Volume 1 of 6
Parts 1 - 4

Vancouver Energy
Application for Site Certification Agreement
EFSEC Application No. 2013-01
Revised May 2016
Docket No. EF131590

Submitted to

State of Washington
Energy Facility Site Evaluation Council
Olympia, Washington

27 May 2016

Vancouver Energy
Application for Site Certification Agreement
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List of Acronyms, Initials, and Abbreviations

A

AAR	American Association of Railroads
AC	Alternative connect
ACDP	Air Contaminant Discharge Permit
ACFM	Actual cubic feet per minute
ACI	American Concrete Institute

ACM	Asbestos-containing material
ACP	Area contingency plans
ADT	Average daily trips
af/year	Acre feet per year
AF&PA	American Forest and Paper Association
AGR	Acid gas removal system
AGS	Acid gas system
AINW	Archaeological Investigations Northwest, Inc.
AISC	American Institute of Steel Construction
Alcoa	Aluminum Company of America
ALS	Advanced life support
ANSI	American National Standards Institute
ANT	Advance notice of oil transfer
AQRV	Air quality related values
APE	Area of potential effects
Applicant	Tesoro Savage Petroleum Terminal LLC
Application	Site Certification Agreement
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
ARM	Ambient ratio method
ASC	Application for Site Certification
ASCE	American Society of Civil Engineers
ASIL	Acceptable source impact level
AST	Aboveground storage tank
ASTM	American Standards Testing and Materials
ASU	Air separation unit
ATB	Articulated tug barges
AWS	American Welding Society

B

BACT	Best available control technology
BAPE	Biological area of potential effect
BART	Best available retrofit technology
bbl	Barrel [and barrels]
bbl/hr	Barrels per hour
BCC	Bioaccumulative chemical of concern
BE	Biological evaluation
BENMAP	Benefits mapping and analysis program
BGS	Below ground surface
BMP	Best management practice
BO	Biological opinion
B&O	Business & occupation
BOD	Biological oxygen demand
B.P.	Before present
BPA	Bonneville Power Administration
bpd	Barrels per day

BPIP-Prime	EPA's Building Parameter Input Program-Prime
BTEX	Benzene, toluene, ethylbenzene, and xylenes
BTU	British thermal unit

C

CAA	Clean Air Act
$CaCO_3$	Calcium carbonate
CAO	Critical areas ordinance
CARA	Critical aquifer recharge area
CASAC	Clean Air Scientific Advisory Committee
CCPI	Clean coal power initiative
CCTV	closed-circuit television
CD	Criteria determinant
CECSL	Certified Erosion and Sediment Control Lead
CEMS	Continuous emissions monitoring
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFB	Circulating fluidized bed
CFC	Chlorofluorocarbons
CFHMP	Comprehensive flood hazard management plan
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CH_4	Methane
CHSM	Construction Health and Safety Manual
City	City of Vancouver
CM	Crustal Mass
CMMP	Contaminated media management plan
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COCs	Contaminants of Concern
COD	Chemical oxygen demand
COE	Cost of electricity
Co-Op	Electric cooperative utilities
COMS	Continuous opacity monitoring system
COPT	USCG Captain of the Port
COS	Carbonyl sulfide
County	Clark County
CPC	Casualty Prevention Circular
CPT	Cone penetration test
CPU	Clark Public Utilities
CRBG	Columbia River Basalt Group
CRD	Columbia River datum
CRESA	Clark Regional Emergency Services Agency
CRIDP	Cultural Resources Inadvertent Discovery Plan
CRWMB	Columbia River Wetland Mitigation Bank
CSGP	Construction stormwater general permit

CSHM	Construction Safety and Health Manual
cSPCCP	Construction Spill Prevention Control and Countermeasures Plan
cSWPPP	Construction Stormwater Pollution Prevention Plan
CSZ	Cascadia subduction zone
CTED	Community Trade and Economic Development, Washington State
CTG	Combustion Turbine Generator
CWA	Clean Water Act
CWMP	Construction Wildlife Monitoring Plan

