken 413, and Bakken 413 at 11 psi

Speciation Profiles for Bakken 423 and Bakken 430		
Chemical Name	**Bakken 423 - Percent of Total Liquid Weight**	**Bakken 430 - Percent of Total Liquid Weight**
Isopentane	0.81	1.512
Pentane (-n)	1.781	1.977
Cyclopentane	0.236	0.198

Speciation Profiles for Bakken 413 and Bakken 413 at 11 psi	
Chemical Name	**Percent of Total Liquid Weight**
Isopentane	0.96
Pentane (-n)	1.93
Cyclopentane	0.16
Benzene	0.209
Cyclohexane	0.477
Ethylbenzene	0.107
Xylene (-p)	0.219
Xylene (-m)	0.35
Xylene (-o)	0.198
Hexane (-n)	1.749
Toluene	0.378

TANKS 4.0.9d

Annual Emission Report: RVP 0.98 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 0.98)	13.24	4,492.83	50.20	0.00	4,556.27
Hexane (-n)	1.37	17.97	5.20	0.00	24.54
Benzene	1.24	26.96	4.72	0.00	32.92
Isooctane	0.00	4.49	0.00	0.00	4.49
Toluene	0.58	44.93	2.18	0.00	47.69
Ethylbenzene	0.07	17.97	0.28	0.00	18.33
Xylene (-m)	0.22	62.90	0.82	0.00	63.94
Isopropyl benzene	0.01	4.49	0.03	0.00	4.53
1,2,4-Trimethylbenzene	0.01	14.83	0.04	0.00	14.88
Cyclohexane	1.51	31.45	5.73	0.00	38.69
Unidentified Components	8.23	4,266.84	31.20	0.00	4,306.27

TANKS 4.0.9d

Annual Emission Report: RVP 3.25 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 3.25)	73.98	4,454.46	280.40	0.00	4,808.84
Hexane (-n)	1.43	17.82	5.42	0.00	24.66
Benzene	1.30	26.73	4.92	0.00	32.94
Isooctane	0.00	4.45	0.00	0.00	4.45
Toluene	0.60	44.54	2.28	0.00	47.42
Ethylbenzene	0.08	17.82	0.29	0.00	18.19
Xylene (-m)	0.23	62.36	0.86	0.00	63.44
Isopropyl benzene	0.01	4.45	0.03	0.00	4.50
1,2,4-Trimethylbenzene	0.01	14.70	0.04	0.00	14.76
Cyclohexane	1.58	31.18	5.97	0.00	38.73
Unidentified Components	68.76	4,230.40	260.59	0.00	4,559.75

TANKS 4.0.9d

Annual Emission Report: RVP 3.27 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 3.27)	74.65	4,048.63	282.95	0.00	4,406.24
Hexane (-n)	1.43	16.19	5.42	0.00	23.04
Benzene	1.30	24.29	4.92	0.00	30.51
Isooctane	0.00	4.05	0.00	0.00	4.05
Toluene	0.60	40.49	2.28	0.00	43.37
Ethylbenzene	0.08	16.19	0.29	0.00	16.57
Xylene (-m)	0.23	56.68	0.86	0.00	57.76
Isopropyl benzene	0.01	4.05	0.03	0.00	4.09
1,2,4-Trimethylbenzene	0.01	13.36	0.04	0.00	13.42
Cyclohexane	1.58	28.34	5.97	0.00	35.89
Unidentified Components	69.43	3,844.99	263.13	0.00	4,177.55

TANKS 4.0.9d

Annual Emission Report: RVP 3.59 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 3.59)	85.72	3,914.80	324.88	0.00	4,325.40
Hexane (-n)	1.44	15.66	5.46	0.00	22.56
Benzene	1.31	23.49	4.96	0.00	29.75
Isooctane	0.00	3.91	0.00	0.00	3.91
Toluene	0.61	39.15	2.30	0.00	42.05
Ethylbenzene	0.08	15.66	0.30	0.00	16.03
Xylene (-m)	0.23	54.81	0.86	0.00	55.90
Isopropyl benzene	0.01	3.91	0.03	0.00	3.96
1,2,4-Trimethylbenzene	0.01	12.92	0.04	0.00	12.98
Cyclohexane	1.59	27.40	6.02	0.00	35.01
Unidentified Components	80.45	3,717.88	304.92	0.00	4,103.26

TANKS 4.0.9d

Annual Emission Report: RVP 3.96 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 3.96)	99.24	4,449.18	376.12	0.00	4,924.54
Hexane (-n)	1.45	17.80	5.51	0.00	24.76
Benzene	1.32	26.70	5.00	0.00	33.02
Isooctane	0.00	4.45	0.00	0.00	4.45
Toluene	0.61	44.49	2.32	0.00	47.42
Ethylbenzene	0.08	17.80	0.30	0.00	18.17
Xylene (-m)	0.23	62.29	0.87	0.00	63.39
Isopropyl benzene	0.01	4.45	0.03	0.00	4.49
1,2,4-Trimethylbenzene	0.01	14.68	0.05	0.00	14.74
Cyclohexane	1.60	31.14	6.07	0.00	38.82
Unidentified Components	93.92	4,225.39	355.98	0.00	4,675.29

TANKS 4.0.9d

Annual Emission Report: RVP 8.41 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (RVP 8.41)	330.95	3,887.94	1,254.34	0.00	5,473.22
Hexane (-n)	1.69	15.55	6.40	0.00	23.64
Benzene	1.53	23.33	5.81	0.00	30.67
Isooctane	0.00	3.89	0.00	0.00	3.89
Toluene	0.71	38.88	2.69	0.00	42.28
Ethylbenzene	0.09	15.55	0.35	0.00	15.99
Xylene (-m)	0.27	54.43	1.01	0.00	55.71
Isopropyl benzene	0.01	3.89	0.04	0.00	3.94
1,2,4-Trimethylbenzene	0.01	12.83	0.05	0.00	12.90
Cyclohexane	1.86	27.22	7.05	0.00	36.13
Unidentified Components	324.77	3,692.37	1,230.94	0.00	5,248.08

TANKS 4.0.9d

Annual Emission Report: Bakken 423 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (Bakken 423)	437.71	3,906.16	1,659.00	0.00	6,002.88
Isopentane	19.47	31.64	73.79	0.00	124.89
Pentane (-n)	29.24	69.57	110.81	0.00	209.61
Cyclopentane	2.37	9.22	8.97	0.00	20.55
Unidentified Components	386.65	3,795.74	1,465.44	0.00	5,647.82

TANKS 4.0.9d

Annual Emission Report: Bakken 430 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (Bakken 430)	193.39	3,889.85	732.99	0.00	4,816.23
Isopentane	31.19	58.81	118.20	0.00	208.20
Pentane (-n)	27.85	76.90	105.55	0.00	210.30
Cyclopentane	1.70	7.70	6.46	0.00	15.86
Unidentified Components	132.66	3,746.44	502.78	0.00	4,381.87

TANKS 4.0.9d

Annual Emission Report: Bakken 413 – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (Bakken 413)	306.57	3,927.38	1,161.96	0.00	5,395.92
Isopentane	21.29	37.70	80.67	0.00	139.66
Pentane (-n)	29.23	75.80	110.77	0.00	215.80
Cyclopentane	1.48	6.28	5.61	0.00	13.37
Benzene	0.53	8.21	1.99	0.00	10.73
Cyclohexane	1.25	18.73	4.73	0.00	24.72
Ethylbenzene	0.02	4.20	0.09	0.00	4.32
Xylene (-p)	0.04	8.60	0.17	0.00	8.81
Xylene (-m)	0.07	13.75	0.25	0.00	14.06
Xylene (-o)	0.03	7.78	0.11	0.00	7.92
Hexane (-n)	7.27	68.69	27.56	0.00	103.52
Toluene	0.26	14.85	1.00	0.00	16.11
Unidentified Components	245.11	3,662.80	929.00	0.00	4,836.90

TANKS 4.0.9d

Annual Emission Report: Bakken 413 at 11 psi – Internal Floating Roof Tank

Individual Tank Emission Totals

	Losses (lbs)				
Components	**Rim Seal Loss**	**Withdrawl Loss**	**Deck Fitting Loss**	**Deck Seam Loss**	**Total Emissions**
Crude oil (Bakken 413 at 11 psi)	949.68	3,906.16	3,599.40	0.00	8,455.24
Isopentane	30.74	37.50	116.52	0.00	184.76
Pentane (-n)	42.21	75.39	159.99	0.00	277.60
Cyclopentane	2.14	6.25	8.10	0.00	16.49
Benzene	0.76	8.16	2.88	0.00	11.80
Cyclohexane	1.80	18.63	6.84	0.00	27.27
Ethylbenzene	0.03	4.18	0.13	0.00	4.35
Xylene (-p)	0.06	8.55	0.24	0.00	8.86
Xylene (-m)	0.09	13.67	0.36	0.00	14.13
Xylene (-o)	0.04	7.73	0.16	0.00	7.94
Hexane (-n)	10.50	68.32	39.81	0.00	118.63
Toluene	0.38	14.77	1.45	0.00	16.59
Unidentified Components	860.90	3,643.01	3,262.92	0.00	7,766.82

TANKS 4.0.9d

Degassing Emissions - Tank Parameters

Internal Floating Roof Tank Parameters[1]	
Diameter (ft)	240
Volume (gal)	15,120,000
Turnovers per year	60
Net Throughput (gal/yr)	868,700,000
Number of Columns	37
External Shell and Roof Color	White

Vertical Fixed Roof Tank Parameters[2]	
Shell Height (ft)	48
Shell Diameter (ft)	240
Maximum Liquid Height (ft)	4
Average Liquid Height (ft)	1
Net Throughput (gal/yr)	1,353,647.4
Turnovers per Year	1
External Shell and Roof Color	White

[1] Speciation profile is the same as Bakken 413 and Bakken 413 at 11 psi
[2] Speciation profile is the same as RVP tank runs

TANKS 4.0.9d

Degassing Emissions

Emission Type	Tank Type	VOC (lb/yr)
Withdrawal Losses	Internal Floating Roof	67.99
Working Losses	Fixed Roof	3,153.64
Total VOC Degassing Emissons		3,221.63
		1.61 tpy

Section 5.2 – Wastewater/Stormwater Discharge Permit Applications

WAC 463-60-537
Applications for Permits and Authorizations – Wastewater/stormwater discharge permit applications.

The application for site certification shall include:

(1) A completed National Pollutant Discharge Elimination System (NPDES) permit application, for any proposed discharge to surface waters of the state of Washington, pursuant to the requirements of WAC 463-76-031; or

(2) For any proposed discharge to publicly owned treatment works (POTW) and/or groundwater of the state of Washington, a state waste discharge application;

(3) A notice of intent to be covered under any applicable statewide general permit for storm water discharge.

(04-23-003, recodified as § 463-60-537, filed 11/4/04, effective 11/11/04. Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, § 463-42-537, filed 10/11/04, effective 11/11/04.)