D

DAHP	Washington State Department of Archaeology and Historic Preservation
DAT	Depositional analysis threshold
dB	Decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
dB_{RMS}	Decibel mean root square
DC	Direct connect
DCS	Distributed control system
DEIS	Draft environmental impact statement
DGER	DNR Division of Geology and Earth Resources
DI	Ductile iron
DLC	Donation land claim
DLN	Dry lox-NOx
DNR	Washington State Department of Natural Resources
DO	Dissolved oxygen
DOE	U.S. Department of Energy
DMR	Discharge Monitoring Report
DNR	Washington State Department of Natural Resources
DPS	Distinct population segment
DSM	Deep soil mixing
DWT	Deadweight tonnage

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	Washington State Energy Facility Site Evaluation Council
EGU	Electrical generating units
EIS	Environmental impact statement
EIV	Environmental information volume
EMD	Washington Military Department Emergency Management Division
ENR	Engineering News Record
EO	Executive Order
EOC	Emergency Operations Center

EPA	U.S. Environmental Protection Agency
EPC	Engineering, procurement, and construction
EPCRA	Emergency Planning and Community Right-to-Know Act
EPRI	Electric Power Research Institute
ER	Engineering Report
ESA	Endangered Species Act
ESD	Emergency shutdown
ESP	Electrostatic precipitator
ESU	Evolutionarily significant unit
Evergreen	Evergreen Aluminum LLC

F

Facility	Vancouver Energy Terminal
F	Fahrenheit
FEED	Front end engineering design
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGD	Fluid gas desulfurization
FHWA	Federal Highway Administration
FIRM	Flood insurance rate maps
FLAG	Federal Land Managers Air Quality-Related Values Workgroup
FLM	Federal land manager
FONSI	Finding of no significant impact
FOSC	Federal On-Scene Coordinator
F-PAAC	Fire Protection Agency Advisory Council
FRA	Federal Railroad Administration
FRP	Facility response plan
FSA	Facility Security Assessment
FSQ	Full slurry quench
FSP	Facility Security Plan
ft	Foot
FTA	Federal Transit Administration
FT-MSL	Feet above mean sea level
FWPCA	Federal Water Pollution Control Act

G

GAC	Granulated activated carbon
GCP	Good combustion practice
GHG	Greenhouse gas
GI	Generator interconnection
GLO	General Land Office
GMA	Growth Management Act
GO	Generator outlet
gpd	Gallons per day
gpm	Gallons per minute

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

H

H	Hydrogen
HAP	Hazardous air pollutant
HAZWOPER	Hazardous waste operations and emergency response
HB	House Bill
HBC	Hudson's Bay Company
H_2S	Hydrogen sulfide
HDD	Horizontal directional drilling
HDPE	High-density polyethylene
HGM	Hydrogeomorphic
HHV	High heating value
HG	Mercury
HMR	Hazardous materials regulations
HMTA	Hazardous Material Transportation Act
HP	High pressure
hp	Horsepower
HPA	Hydraulic Project Approval
hr	Hour
HRSG	Heat recovery steam generator
HSSE	Health, safety, security, and environment
HV	High voltage
HVAC	High voltage alternative current
HVDC	High voltage direct current
HVTL	High voltage transmission line
Hz	Hertz; unit of frequency

I

I-5	Interstate 5
IBC	International Building Code
ICS	Incident Command System
ICT	Innovative control technology
IES	Illuminating Engineering Society
IFC	International Fire Code
IGCC	Integrated gasification combined cycle
IHA	Incidental Harassment Authorization
IMC	International Mechanical Code
IND	Industrial
IOU	Investor-owned utilities
IP	Intermediate pressure
IPP	Independent power producers
IRP	Integrated resource plan
ISBL	Inside the boundary limit

ISGP	Industrial stormwater general permit
ISO	International organization for standardization
ISPM	Industrial safety program manual
ITE	Institute of Transportation Engineers
IWAQM	Interagency Workgroup on Air Quality Modeling