Section 5.2 Wastewater Permit Application

City of Vancouver
Industrial Information Form

Business Name:	Tesoro Savage Petroleum Terminal, LLC	
Facility Address:	5501 Northwest Lower River Road	
Mailing Address:	6340 South 3000 East, Suite 600	
(if different)	6340 South 3000 East, Suite 600	
Name of Contact:	Kelly Flint	
Title:	Authorized Person	
E-mail:	generalcounsel@savageservices.com	
Phone:	(801) 944-6600	Fax: (801) 944-6554

For Office Use Only:

Eng No.:
Possible Classified? Y N
WRP Staff:
Date IP App sent:
Date IP App due:
IP Staff Assigned:
Comments:

Nature of business:	*(Briefly describe your business AND any activities that produce wastewater.)*
See Attached	

Please answer each of the following questions:

1.	Yes ☑	No ☐	Is this business or facility connected to the city's sanitary sewers? *(Are there toilets, sinks or drains in the facility connected to the city sewer system?)*
2.	Yes ☑	No ☐	Does this business or facility discharge ANYTHING OTHER THAN domestic - toilet and sink - wastewater to city sanitary sewers? (*Will process industrial or commercial wastewater be sent to floor drains, batch or process drains, and then discharged to the city sanitary sewers?)* ***If yes, please check one of the following estimates.*** *(Shown below in gallons per day.)*
			Estimated process wastewater discharges: ☐ 0-99 ☐ 100-999 ☐ 1000-3999 ☑ >4000 GPD
3	Yes ☑	No ☐	Does this business have shop or facility floor drains, other than those in restrooms?
4.	Yes ☑	No ☐	Does this business store chemicals or petroleum products in containers of more than 5 gallons? ***If yes, provide information below on materials stored.*** *(Attach and use extra page if needed.)*

Chemical or Active Ingredient	Brand Name	Purpose	Container Size, gallons	Estimated Amounts On Site Avg., gallons.	Max., gallons
See Attached					

5.	Yes ☑	No ☐	Does this facility perform on-site vehicle maintenance or vehicle/equipment washing?

Please fax the completed, signed form to (360) 487-7139 or mail to Industrial Pretreatment, City of Vancouver Engineering Services, PO Box 1995, Vancouver, WA 98668. If you have questions or need help completing this form, contact the City of Vancouverôs Industrial Pretreatment or Water Protection divisions at (360)487-7130.

CERTIFICATION STATEMENT:

I certify that the information submitted is, to the best of my knowledge and belief, true and accurate.

Signature _____ Date _____

Kelly Flint
Printed Name

Authorized Person
Title

Application for a State Waste Discharge Permit to Discharge Industrial Wastewater to a Publicly-Owned Treatment Works (POTW)

DEPARTMENT OF ECOLOGY
State of Washington

This application is for a state waste discharge permit for a discharge of industrial wastewater to a publicly-owned treatment works (POTW) as required by Chapter 90.48 RCW and Chapter 173-216 WAC. It is designed to provide Ecology with information on pollutants in the waste stream, materials that may enter the waste stream, and the flow characteristics of the discharge.

Ecology may request additional information to clarify the conditions of this discharge. The applicant should reference information previously submitted to Ecology that applies to this application in the appropriate section.

SECTION A. GENERAL INFORMATION

1. Applicant Name: Tesoro Savage Petroleum Terminal LLC

2. Facility Name: Tesoro Savage Vancouver Energy Distribution Terminal
(if different from Applicant)

3. Applicant Mail Address: 6340 South 3000 East, Suite 600
Street

Salt Lake City, UT — 84121
City/State — Zip

4. Facility Location Address: 5501 NW Lower River Road
(if different from 3 above) Street

Vancouver, WA — 98660
City/State — Zip

5. UBI No. 603308951

Sometimes called a registration, tax, "C," or resale number, the Unified Business Identifier (UBI) number is a nine-digit number used to identify persons engaging in business activities. The number is assigned when a person completes a Master Business Application to register with or obtain a license from state agencies. The Departments of Revenue, Licensing, Employment Security, Labor and Industries, and the Corporations Division of the Secretary of State are among the state agencies participating in the UBI program.

6. Latitude/longitude of the facility as decimal degrees (NAD83/WGS84):
45.651778 / -122.731131

FOR OFFICE USE ONLY	Check One: New/Renewal ☐ Modification ☐		
Date Application Received _____	Date Fee Paid _____	Application/ Permit No. _____	Date Application Accepted _____

7. Person to contact who is familiar with the information contained in this application:

Kelly Flint Name	Authorized Person Title
(801) 944-6600 Telephone number	(801) 944-6554 Fax number

8. Check One:

☐ **Permit Renewal** (including renewal of temporary permits)

Does this application request a greater amount of wastewater discharge, a greater amount of pollutant discharge, or a discharge of different pollutants than specified in the last permit application for this facility? ☐ YES ☐ NO

For permit renewals, the current permit is an attachment, by reference, to this application.

☐ **Permit Modification**

☐ **Existing Unpermitted Discharge**

☒ **Proposed Discharge**

Anticipated date of discharge: 7/31/2015

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and/or imprisonment for knowing violations.

Signature*	Date	Authorized Person Title

Kelly Flint
Printed Name

*Applications must be signed as follows: corporations, by a principal executive officer of at least the level of vice-president; partnership, by a general partner; sole proprietorship, by the proprietor. If these titles do not apply to your organization, the person who makes budget decisions for this facility must sign the application.

The application signatory may delegate signature authority for submittals required by the permit, such as monthly reports, to a suitable employee. You can delegate this authority to a qualified individual or to a position, which you expect to fill with a qualified individual. If you wish to delegate signature authority, please complete the following:

Signature of delegated employee	Date	Title or function at the facility

Printed name

SECTION B. PRODUCT INFORMATION

1. Briefly describe all manufacturing processes and products, and/or commercial activities, at this facility. Provide the applicable Standard Industrial Category (SIC) and the North American Industry Classification System (NAICS) Code(s) for each activity (see *North American Industrial Classification System,* 2007 ed.). You can find the 1997 NAICS codes and the corresponding 1987 Standard Industry Category (SIC) codes at (http://www.census.gov/epcd/naics/frames3.htm).

Description: The Tesoro Savage Vancouver Energy Distribution Terminal will transfer crude oil transported to the facility by rail into storage tanks and onto vessels for shipment to West Coast refineries. There is no processing of raw materials at the proposed facility. Crude oil will be transferred and stored on stie. Boiler plants will be utilized to heat incoming crude and to maintain crude temperatures during stroage prior to being transferred onto the shipping vessels. Incoming City of Vancouver water supply will be treated to inhibit corrosion and sediment buildup in the steam lines. The West Boiler plant wastewater will be pumped and combined with domestic sewage from the Administrative and Support Buildings prior to discharge to the existing sanitary sewer (Waste Stream No. 1). The Rail Offloading area will have containment pans and equipment/part washing capabilities. Waste collected from these operations will be collected and pumped to holding tanks and hauled off site (Waste Stream No. 2). Boiler plant wastewater, restroom facility, fire pump cooling water and rainwater collected in the pump basin located at the Storage area will be discharged to an existing sanitary sewer (Waste Streamt No. 3). Portable toilet facilities will be installed at the Marine Terminal and wastewater will be hauled off (Waste Stream No. 4). The average wastewater stream from the facilitiy will be aprpoximately 17 gpm. Industrial SIC and NAICS codes for this facility are SIC 5171 and NAICS 422710: "Petroleum Bulk Station & Terminal."

2. List raw materials and products used at his facility:

Type	RAW MATERIALS	Quantity
Grapes (Example)		*1,000 tons per year*
Crude Oil		360,000 barrels per day
Type	**PRODUCTS**	**Quantity**
Grape Juice(Example)		*300,000 gallons per year*
N/A		N/A

SECTION C. PLANT OPERATIONAL CHARACTERISTICS

1. For each process listed in B.1. that generates wastewater, list the process, assign the waste stream a name and an ID # and describe whether it is a batch or continuous flow.

Process	Waste Stream Name	Waste Stream ID#	Batch (B) or Continuous (C) Process
West Boiler and Administrative and Support Buildings	Waste Stream No. 1	001	B
Rail Offloading building, including containment pans, fire pump cooling and equipment/part washdown	Waste Stream No. 2	002	B
Storage Area Boiler, including restroom, fire pump cooling, and pump basin	Waste Stream No. 3	003	B
Marine Terminal portable toilets	Waste Stream No. 4	004	B

2. On a separate sheet, produce a schematic drawing showing production processes, water flow through the facility, wastewater treatment devices and waste streams as named above. The drawing should indicate the source of intake water and show the operations contributing wastewater to the effluent. The treatment units should be labeled. Construct a water balance by showing average flows between intakes, operations, treatment units, and points of discharge to the POTW. (*See the example on page 16 of this application form.)*

3. What is the maximum daily wastewater discharge flow? 24,000 gallons/day

   What is the maximum average monthly wastewater discharge flow (daily flows averaged over a month)? 36,000 gallons/day

4. Describe any planned wastewater treatment improvements or changes in wastewater disposal methods, and the schedule for these improvements. *(Use additional sheets, if necessary and label as attachment C4.)*

Necessary wastewater pretreatment will be conducted on site for all process flows discharging to municipal sanitary sewer to ensure effluent limits meet the discharge limits specified in Vancouver Municipal Code Pretreatment Ordinaance 14.010.000.

Preliminary design for the boiler plants indicates that cooling water will be necessary to reduce boiler blowdown temperatures and pH adjustment may additionally be necessary. Waste Stream No. 3 includes a sump pump located within the crude transfer pump pit at the Tank Farm and discharge cooling water from the tank farm fire pump; therefore, an oil/water separator is additionally proposed at this facility. Domestic strength sewage from the onsite restroom facilities will not receive pretreatment.

Monitoring manholes will be provided at each santiary sewer connection from the project site to public sewer. Monitoring will be conducted to confirm that the waste stream meets the requirements of the City's pretreatment ordinance.

5. If production processes are subject to seasonal variations, provide the following information. The combined value for each month should equal the estimated total monthly flow. Please indicate the proper flow unit by checking one of the following boxes:

☐ gallons per day ☐ gallons per month ☐ million gallons per month

Waste Stream ID#	**MONTHS**											
	J	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**	**D**
Estimated Total Monthly Flow (GPD)												

6. How many hours a day does this facility typically operate? 24

How many days a week does this facility typically operate? 7

How many weeks per year does this facility typically operate? 52

7. List all incidental materials, such as oil, paint, grease, solvents, and cleaners, that are used or stored on site (*list only those with quantities greater than 10 gallons for liquids and 50 pounds for solids).* For solvents and solvent-based cleaners, include a copy of the material safety data sheet and estimate the quantity used. (*Use additional sheets, if necessary, and label as attachment C.7.)*

Materials/Quantity Stored: See Attachement C.7

8. Some types of facilities are required to have spill or waste control plans. Does this facility have:

		Yes	No
a.	A spill prevention, control, and countermeasure plan (40 CFR 112)?	☒	☐
b.	An Oil Spill Contingency Plan (chapter 173-182 WAC)?	☒	☐
c.	An emergency response plan (per WAC 173-303-350)?	☐	☒
d.	A runoff, spillage, or leak control plan (per WAC 173-216-110(f))?	☒	☐
e.	Any spill or pollution prevention plan required by local, state or federal authorities? If yes specify: WA Energy Facility Site Evaluation Council	☒	☐
f.	A solid waste control plan?	☐	☒
g.	A Slug Discharge Control Plan (40 CFR 403.8(f)(2)(v))?	☐	☒

SECTION D. WATER CONSUMPTION AND WATER LOSS

1. Potable water source(s):

☒ Public System (Specify) City of Vancouver

☐ Private Well ☐ Surface Water

a. Water Right Permit Number: N/A

b. Legal Description of Water Source

N/A ¼S, N/A ¼E, N/A , Section, N/A TWN, N/A R

2. Potable water use

a. Indicate total water use____

Gallons per day (average) 60,900

Gallons per day (maximum) 87,200

b. Is water metered?

☒ YES ☐ NO

SECTION E. WASTEWATER INFORMATION

1. How are the water intake and effluent flows measured?

   Intake: Public water meter

   Effluent Not measured

2. Describe the collection method for the samples analyzed below. (*i.e.*, grab, 24-hour composite). Applicants must collect grab samples (not composites) for analysis of pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, fecal coliform (including E. coli), and Enterococci (previously known as fecal streptococcus at § 122.26 (d)(2)(iii)(A)(3)),or volatile organics.

   Effluent sampling if required by permit will be collected using the grab sample method for the required analysis, including pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, fecal coliform, Enterococci, and volitile organics.

3. Has the effluent been analyzed for any other parameters than those identified in question E.4.? ☒ YES ☐ NO
   If yes, attach results and label as attachment E.4. This data must clearly show the date, method and location of sampling. *(Note: Ecology may require additional testing.)*

4. Provide measurements or range of measurements for treated wastewater prior to discharge to the POTW for the parameters with an "X" in the left column. If you obtain the application from the internet, contact Ecology's regional office to see if testing for a subset of these parameters is permissible. All analyses (except pH) must be conducted by a laboratory registered or accredited by Ecology (WAC 173-216-125). If this is an application for permit renewal, provide data for the last year for those parameters that are routinely measured. For parameters measured only for this application, place the values under "Maximum." Report the values with units as specified in the parameter name or in the detection level.

   The Permittee must use the specified analytical methods, detection limits (DLs) and quantitation levels (QLs) in the following table unless Ecology approves an alternate method or the method used produces measurable results in the sample and EPA has listed it as an EPA approved method in 40 CFR Part 136. If the Permittee uses an alternative method as allowed above, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

X	Parameter	Measurement Values			Number of Analyses	Analytical Method Std. Methods 19th,20th edition or EPA	Detection Limit/Quantitation Level
		Minimum	Maximum	Average			
	BOD (5 day)					SM 5210 B	/2 mg/l
	COD					SM 5220 D	/10 mg/l
	Total suspended solids					SM 2540 D	/5 mg/l
	Fixed Dissolved Solids					SM 2540 E	
	Total dissolved solids					SM 2540 C	
X	Conductivity (micromhos/cm)	1000 mmhos	1200 mmhos			SM 2510 B	
	Ammonia-N as N					SM 4500-NH_3 C	/0.3 mg/L
X	pH	8	10.2			SM 4500-H	0.1 standard units
	Fecal coliform (organisms/100 mL)					SM 9221 E or 9222 D	
	Total coliform (organisms/100 mL)					SM 9221 B or 9222 B	
	Dissolved oxygen					SM 4500-O C/G	
X	Nitrate + nitrite-N as N	<0.52 mg/L	<1 mg/L			SM 4500-NO_3 E	100 µg/L
	Total kjeldahl N as N					SM 4500-N_{org} C/E/FG	300 µg/l
	Ortho-phosphate-P as P					SM 4500-P E/F	10 µg/l
	Total-phosphorous-P as P					SM 4500-P E/P/F	10 µg/l
	Total Oil & grease					EPA 1664A	1.4/5 mg/l
	NWTPH - Dx					Ecology NWTPH Dx	250/250 µg/l
	NWTPH - Gx					Ecology NWTPH Gx	250/250 µg/l
X	Calcium	0.5 mg/L	125 mg/L			EPA 200.7	10 µg/l
X	Chloride	9.3 mg/L	6000 mg/L			SM 4500-Cl C	0.15 µg/l
	Fluoride					SM 4500-F E	.025/0.1 mg/l
	Magnesium					EPA 200.7	10/50 µg/l
	Potassium					EPA 200.7	700/ µg/l
X	Sodium	5880 mg/L	6000 mg/L			EPA 200.7	29/ µg/l
X	Sulfate	0.72 mg/L	15 mg/L			SM 4500-SO_4 C/D	/200 µg/l
	Arsenic(total)					EPA 200.8	0.1/0.5 µg/l

X	Parameter	Measurement Values			Number of Analyses	Analytical Method Std. Methods 19th,20th edition or EPA	Detection Limit/Quantitation Level
		Minimum	Maximum	Average			
X	Barium (total)		<0.4 mg/L			EPA 200.8	0.5/2 µg/l
X	Cadmium (total)		<0.04 mg/L			EPA 200.8	.05/.25 µg/l
X	Chromium (total)		<0.01 mg/L			EPA 200.8	0.2/1 µg/l
X	Copper (total)	0.2 mg/L	4 mg/L			EPA 200.8	0.4/2 µg/l
X	Lead (total)	<0.2 mg/L	<0.2 mg/L			EPA 200.8	0.1/.5 µg/l
	Mercury (total) pg/L					EPA 1631E	0.2/0.5 pg/l
X	Molybdenum(total)	<0.1 mg/L	<0.1 mg/L			EPA 200.8	0.1/0.5 µg/l
X	Nickel(total)	<1 mg/L	<1 mg/L			EPA 200.8	0.1/0.5 µg/l
	Selenium (total)					EPA 200.8	1/1 µg/l
	Silver (total)					EPA 200.8	.04/.2 µg/l
x	Zinc (total)	0.2 mg/L	0.2 mg/L			EPA 200.8	0.5/2.5 µg/l

6. Does this facility use any of the following chemicals as raw materials or produce them as part of the manufacturing process, or are they present in the wastewater? ☐ YES ☒ NO

(*The number in the column next to the chemical name is the Chemical Abstract Service (CAS) reference number to aid in identifying the compound.*)

If yes, specify how the chemical is used and the quantity used or produced:

METALS, CYANIDE & TOTAL PHENOLS			
Antimony, Total	7440-36-0	Nickel, Total	7440-02-0
Arsenic, Total	7440-38-2	Selenium, Total	7782-49-2
Beryllium, Total	7440-41-7	Silver, Total	7440-22-4
Cadmium, Total	7440-43-9	Thallium, Total	7440-28-0
Chromium (hex) dissolved	18540-29-9	Zinc, Total	7440-66-6
Chromium, Total	7440-47-3		
Copper, Total	7440-50-8	Cyanide, Total	57-12-5
Lead, Total	7439-92-1	Cyanide, Weak Acid Dissociable	
Mercury, Total	7439-97-6)	Phenols, Total	

PESTICIDES			
Aldrin	309-00-2	Endrin	72-20-8
alpha-BHC	319-84-6	Endrin Aldehyde	7421-93-4
beta-BHC	319-85-7	Heptachlor	76-44-8
gamma-BHC	58-89-9	Heptachlor Epoxide	1024-57-3
delta-BHC	319-86-8	PCB-1242	53469-21-9
Chlordane	57-74-9	PCB-1254	11097-69-1
4,4'-DDT	50-29-3	PCB-1221	11104-28-2
4,4'-DDE	72-55-9	PCB-1232	11141-16-5
4,4' DDD	72-54-8	PCB-1248	12672-29-6
Dieldrin	60-57-1	PCB-1260	11096-82-5
alpha-Endosulfan	959-98-8	PCB-1016	12674-11-2
beta-Endosulfan	33213-65-9	Toxaphene	8001-35-2
Endosulfan Sulfate	1031-07-8		

VOLATILE COMPOUNDS			
Acrolein	107-02-8		
Acrylonitrile	107-13-1	1,1-Dichloroethylene	75-35-4
Benzene	71-43-2	1,2-Dichloropropane	78-87-5
Bromoform	75-25-2	1,3-dichloropropene (mixed isomers) (1,2-dichloropropylene)	542-75-6
Carbon tetrachloride	56-23-5	Ethylbenzene	100-41-4
Chlorobenzene	108-90-7	Methyl bromide (Bromomethane)	74-83-9
Chloroethane	75-00-3	Methyl chloride (Chloromethane)	74-87-3
2-Chloroethylvinyl Ether	110-75-8	Methylene chloride)	75-09-2
Chloroform	67-66-3	1,1,2,2-Tetrachloroethane	79-34-5
Dibromochloromethane	124-48-1	Tetrachloroethylene	127-18-4
1,2-Dichlorobenzene	95-50-1	Toluene (108-88-3)	
1,3-Dichlorobenzene	(541-73-1)	1,2-Trans-Dichloroethylene (Ethylene dichloride)	156-60-5
1,4-Dichlorobenzene	106-46-7	1,1,1-Trichloroethane	71-55-6
Dichlorobromomethane	75-27-4	1,1,2-Trichloroethane	79-00-5
1,1-Dichloroethane	75-34-3	Trichloroethylene	79-01-6
1,2-Dichloroethane	107-06-2	Vinyl chloride	75-01-4

ACID COMPOUNDS

2-Chlorophenol	95-57-8	4-nitrophenol	100-02-7
2,4-Dichlorophenol	120-83-2	Parachlorometa cresol (4-chloro-3-methylphenol)	59-50-7
2,4-Dimethylphenol	105-67-9	Pentachlorophenol	87-86-5
4,6-dinitro-o-cresol (2-methyl-4,6,-dinitrophenol)	534-52-1	Phenol	108-95-2
2,4 dinitrophenol	51-28-5	2,4,6-Trichlorophenol	88-06-2
2-Nitrophenol	88-75-5		

BASE/NEUTRAL COMPOUNDS (compounds in bold are Ecology PBTs)			
Acenaphthene	83-32-9	3,3-Dichlorobenzidine	91-94-1
Acenaphthylene	208-96-8	Diethyl phthalate	84-66-2
Anthracene	120-12-7	Dimethyl phthalate	131-11-3
Benzidine	92-87-5	Di-n-butyl phthalate)	84-74-2
Benzyl butyl phthalate	85-68-7	2,4-dinitrotoluene	121-14-2
Benzo(*a*)anthracene	56-55-3	2,6-dinitrotoluene	606-20-2
Benzo(b)fluoranthene (3,4-benzofluoranthene)	205-99-2	Di-n-octyl phthalate	117-84-0
Benzo(j)fluoranthene	**205-82-3**	1,2-Diphenylhydrazine (*as Azobenzene*)	122-66-7
Benzo(k)fluoranthene (11,12-benzofluoranthene)	207-08-9	Fluoranthene	206-44-0
Benzo(r,s,t)pentaphene	**189-55-9**	Fluorene	86-73-7
Benzo(*a*)pyrene	50-32-8	Hexachlorobenzene	118-74-1
Benzo(*ghi*)Perylene	191-24-2	Hexachlorobutadiene	87-68-3
Bis(*2-chloroethoxy)*methane	111-91-1	Hexachlorocyclopentadiene	77-47-4
Bis(*2-chloroethyl*)ether	111-44-4	Hexachloroethane	67-72-1
Bis(*2-chloroisopropyl*)ether	39638-32-9	Indeno(*1,2,3-cd*)Pyrene	193-39-5
Bis(*2-ethylhexyl*)phthalate	117-81-7	Isophorone	78-59-1
4-Bromophenyl phenyl ether	101-55-3	**3-Methyl cholanthrene**	**56-49-5**
2-Chloronaphthalene	91-58-7	Naphthalene	91-20-3
4-Chlorophenyl phenyl ether	7005-72-3	Nitrobenzene	98-95-3
Chrysene	218-01-9	N-Nitrosodimethylamine	62-75-9
Dibenzo (a,j)acridine	**224-42-0**	N-Nitrosodi-n-propylamine	621-64-7
Dibenzo (a,h)acridine	**226-36-8**	N-Nitrosodiphenylamine	86-30-6
Dibenzo(a-*h*)anthracene (1,2,5,6-dibenzanthracene)	53-70-3	**Perylene**	**198-55-0**
Dibenzo(a,e)pyrene	192-65-4	Phenanthrene	85-01-8
Dibenzo(a,h)pyrene	189-64-0	Pyrene	129-00-0
		1,2,4-Trichlorobenzene	120-82-1

7. Are any other pesticides, herbicides or fungicides used at this facility? ☒ YES ☐ NO

If yes, specify the material and quantity used:

Generic weed control herbicides may be applied on site to control weed growth around the facilities. Herbicides will be applied in accordance with applicable manufacturer's recommendations and state and local regulations.

8 Are there other pollutants that you know of or believe to be present? ☒ YES ☐ NO

If yes, specify the pollutants and their concentration if known
(attach laboratory analyses if available as Attachment E8):

Additional laboratory analysis is included in Attachment E8.

9. Is the wastewater being discharged, or proposed for discharge, to the POTW designated as a dangerous waste according to the procedures in Chapter 173-303 WAC?

☐ YES ☒ NO ☐ DON'T KNOW

10. If the answer to question 9 above is yes, how did the waste designate as a dangerous waste *(check appropriate box)*?

For Listed and TCLP Characteristic Wastes only, also provide the Dangerous Waste Number(s).