J

JARPA	Joint Aquatic Resources Permit Application
JIC	Joint Information Center
JWC	Jail Work Center

K

KV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour

L

L	Liter
LAER	Lowest achievable emission rate
L_{dn}	Day-night sound level
L_{eq}	Equivalent sound level
lbs	Pounds
LED	Light-emitting diode
LEPC	Local Emergency Planning Committee
LEPGP	Large electric power generating plant
LGIA	Large generator interconnect agreement
LGIP	Large generator interconnection procedure
LNB	Low-NO_X burners
LNG	Liquefied natural gas
LOA	Letter of authorization
LP	Low pressure
LSTK	Lump-sum turnkey

M

MACT	Maximum achievable control technology
MARSEC	Maritime Security
MDEA	Methyldiethanolamine (amine absorbent)
MDNS	Mitigated Determination of Non-Significance
MDWT	Thousand deadweight tons
MFR	Memorandum for Record
MFSA	Maritime Fire and Safety Association
mg	Milligram
MGD	Million gallons per day
MMBtu	Million British thermal units
MMDT	Million decatherms
mmhos	Millimhos

MMMP	Marine mammal monitoring and protection plan
MMPA	Marine Mammal Protection Act
MMscf/yr	Million standard cubic feet of natural gas per year
MOU	Memorandum of understanding
MRSC	Marine Spill Response Corp
MSDS	Material safety data sheets
MSH	Mount St. Helens
MSL	Mean sea level
MTCA	Model Toxics Control Act
MTR	Marine transportation-related
MTSA	Maritime Transportation Security Act
MVCU	Marine vapor combustion unit
MW	Megawatt
MWh	Megawatt hour

N

NAAQS	National ambient air quality standards
NATA	National-Scale Air Toxics Assessment
NAVD	North American Vertical Datum
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NESHAP	National emissions standards for hazardous air pollutants
NETL	National Energy Technology Laboratory
NFPA	National Ffire Protection Association
NGCC	Natural gas-fired combined cycle
NH_3	Ammonia
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of construction
NOI	Notice of intent
NO_X	Oxides of nitrogen
NNSR	non-attainment NSR
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRDA	Natural Resource Damage Assessment
NRIS	Network Resource Interconnection Service
NRT	National Response Team
NSR	New source review
NSPS	New source performance standards
NTP	Notice to proceed
NTU	Nephelometric turbidity unit

NWACP	Northwest Area Contingency Plan
NWI	National Wetlands Inventory
NWPCC	Northwest Power and Conservation Council
NWR	National Wildlife Refuge
NWS	National Weather Service

O

O_3	Ozone
OAQPS	EPA Office of Air Quality Planning and Standards
OC	Organic carbon
OCIMF	Oil Companies International Marine Forum
OEA	Oregon Office of Economic Analysis
OFA	Overfire air
OFM	Washington Office of Financial Management
OFSP	Operations Facility Safety Program
O&M	Operations and maintenance
OHWM	Ordinary high water mark
OMB	Office of Management and Budget
OPA 90	Oil Pollution Act of 1990
OSBL	Outside battery limits
OSCP	Oil Spill Contingency Plan
OSHA	U.S. Occupational Safety and Health Act
oSPCCP	Operation Spill Prevention Control and Countermeasures Plan
OSRA	Oil Spill Recovery Act
oSWPPP	Operation Stormwater Pollution Prevention Plan

P

PAH	Polycyclic or polynuclear aromatic hydrocarbon
PATON	Private Aids to Navigation
PC	Pulverized coal
PCB	Polychlorinated biphenyls
PDEIS	Preliminary draft environmental impact statement
PDP	Process design package
PDX	Portland International Airport
PEP	Project execution plan
PFC	Perfluorocarbons
PG	Pollution generating
PGA	Peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
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
POI	Point of interconnection
Port	Port of Vancouver USA