Listed Waste ☐ Dangerous Waste Number(s) _____

Characteristic Wastes Dangerous Waste Number(s) _____

Ignitable ☐
Reactive ☐
Corrosive ☐
TCLP ☐

State Only Dangerous Wastes Dangerous Waste Number(s) _____

Toxicity ☐
Persistent ☐

For questions about waste designation under the *Dangerous Waste Regulations*, Chapter 173-303 WAC, contact Ecology's Hazardous Waste and Toxics Program at:

Northwest Regional Office - Bellevue	(425) 649-7000
Southwest Regional Office - Lacey	(360) 407-6300
Central Regional Office - Yakima	(509) 575-2490
Eastern Regional Office - Spokane	(509) 329-3400

SECTION F. SEWER INFORMATION

1. Is an inspection and sampling manhole or similar structure available on-site? ☒ YES ☐ NO
   If yes, attach a map or hand drawing of the facility that shows the location of these structures (Label as attachment F1 or this may be combined with map in H8, if H8 is applicable to your facility.)

SECTION G. OTHER PERMITS

1. List all environmental control permits or approvals needed for this facility; for example, air emission permits.

The Tesoro Savage Vancouver Engergy Distribution Terminal is required to go through the Washington State Energy Facility Site Evaluation Council (EFSEC) for approval. A comprehensive list of permits/approvals are provided in Part 2, Section 2.23 Pertinent Federal, State and Local Requirements of the Applicaton for Site Certification.

SECTION H. STORMWATER

1. Do you have coverage under the Washington State Industrial Stormwater NPDES General Permit? ☐ YES ☒ NO
   If yes, please list the permit number here. _____

   If no, have you applied for a Washington State Stormwater Industrial Stormwater General Permit? ☐ YES ☒ NO

   If you answered no to both questions above, complete the following questions 2 through 5.

2. Does your facility discharge stormwater: *(Check all that apply)*

   ☒ To storm sewer system *(provide name of storm sewer system operator:* Port of Vancouver

   ☐ Directly to any surface waters of Washington State *(e.g., river, lake, creek, estuary, ocean).*

   Specify waterbody name(s) _____

   ☐ Indirectly to surface waters of Washington State *(i.e., flows over adjacent properties first).*

   ☒ To a Sanitary Sewer

   ☐ Directly to ground waters of Washington State via:

   ☐ Dry well

   ☐ Drainfield

   ☐ Other

3. Areas with industrial activities at facility: *(check all that apply)*

   ☐ Manufacturing Building

   ☒ Material Handling

   ☒ Material Storage

   ☐ Hazardous Waste Treatment, Storage, or Disposal *(Refers to RCRA, Subtitle C Facilities Only)*

   ☐ Waste Treatment, Storage, or Disposal

   ☐ Application or Disposal of Wastewaters

   ☐ Storage and Maintenance of Material Handling Equipment

   ☐ Vehicle Maintenance

   ☐ Areas Where Significant Materials Remain

   ☒ Access Roads and Rail Lines for Shipping and Receiving

   ☐ Other (please specify): _____

4. Material handling/management practices

   a. Types of materials handled and/or stored outdoors: *(check all that apply)*

☐	Solvents	☐	Hazardous Wastes
☐	Scrap Metal	☐	Acids or Alkalies
☒	Petroleum or Petrochemical Products	☐	Paints/Coatings
☐	Plating Products	☐	Woodtreating Products
☐	Pesticides	☐	Other *(please list)*: _____

b. Identify existing management practices employed to reduce pollutants in industrial stormwater discharges: *(check all that apply)*

☒	Oil/Water Separator	☐	Detention Facilities
☒	Containment	☐	Infiltration Basins
☒	Spill Prevention	☒	Operational BMPs
☐	Surface Leachate Collection	☒	Vegetation Management
☒	Overhead Coverage	☐	Other *(please list)*: _____

5. Attach a facility site map showing stormwater drainage/collection areas, disposal areas and discharge points. This may be a hand-drawn map if no other site map is available *(See example on page 16 of this application)*. *Label this as attachment H.5.*

SECTION I. OTHER INFORMATION

1. Describe liquid wastes or sludges being generated by your facility that are not disposed of in the waste stream(s) and how they are being disposed of. For each type of waste, provide type of waste and the name, address, and phone number of the hauler.

   Liquid wastes from containment pans, fire pump cooling water, and miscellaneous floor drains from the rail car unloading building (Waste Stream #2) will be pumped from the rail offloading building to containment holding tanks located near the Adminstrative and Support Buildings.

   Sludge from the bottom of the storage tanks will be removed and hauled off-site once every 10 years per API Standards.

   Waste flows from portable restroom facilities located at the Marine Terminal (Waste Stream #4) will be hauled off.

2. Describe storage areas for raw materials, products, and wastes.

   Raw materials and products will be stored within the buildings on the site in designated locations. Products being stored, and estimated amounts, are listed in Attachment C.7. No significant waste streams are anticipated to result from the storage of materials.

3. Have you designated the wastes described above according to the applicable procedures of Dangerous Waste Regulations, Chapter 173-303 WAC? ☐ YES ☒ NO

SECTION J. CERTIFICATIONS

1. **Approval by Publicly-Owned Treatment Works [required by WAC 173-216-070(4)(b)]**

I approve of the discharge as described in this application. The applicant is:

(Please check the appropriate box below.)

☐ A Significant Industrial User (see Definitions at the end of this Section)

☒ A Categorical Industrial User

☐ Neither of the above

Name and location of sewer system to which this project will be tributary:

City of Vancouver. Waste Stream #1 (West Boiler and Administrative and Support Buildings) will connect to an existing 18" sewer main located immediately north of the site in NW Old Lower River Road. Waste Stream #3 (Storage Area) will connect to an existing 18" sewer main located immedately south of the site along the Port's rail corridor.

Treatment Works Owner: City of Vancouver

Street: 4500 SE Columbia Way

City/State: Vancouver, WA Zip: 98660

Signature of Treatment Works Authority | Date | Title

Printed Name

2. **Application review by Intermediate Sewer Owner at point of discharge (if applicable)**

I hereby acknowledge that I have reviewed the application for discharge to this sewer system.

Name and location of sewer system to which this project will be tributary:

Sewer System Owner:

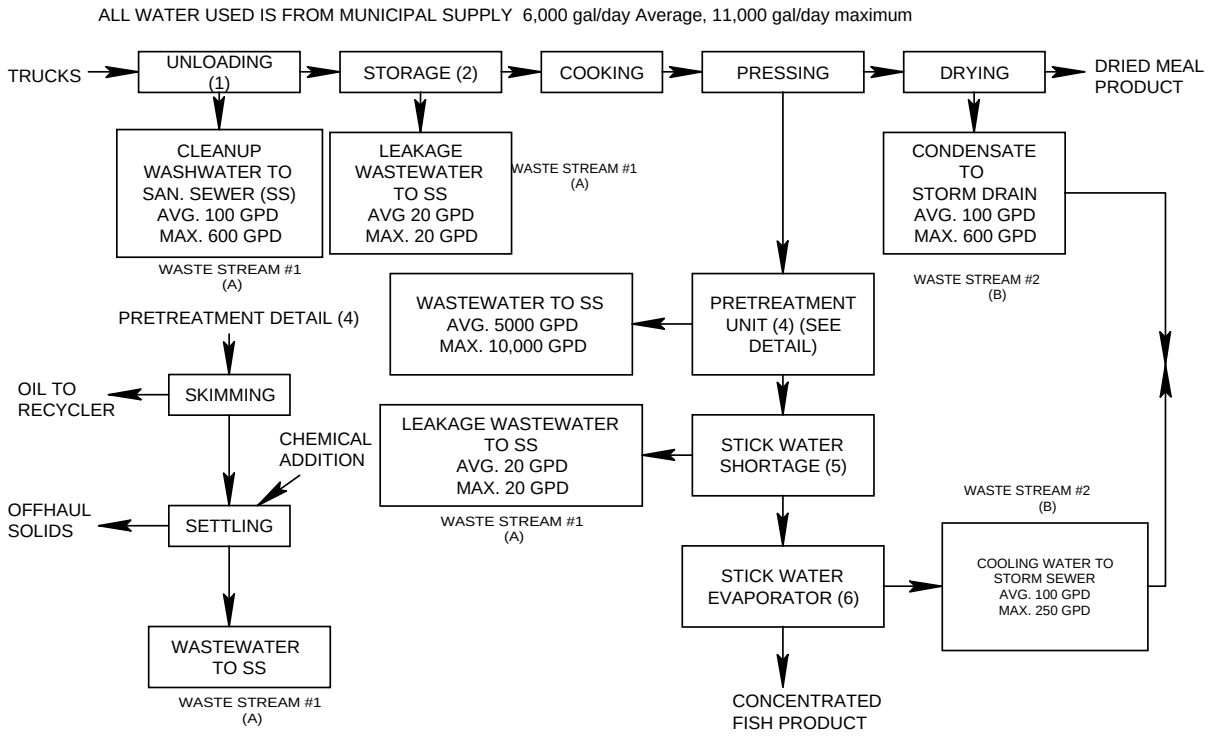
Street:

City/State: Zip:

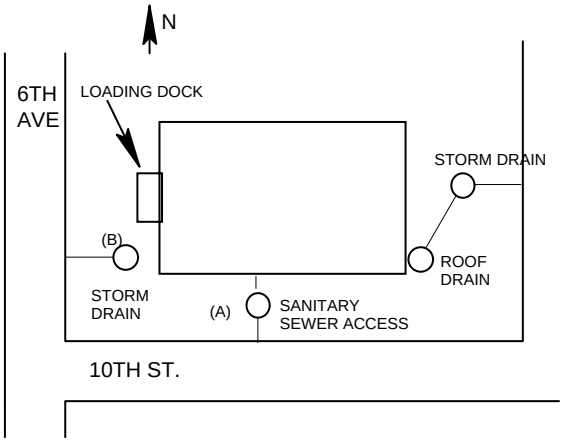
Signature of Sewer System Authority | Date | Title

Printed Name

Example 1 for application section C.2. (SCHEMATIC DIAGRAM)



Example 2 for application section F1 or H8 (FACILITY SITE MAP)



DEFINITIONS

Significant Industrial User (SIU)--

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

   Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

Control Authority - means the Washington State Department of Ecology in the case of non-delegated POTWs or means the POTW in the case of delegated POTWs.

Categoric Industrial User (CIU): An industrial user subject to national categorical pretreatment standards promulgated by EPA (40 CFR 403.6 and40 CFR parts 405-471).

Summary of Attachments That May be Required for This Application:

(Please check those attachments that are included)

- ☒ C.2. Production schematic flow diagram and water balance
- ☐ C.4. Wastewater treatment improvements
- ☒ C.7. Additional incidental materials
- ☒ E.8. Additional results of effluent testing
- ☒ F.1. Facility site map
- ☒ H.5. Stormwater drainage map

If you need this document in a format for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

C.7 Incidental Materials

A list of incidental materials that are anticipated to be used and stored on site can be found in Appendix G, Material Safety Data Sheets, along with the manufacturers' data sheets. Note that the manufacturers and trade names may differ after construction, but the types of products and their purposes are expected to be consistent with this list.

E.8 Additional Results of Effluent Testing

Actual effluent testing has not been completed for this project. NALCO, a local supplier of boiler plant chemical and pretreatment supplier, reviewed the City of Vancouver's domestic water constituents, and conducted an analysis to determine approximate effluent water quality. The results of that analysis are shown below for both the boiler blowdown and water softener backwash.

Constituent	Boiler Blowdown	Softener Backwash	Units
pH	10.2	8	
Conductivity	1200	1000	mmhos
Alkalinity	336	120	mg/L
Hardness	14	500	Mg/L as CaCO3
Polyacrylate	250	0	mg/L
Aluminum	<0.1	<0.1	mg/L
Barium	<0.4	<0.4	mg/L
Boron	<0.1	<0.1	mg/L
Bromide	<0.2	<0.2	mg/L
Cadmium	<0.04	<0.04	mg/L
Calcium	0.5	125	mg/L
Chloride	9.3	6000	mg/L
Chromium	<0.01	<0.01	mg/L
Copper	4	0.2	mg/L
Iron	2	0.1	mg/L
Lead	<0.2	<0.2	mg/L
Lithium	<0.01	<0.01	mg/L
Magnesium	3	50	mg/L
Manganese	<0.01	<0.01	mg/L
Molybdenum	<0.1	<0.1	mg/L
Nickel	<1	<1	mg/L
Nitrate	0.8	0.32	mg/L
Nitrite	<0.2	<0.2	mg/L
Phosphorus	1	1	mg/L
Potassium	59	59	mg/L
Silica	150	54	mg/L
Sodium	5880	6000	mg/L
Strontium	0.1	0.1	mg/L
Sulfate	15	0.72	mg/L
Sulfite	40	<0.2	mg/L
Vanadium	<1	<1	mg/L
Zinc	0.2	0.2	mg/L

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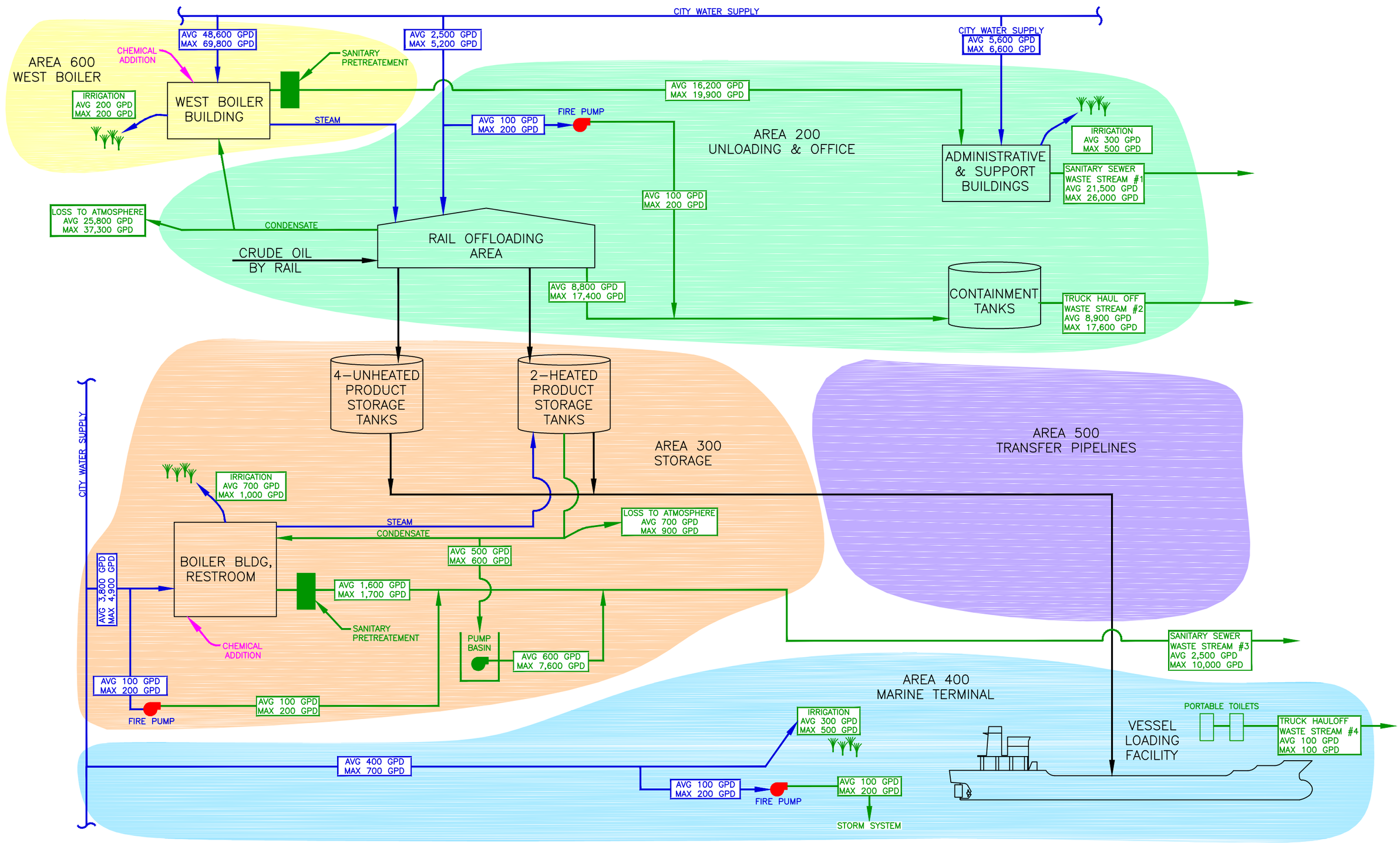
C.2 PROCESS SCHEMATIC FOR WASTEWATER DISCHARGES



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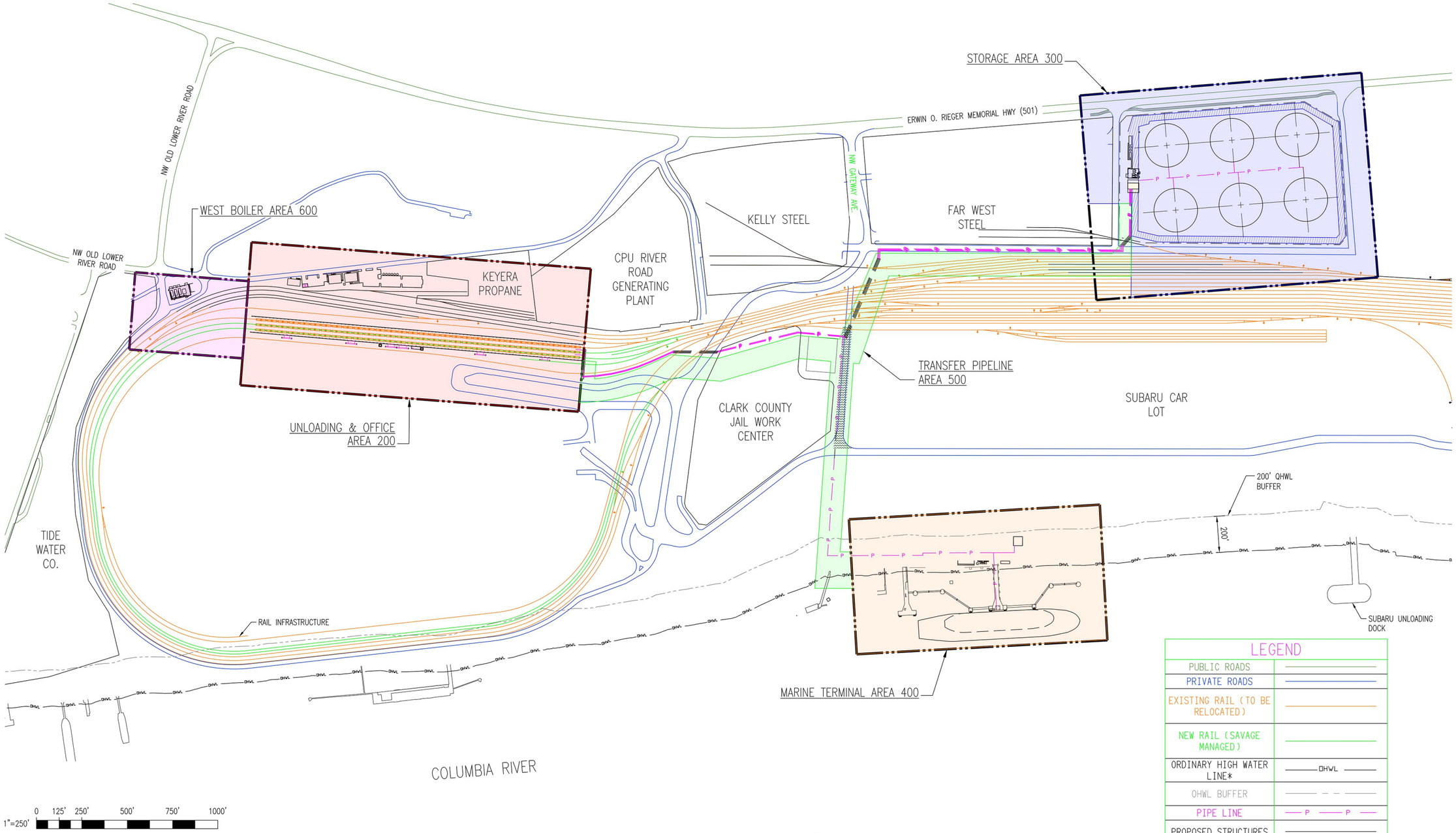
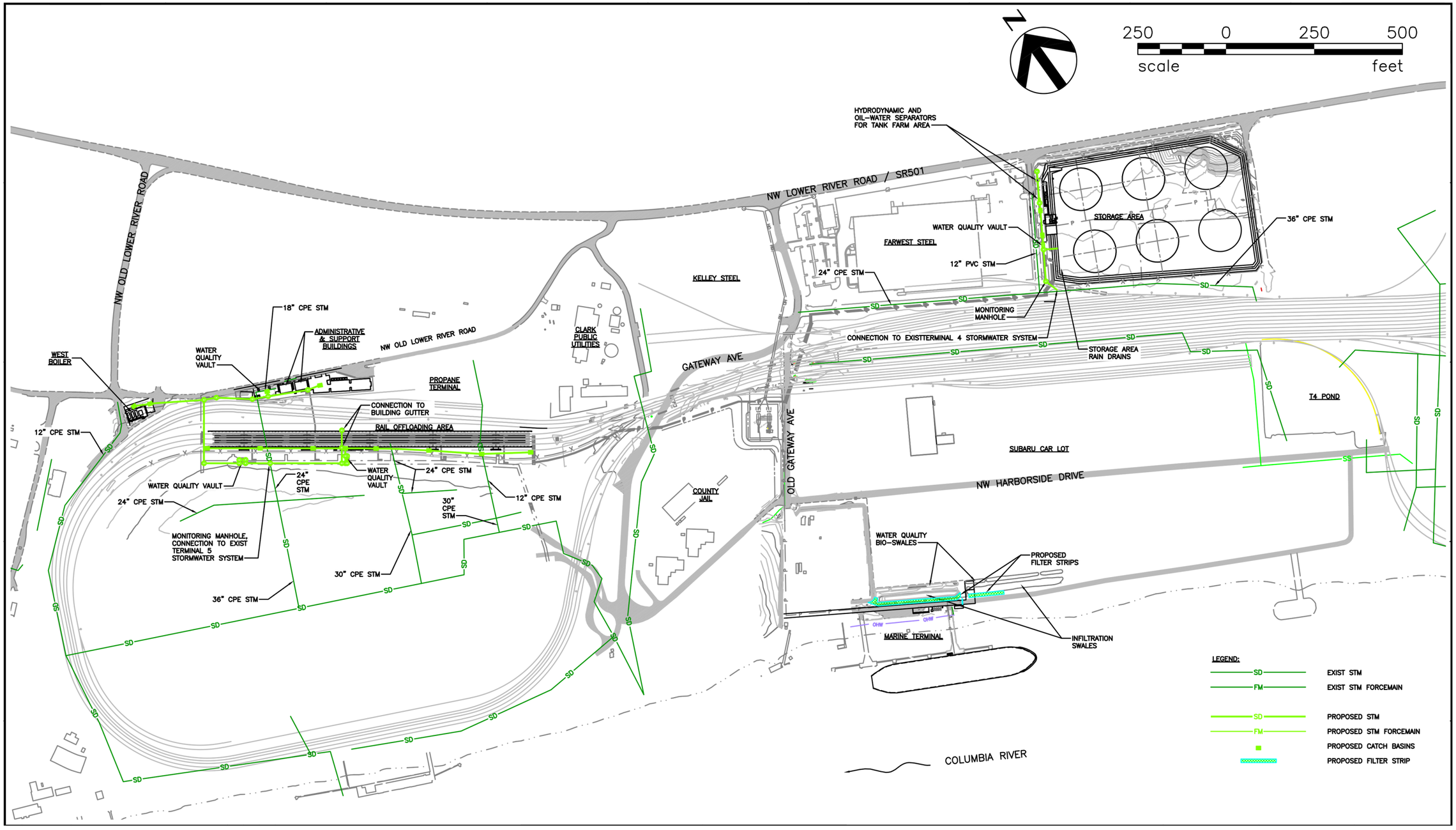


OVERALL SITE – PLAN VIEW
1"=250'

LEGEND	
PUBLIC ROADS	
PRIVATE ROADS	
EXISTING RAIL (TO BE RELOCATED)	
NEW RAIL (SAVAGE MANAGED)	
ORDINARY HIGH WATER LINE*	OHWL
OHWL BUFFER	
PIPE LINE	P P
PROPOSED STRUCTURES	
CONTAINMENT BERM	

* OHWL IS APPROXIMATE AND SHOWN FOR ILLUSTRATIVE PURPOSE ONLY



5.2-3. H5 Stormwater Drainage Map

Section 5.3 Stormwater Discharge Permit Application

DEPARTMENT OF ECOLOGY
State of Washington

NOTICE OF INTENT (NOI)
APPLICATION FORM

Construction Stormwater General Permit

Check if applicable:
☐ Change or Update Permit Information
☐ Modification of Permit Coverage
Permit #WAR_____

Please print or type all sections of this application. All fields are required unless otherwise marked.

I. Operator/Permittee (Party with operational control over plans and specifications or day-to-day operational control of activities which ensure compliance with Stormwater Pollution Prevention Plan (SWPPP) and permit conditions. Ecology will send correspondence and permit fee invoices to the permittee on record.)

Name: Tesoro Savage Vancouver Energy Distribution Terminal		Company: Tesoro Savage Petroleum Terminal LLC		
Business Phone: (801) 944-6600	Ext.	Unified Business Identifier (UBI): 603308951 *(UBI is a nine-digit number used to identify a business entity. Write "none" if you do not have a UBI number.)*		
Cell Phone (Optional):	Fax (Optional): (801) 944-6554			
E-mail: generalcounsel@savageservices.com				
Mailing Address: 6340 South 3000 East, Suite 600		City: Salt Lake City	State: UT	Zip 84121

II. Property Owner (The party listed on the County Assessor's records as owner and taxpayer of the parcel[s] for which permit coverage is requested. Ecology will not send correspondence and permit fee invoices to the Property Owner. The Property Owner information will be used for emergency contact purposes.)

Name: Port of Vancouver		Company (if applicable):		
Business Phone: (360) 693-3611	Ext.	Unified Business Identifier (UBI): *(UBI is a nine-digit number used to identify a business entity. Write "none" if you do not have a UBI number.)*		
Cell Phone (Optional):	Fax (Optional): (360) 735-1565			
E-mail:				
Mailing Address: 3103 Lower River Road		City: Vancouver	State: WA	Zip 98660

III. On-site Contact Person (Typically the Certified Erosion & Sediment Control Lead or Operator/Permittee)

Name: TBD		Company:		
Business Phone:	Ext.	Mailing Address:		
Cell Phone (Optional)	Fax (Optional):	City:	State:	Zip
E-mail:				

IV. WebDMR (Electronic Discharge Monitoring Reporting)

You must submit monthly discharge monitoring reports using Ecology's WebDMR system. To sign up for WebDMR, or to register a new site, go to www.ecy.wa.gov/stormwater, and click on the "Construction Stormwater" link. You will find information on WebDMR under the "WebDMR and PARIS" link on the right-hand side. If you are unable to submit your DMRs electronically, you may contact Ecology to request a waiver. Ecology will generally only grant waiver requests to those permittees without internet access. Only a permittee or representative, designated in writing, may request access to or a waiver from WebDMR. To have the ability to use the system immediately, you must submit the Electronic Signature Agreement with your application. If you have questions on this process, contact Ecology's WebDMR staff at WAWebDMR-Stormwater@ecy.wa.gov or 360-407-7097.

V. Site Information

Site or Project Name
Tesoro Savage Vancouver Energy Distribution Terminal

Street Address or Location Description (*If the site lacks a street address, list its specific location. For example, Intersection of Highway 61 and 34.)*

5501 NW Lower River Road, Vancouver, WA 98660_____

Parcel ID#: _____ *(Optional)*

Type of Construction Activity (*check all that apply*):
- ☐ Residential
- ☐ Commercial
- ☒ Industrial
- ☐ Highway or Road (city ,county, state)
- ☐ Utilities (specify): _____.
- ☐ Other (specify):_____.

Site Acreage
Total size of your site/project (that you own/control): 41.5 acres.

Total area of soil disturbance (grading and/or excavating) for your site/project over the life of the project: 41.5 acres. *(Note: 1 acre = 43,560 ft^2.)*

Concrete / Engineered Soils
How many yards of concrete will be poured over the life of the project? TBD yd^3 (estimate)

How many yards of recycled concrete will be used over the life of the project? TBD yd^3 (estimate)

Will any engineered soils be used? (For example: cement treated base, cement kiln dust, etc.)
☐ Yes ☐ No

City (or nearest city): Vancouver County: Clark	Zip Code: 98660	Estimated project start-up date (mm/dd/yy): Estimated project completion date (mm/dd/yy):

Record the latitude and longitude of the *main entrance* to the site or the approximate center of site.

Latitude: 45.651778 °N Longitude: 122.731131 °W

For assistance with latitude and longitude, refer to the following website: ***http://www.getlatlon.com****. Convert all latitude and longitude coordinates into degrees, minutes, seconds format. For help with this process go to:* **http://transition.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html**

VI. Existing Site Conditions

1. Are you aware of contaminated soils present on the site? ☒ Yes ☐ No

2. Are you aware of groundwater contamination located within the site boundary? ☐ Yes ☒ No

3. If you answered yes to questions 1 or 2, will any contaminated soils be disturbed or will any contaminated groundwater be discharged due to the proposed construction activity? ☐ Yes ☒ No

["Contaminated" and "contamination" here mean containing any hazardous substance (as defined in WAC 173-340-200) that does not occur naturally or occurs at greater than natural background levels.]

If you answered yes to Question 3, please explain below or on a separate paper in detail the locations, contaminants, and concentrations, and pollution prevention and/or treatment BMPs proposed to control the discharge of soil/groundwater contaminants. Ecology may request a copy of your SWPPP.

Deed restrictive caps exist on-site. Construction will minimize impact to the maximum extent possible. Excavated soils and dewatering water will be tested and re-used on-site or disposed of in accordance with Port standard operating procedures and state and local regulations.

VII. Stormwater Pollution Prevention Plan (SWPPP)

You must develop a SWPPP prior to starting construction. Do **not** submit your SWPPP with your application. The exception is that Ecology may request a copy of your SWPPP if you answered yes to the questions in Part VI.

VIII. Best Management Practices (BMPs)

You must use the BMPs listed in the Stormwater Management Manual for Western Washington or the Stormwater Management Manual for Eastern Washington or other manuals approved by Ecology. Alternatively, you may use demonstrably equivalent BMPs on the basis of permit condition S9.C.4. If you intend to use a BMP at your site that is not included in these manuals, but that you believe meets the definition of a *demonstrably equivalent* BMP, you must notify the appropriate regional office. (See Definitions in the Construction Stormwater General Permit).*

http://www.ecy.wa.gov/programs/wq/stormwater/construction/contacts.html

**Note that if you receive permit coverage without indicating the preference for a demonstrably equivalent BMP and later decide to use one, you must provide Ecology with notice of the selection of an equivalent BMP no less than 60 days before the intended use of the equivalent BMP.*

IX. Discharge/Receiving Water Information

Indicate whether your site's stormwater and/or dewatering water could enter surface waters, **directly** and/or **indirectly**:

☒ Water will discharge directly or indirectly (through a storm drain system or roadside ditch) into one or more surface waterbodies (wetlands, creeks, lakes, and all other surface waters and water courses).

If your discharge is to a storm sewer system, provide the name of the operator of the storm sewer system:

(e.g., City of Tacoma): Port of Vancouver

(NOTE: If your stormwater discharges to a storm sewer system operated by the City of Seattle, King County, Snohomish County, City of Tacoma, Pierce County, or Clark County, you must **also** submit a copy of this NOI to the appropriate jurisdiction.)

☐ Water will discharge to ground with 100% infiltration, with no potential to reach surface waters under any conditions.

If your project includes dewatering, you **must** include dewatering plans and discharge locations in your site Stormwater Pollution Prevention Plan.

Location of Discharge into Surface Waterbody

Enter the waterbody name and latitude/longitude of the point(s) where the site has the potential to discharge into a waterbody (enter all locations).

- Include the names and locations of both direct and indirect discharges to surface waterbodies, even if the risk of discharge is low or limited to periods of extreme weather.
- Some large construction projects (for example, subdivisions, roads, or pipelines) may discharge into several waterbodies.
- If the creek or tributary is unnamed, use a format such as "unnamed tributary to Deschutes River."
- **Attach a separate list if necessary.**

Surface Waterbody Name	Latitude Decimal Degrees	Longitude Decimal Degrees
Columbia River	45.6375° N	-122.7125° W
Columbia River	45.649722° N	-122.745833° W
	° N	° W
	° N	° W

If your site discharges to a waterbody that is on the impaired waterbodies list (i.e., 303[d] list) for turbidity, fine sediment, high pH, or phosphorus, Ecology will require additional documentation before issuing permit coverage and these sites will be subject to additional sampling and numeric effluent limits (per Permit Condition S8). Ecology will notify you if any additional sampling requirements apply. Information on impaired waterbodies is available online at http://www.ecy.wa.gov/programs/wq/303d/2008/index.html.

X. State Environmental Policy Act (SEPA)

This Notice of Intent (NOI) is incomplete and cannot be approved until the applicable SEPA requirements under Chapter 197-11 WAC are met.

Who is the SEPA lead agency on your site? Energy Site Evaluation Council.

Has the SEPA lead agency issued a final decision on your checklist? ☒No ☐Yes ☐ Exempt*

If No: The NOI is incomplete. Ecology will hold the application until a final SEPA decision is made or the Construction Stormwater NOI public comment period ends, whichever is later. **You must notify Ecology once the lead agency has issued a determination.**

If Yes: Type of SEPA decision issued: ☐ Determination of Non-Significance (DNS) ☐ Mitigated DNS (MDNS) ☐ Determination of Significance (DS) ☐ Final Environmental Impact Statement (EIS) ☐ Other:_____

- Date of final SEPA decision:_____.
- If a supplemental EIS, SEPA addendum, or some other type of additional SEPA review was required, please attach and submit with this form.
- Date when all SEPA-related comment & appeal periods are exhausted: _____.

***If Exempt:** Attach written documentation, check type of exemption below, and proceed to Section VII.

☐ Watershed Restoration & Fish Habitat Enhancement Exemption (RCW 43.21C.0382).

☐ Infill Development Exemption (RCW 43.21C.229).

☐ Planned Action Exemption (RCW 43.21C.031).

☐ Categorical Exemption. Under what section of the SEPA Rule (WAC 197-11-800) is it exempt? _____ (for example, WAC 197-11-800(1) Minor New Construction)

More SEPA information is available at: http://www.ecy.wa.gov/programs/sea/sepa/e-review.html.

XI. Public Notice

You must publish a public notice at least **once** a week for **two** consecutive weeks with **seven days** between publications, in at least a **single** newspaper of general circulation in the county in which the construction is to take place. Ecology cannot grant permit coverage sooner than the end of the 30-day public comment period, which begins on the date of the **second** public notice.

Mail or fax (360-407-6426) the NOI to Ecology on or **before** the **first** public notice date. If you fax the public notice to Ecology, you must also mail a hard copy. Failure to do so may delay the issuance of your permit.

Provide the **exact** dates (mm/dd/yy) that the first and second public notices will appear in the newspaper(s):

First notice: TBD/_____ /_____

Second notice: TBD/_____ /_____ (Begins 30-day public comment period.)

For example: First notice: 01/01/10

Second notice: 01/08/10

Name of the newspaper(s) publishing the notices: TBD

PUBLIC NOTICE TEMPLATE

Complete this template using project-specific information and submit to a local newspaper with general circulation within the county where the project is located. The **bold** language is required by WAC 173-226-130 and must be included in its entirety. (Either use the fill-in template below or **attach on a separate sheet of paper, if necessary.**)

(Note: This section is unprotected so you can delete text in parentheses)

Tesoro Savage Petroleum Terminal LLC, 6340 South 3000 East, Suite 600, Salt Lake City, UT 84121, **is seeking coverage under the Washington State Department of Ecology's Construction Stormwater NPDES and State Waste Discharge General Permit.**

The proposed project, Tesoro Savage Vancouver Energy Distribution Terminal, **is located at** 5501 NW Lower River Road in Vancouver, in Clark County.

This project involves 41.5 **acres of soil disturbance for** industrial **construction activities.**

Stormwater will be discharged to existing Port of Vancouver stormwater systems prior to discharge to the Columbia River.

Any persons desiring to present their views to the Washington State Department of Ecology regarding this application, or interested in Ecology's action on this application, may notify Ecology in writing no later than 30 days of the last date of publication of this notice. Ecology reviews public comments and considers whether discharges from this project would cause a measurable change in receiving water quality, and, if so, whether the project is necessary and in the overriding public interest according to Tier II antidegradation requirements under WAC 173-201A-320.

Comments can be submitted to:
Department of Ecology
Attn: Water Quality Program, Construction Stormwater
P.O. Box 47696, Olympia, WA 98504-7696

XII. Certification of Permittees

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Kelly Flint / Tesoro Savage Petroleum Terminal LLC
Printed Name / Company (operator/permittee only)

Authorized Person .
Title

_____
Signature of Operator/Permittee*

_____.
Date

*** Federal regulations require this application is signed by one of the following:**

A. For a corporation: By a principal executive officer of at least the level of vice president.
B. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively.
C. For a municipality, state, federal, or other public facility: By either a principal executive officer or ranking elected official.

Please sign and return this document to the following address:

Washington Department of Ecology - Stormwater
P.O. Box 47696
Olympia, WA 98504-7696

This form is equivalent to EPA Form 3510-1

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

FORM 1 GENERAL	U.S. ENVIRONMENTAL PROTECTION AGENCY/ECOLOGY	1. Current permit I.D.
	GENERAL INFORMATION	WA
	Consolidated Permits Program	T/A: D
	(Read the "General Instructions" before starting.)	14 15

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit a NPDES permit application forms to Ecology. If you answer "yes" to any questions, you must submit this form and the supplemental from listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

	MARK "X"				MARK "X"		
	YES	NO	FORM ATTACHED		YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.?** (FORM 2A)	☐	☒	☐	B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.?** (FORM 2B)	☐	☒	☐
C. Is this facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	☐	☒	☐	D. Is this proposal facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.?** (FORM 2D)	☐	☒	☐
E. Does or will this facility treat, store, or dispose of **hazardous wastes?** (FORM 3)	☐	☒	☐	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	☐	☒	☐
G. Do you or will you inject at this facility any produced water other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	☐	☒	☐	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfer by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	☐	☒	☐
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area?** (FORM 5)	☒	☐	☐	J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area?** (FORM 5)	☐	☒	☐

III. NAME OF FACILITY

C 1: ***Tesoro Savage Vancouver Energy Distribution Terminal***

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*		
C 2: ***Flint, Kelly, Authorized Person***	***801***	***944***	***6600***

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX		
C 3: ***6340 South 3000 East, Suite 600***		
B. CITY OR TOWN	**C. STATE**	**D. ZIP CODE**
C 4: ***Salt Lake City***	***UT***	***84121***

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER				
C 5: ***5501 NW Lower River Rd***				
B. COUNTY NAME				
Clark				
C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE	
C 6: ***Vancouver***	***WA***	***98660***		
7 D. LATITUDE/LONGITUDE (NAD 83 DATUM)				
LATITUDE AS DECIMAL DEGREES– N4 45.651778				
LONGITUDE AS DECIMAL DEGREES – W1 122.731131				

CONTINUED FROM THE FRONT

VII. SIC, NAICS CODES *(in order of priority)* AND UBI NUMBER *Place additional on an attachment.*

SIC FIRST				SIC. SECOND	
C 7	5171	*(specify)* **Petroleum Bulk Station & Terminal**	7 7		*(specify)*
EQUIVALENT NAICS FIRST				**EQUIVALENT NAICS SECOND**	
C 7	422710	*(specify)* **Petroleum Bulk Station & Terminal**	7 7		*(specify)*

UBI NUMBER -603308951

VIII. OPERATOR INFORMATION

A. NAME	B. Is the name listed in Item VIII-A also the owner?
C 8 **Tesoro Savage Petroleum Terminal LLC**	☒ YES ☒ NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other," specify.)*				D. PHONE *(area code & no.)*			
F = FEDERAL S = STATE P = PRIVATE	M = PUBLIC *(other than federal or state)* O = OTHER *(specify)*	P	*(specify)*	C A	801	944	6600

E. STREET OR PO BOX
6340 South 3000 East, Suite 600

F. CITY OR TOWN	G. STATE	H. ZIP CODE
C B Salt Lake City	UT	84121

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

	C	T	I		C	T	8		
A. NPDES *(Discharges to Surface Water)*	9	N			D. PSD *(Air Emissions from Proposed Sources)*	9	P		
B. UIC *(Underground Injection of Fluids*	9	U			E. OTHER *(specify)*	9			*(Specify)*
C. RCRA *(Hazardous Wastes)*	9	R			E. OTHER *(specify)*	9			*(Specify)*

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

The proposed project is designed to receive crude oil by rail from various sources and transfer it to storage tanks where it will be held until it is loaded onto vessels for transport to end users. The project will include the construction of administrative and support buildings, rail unloading facility piping, six tanks that can store up to 370,000 barrels each, and a marine loading facility that will include pipelines, cranes, an observation/control platform, and lighting to be installed on the existing dock structure at the site. In addition, two boiler plants will be built on the site and two rail lines will be added to the existing infrastructure at the Terminal 5 loop.

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
Kelly Flint, Authorized Person		

To ask about the availability of this document in a version for the visually impaired, call the Water Quality Program at 360-407-6600. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Please print or type in the unshaded areas	EPA ID Number *(copy from item I of Form 1)*	Form Approved. OMB No. 2040-0086 Approval expires 5-31-92

Form **2F** NPDES

United States Environmental Protection Agency
Washington, DC 20460

Application for Permit to Discharge Storm Water Discharges Associated with Industrial Activity

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 28.6 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information or suggestions for improving this form, including suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M St., SW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. Outfall Number *(list)*	B. Latitude			C. Longitude			D. Receiving Water *(name)*
T4O	***45***	***38***	***15***	***-122***	***42***	***45***	***Columbia River***
T5O	***45***	***38***	***60***	***-122***	***44***	***45***	***Columbia River***

II. Improvements

A. Are you now required by any Federal, State, or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

1. Identification of Conditions, Agreements, Etc.	2. Affected Outfalls		3. Brief Description of Project	4. Final Compliance Date	
	number	source of discharge		a. req.	b. proj.
N/A					

B. You may attach additional sheets describing any additional water pollution (or other environmental projects which may affect your discharges) you now have under way or which you plan. Indicate whether each program is now under way or planned, and idicate your actual or planned schedules for construction.

III. Site Drainage Map

Attach a site map showing topography (or indicating the outline of drainage areas served by the outfall(s) covered in the application if a topographic map Is unavailable) depicting the facility including: each of its intake and discharge structures; the drainage area of each storm water outfall; paved areas and buildings within the drainage area of each storm water outfall, each known past or present areas used for outdoor storage or disposal of significant materials, each existing structure control measure to reduce pollutants in storm water runoff, materials loading and access areas, areas where pesticides, herbicides, soil conditioners and fertilizers are applied; each of its hazardous waste treatment, storage or disposal units (including each are not required to have a RCRA permit which is used for accumulating hazardous waste under 40 CFR 262.34); each well where fluids from the facility are injected underground; springs, and other surface water bodies which receive storm water discharges from the facility.

 Continued on Page 2

Continued from the Front

IV. Narrative Description of Pollutant Sources

A. For each outfall, provide an estimate of the area (include units) of impervious surfaces (including paved areas and building roofs) drained to the outfall, and an estimate of the total surface area drained by the outfall.

Outfall Number	Area of Impervious Surface (provide units)	Total Area Drained (provide units)	Outfall Number	Area of Impervious Surface (provide units)	Total Area Drained (provide units)
T4O	***23.70 (acres)***	***25.32 (acres)***	***T5O***	***13.22 (acres)***	***13.74 (acres)***

B. Provide a narrative description of significant materials that are currently or in the past three years have been treated, stored or disposed in a manner to allow exposure to storm water; method of treatment, storage, or disposal; past and present materials management practices employed to minimize contact by these materials with storm water runoff; materials loading and access areas; and the location, manner, and frequency in which pesticides, herbicides, soil conditioners, and fertilizers are applied.

Areas listed above in IV-A are for the project drainage basins only. The area of the entire drainage basin contributing to outfall T4O is 176 acres and the area contributing to outfall T5O is 154 acres.

The proposed sites have been in general industrial use for the last 3 years and under the operational control of the Port of Vancouver. Construction of rail, utility, and general grading have been performed on these sites since the demolition of a defunct aluminum plant and the remediation of the former industry on Terminal 5. All construction, storage, and excavation on site within the last 3 years were completed in accordance with applicable construction and general stormwater permits. Outfall T4O and its contributing basin are currently governed by a state General Industrial Stormwater Permit WAR000424 and outfall T5O and its contributing basin are currently governed by a state NPDES Municipal Stormwater Permit WAR045201.

C. For each outfall, provide the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of the treatment the storm water receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Treatment	List Codes from Table 2F-1
T4O	***EXISTING TREATMENT*** ***Stormwater on site at Terminal 4 is treated in a combination of forms. Individual industry lease holders perform onsite stormwater treatment prior to discharge to the main drainage system. A master planned drainage system, including a water quality pond, was designed and constructed with sufficient capacity for the entire site, assuming 100 percent impervious coverage.***	***3-G***
	PROPOSED TREATMENT ***Project-specific structural BMPs installed upstream include covered storage facilities with dedicated roof gutter systems, containment berms, hydrodynamic separation, oil/water separators, and cartridge filter units. Nonstructural controls include spill prevention plans, employee training, visual inspection, preventive maintenance, good housekeeping measures, and manual operation of containment area pumps.***	***1-M*** ***1-Q***
T5O	***EXISTING TREATMENT*** ***Stormwater on site at Terminal 5 is treated in a combination of forms. Individual industry lease holders perform onsite stormwater treatment prior to discharge to the main drainage system. A master planned drainage system, including lift station and water quality ponds, was designed and constructed with sufficient capacity for the entire site, assuming 100 percent impervious coverage.***	***3-G***
	PROPOSED TREATMENT ***Project-specific structural BMPs installed upstream include covered storage facilities with dedicated roof gutter systems, oil/water separators, cartridge filter units. Nonstructural controls include spill prevention plans, employee training, visual inspection, preventive maintenance, and good housekeeping measures.***	***1-M*** ***1-Q***

V. Non Stormwater Discharges

A. I certify under penalty of law that the outfall(s) covered by this application have been tested or evaluated for the presence of nonstormwater discharges, and that all nonstormwater discharges from these outfall(s) are identified in either an accompanying Form 2C or Form 2E application for the outfall.

Name of Official Title *(type or print)*	Signature	Date Signed

 Continued on Page 3

N/A - See Narrative Below		

B. provide a description of the method used, the date of any testing, and the onsite drainage points that were directly observed during a test.

Designated outfalls T40 and T50 were not evaluated for the presence of non-stormwater discharges. This project connects to the master planned drainage conveyance system along with multiple other sources of stormwater and possible non-stormwater discharges outside of the operational area of control governed by this permit request. Monitoring manholes will be provided at each point where the project discharges to the existing conveyance systems. Monitoring as required by the final permit documents will be conducted to confirm stormwater quality meets the discharge limits and onsite discharges will be monitored to confirm that non-stormwater discharges are eliminated.

Discharge monitoring reports were obtained from the Port of Vancouver for outfall T40. Review of the 1st and 2nd Quarter DMRs from 2013 do not appear to indicate the presence of non-stormwater discharges. No monitoring is required at T50 in accordance with the Port of Vancouver's current stormwater permit.

VI. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last three years, including the approximate date and location of the spill or leak, and the type and amount of material released.

No significant leaks or spills of toxic or hazardous pollutants are known to have occurred on the project site within the last 3 years. The project area was used for general industrial purposes, including storage of equipment and material, and rail and access improvements have been ongoing. Activities on these sites were governed by previously issued construction and industrial stormwater permits.

 Continued on Page 3

Continued from Page 2

EPA ID Number *(copy from Item I of Form 1)*

VII. Discharge Information

A,B,C, & D: See instruction before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided. Tables Vii-A, VII-B, and VII-C are included on separate sheets numbered VII-1 and VII-2.

E. Potential discharges not covered by analysis - is any toxic pollutant listed in table 2F-2, 2F-3, or 2F-4, a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ Yes *(list all such pollutants below)* ☒ No *(go to Section IX)*

VIII. Biological Toxicity Testing Data

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ Yes *(list all such pollutants below)* ☒ No *(go to Section IX)*

IX. Contact analysis Information

Were any of the analysis reported in item VII performed by a contact laboratory or consulting firm?

☒ Yes *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* ☐ No *(go to Section X)*

A. Name	B. Address	C. Area Code & Phone No.	D. Pollutants Analyzed
Test America	***9405 SW Nimbus Avenue Beaverton, OR 97008***	***(503) 906-9200***	***Turbidity pH Copper Zinc***

X. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title *(type or print)*	B. Area Code and Phone No.
Kelly Flint, Authorized Person	***(801) 944-6600***
C. Signature	D. Date Signed

EPA ID Number *(copy from Item I of Form 1)*

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge Information *(Continued from page 3 of Form 2F)*

Part A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

Pollutant And CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number Of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite		
Oil & Grease	***Unknown***	N/A	***Unknown***	***None Noted***	***4***	***Fuel & oil storage, equipment & trucking drips***
Biological Oxygen Demand (BOD5)	***N/A***	***-***	***-***	***-***	***-***	***-***
Chemical Oxygen Demand (COD)	***N/A***	***-***	***-***	***-***	***-***	***-***
Total Suspended Solids (TSS)	***N/A***	***-***	***-***	***-***	***-***	***-***
Total Organic Nitrogen	***N/A***	***-***	***-***	***-***	***-***	***-***
Total Phosphorus	***N/A***	***-***	***-***	***-***	***-***	***-***
pH	Minimum	Maximum	Minimum	Maximum	***4***	***See below***

Part B - List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant And CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number Of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite		
Turbidity	***Unknown***	***25.5 NTU***	***Unknown***	***16.5 NTU***	***4***	***Exposed soils, gravels, & transient dusts***
pH	***Unknown***	***6***	***Unknown***	***6***	***4***	***-***
Total Copper	***Unknown***	***44.7 ug/L***	***Unknown***	***35.7 ug/L***	***4***	***Onsite bulk material handling, incl. copper***
Zinc	***Unknown***	***87.9 ug/L***	***Unknown***	***53.2 ug/L***	***4***	***Galvanized metals***

 Continue on Reverse

Continued from the Front

Part C - List each pollutant shown in Tables 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant And CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number Of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite	Grab Sample Taken During First 30 Minutes	Flow-weighted Composite		
	N/A					

Part D - Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event *(in minutes)*	3. Total rainfall during storm event *(in inches)*	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Total flow from rain event *(gallons or specify units)*
1/28/13	***1,860***	***1.00***	***5***	***8.06 MG***
2/28/13	***480***	***0.47***	***1***	***3.79 MG***
3/20/13	***360***	***0.39***	***36***	***3.15 MG***
5/16/13	***720***	***0.16***	***10***	***1.29 MG***

7. Provide a description of the method of flow measurement or estimate.

Total flow from the rain event was calculated using an estimate of the contributing area and multiplying by the total rainfall depth; a final conversion to gallons was completed to determine the final figure. The entire contributing area for outfall T4M is roughly 297 acres.

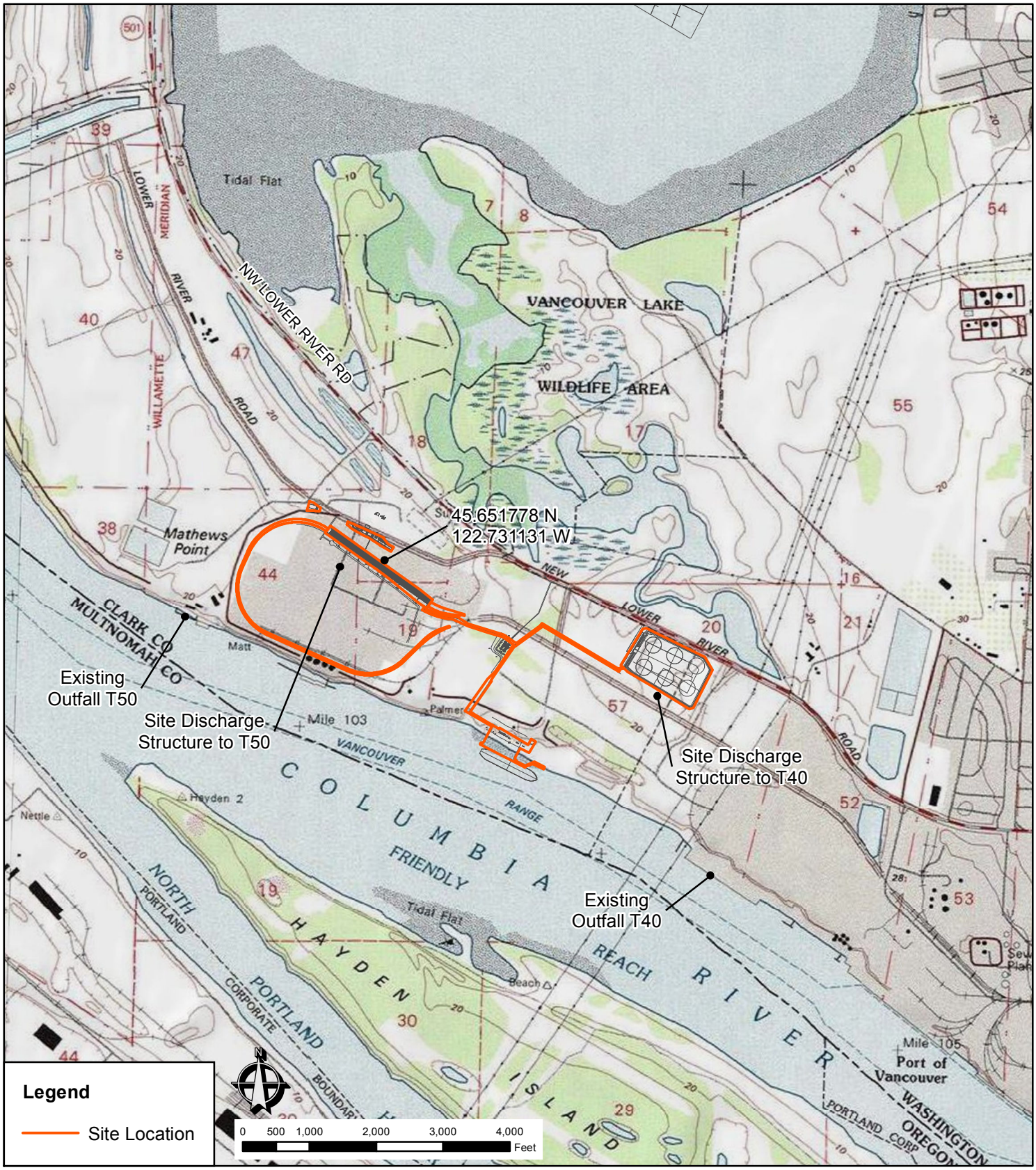
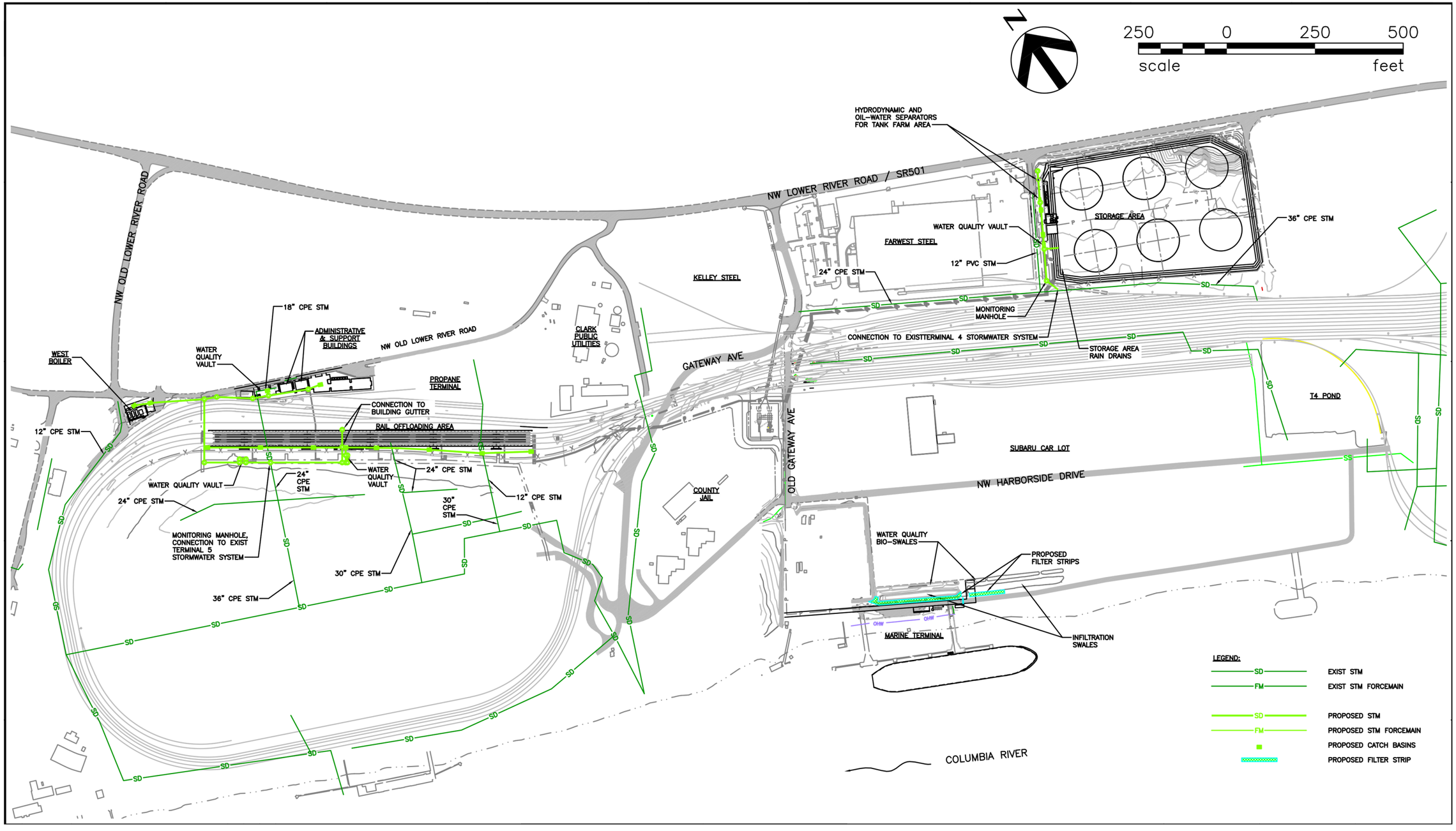


Figure 5.3-1: Topographic Map



5.3-2. Site Drainage map