POTW	Publicly owned treatment works
PPA	Power purchase agreement
ppb	Parts per billion
PPE	Personal protective equipment
ppm	Parts per million
PPMVD	Parts per million (dry basis)
PPMW	Parts per million by weight
PPSA	Power Plant Siting Act
PRC	Primary response contractor
PSD	Prevention of significant deterioration
psi	pounds per square inch
PSIA	Pounds per square inch absolute
PSIG	Pounds per square inch gauge
PTE	Potential-to-emit
PUD	Public utility district
PVC	Polyvinyl chloride

Q

QPD	Qualified public developer
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
RECB	Regional expansion criteria and benefits
REMSAD	Regional modeling system for aerosols and deposition
RFP	Request for proposal
RM	River mile
ROW	Right-of-way
RRIF	Railroad Rehabilitation and Improvement Financing
RRT	Regional Response Team

S

SACTI	Seasonal cooling tower impact
SARA	Superfund Amendments and Reauthorization Act
SCA	Site certification agreement
SCR	Selective catalytic reduction
SCPC	Supercritical pulverized coal plant
SDP	Shoreline Development Permit
SEPA	State Environmental Policy Act
SF_6	Sulfur hexafluoride
SGCN	Species of greatest conservation need

SHAPS	Savage Hazard Analysis and Prevention System
SHE&Q	Safety, Security, Health Environment & Quality
SIL	Significant Impact Levels
SIP	State implementation plan
SIS	System impact study
SLM	Sound level measurements
SMA	Shoreline Management Act
SMP	Shoreline Management Program
SMMP	Shorelines Management Master Program
SNCR	Selective non-catalytic reduction
SNG	Substitute natural gas
SO_2	Sulfur dioxide
SOPEP	Shipboard oil pollution emergency plan
SOSC	State On-Scene Coordinator
SPCC	Spill prevention control and countermeasures
SPL	Spent Pot Liner
SQER	Small quantity emission rate
SR	State Route
SRU	Sulfur recovery unit
SSHE&Q	Safety, Security, Health, Environment & Quality
SSI	Security Sensitive Information
STG	Steam turbine generator
Superfund	Common name for CERCLA
SWCAA	Southwest Clean Air Agency
SWDA	Solid Waste Disposal Act
SWH	Shallow water habitat
SWL	Sound power level
SWPPP	Stormwater pollution prevention plan
SYNGAS	Synthesis gas

T

TAP	Toxic air pollutant
TCE	Trichloroethylene
TDS	Total dissolved solids
TEP	Transmission expansion planning
TESC	Temporary erosion and sediment control
TOC	Total organic carbon
TPD	Tons per day
TPIC	Terminal Person in Charge
TPQ	Threshold planning quantity
TSA	Transportation Security Administration
TSS	Total suspended solids
TTRA	Taconite Tax Relief Area
TWIC	Transportation Worker Identification Credential

U

UGA	Urban growth area
ULSD	Ultra-low sulfur diesel
UPPR	Union Pacific Railroad
UPC	Uniform Plumbing Code
UPS	Uninterrupted power system
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
USLE	Universal soil loss equation
UTM	Universal Transverse Mercator

V

VCPRD	Vancouver-Clark Parks and Recreation Department
VGP	Vessel general permit
VMC	Vancouver Municipal Code
VOC	Volatile organic compounds
VPD	Vancouver Police Department
VPIC	Vessel Person in Charge

W

WAAQS	Washington ambient air quality standards
WAC	Washington Administrative Code
WBS	Work breakdown structure
WCD	Worst-case discharge
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
WQPMP	Water quality protection and monitoring plan
WRRL	Western Response Resource List
WSDOT	Washington State Department of Transportation
WSP	Washington State Patrol
WUTC	Washington Utilities and Transportation Commission
WVFA	West Vancouver Freight Access
WWHM	Western Washington Hydrology Model
WWTP	Westside Wastewater Treatment Plant

Z

ZLD	Zero liquid discharge

BergerABAM

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27 May 2016

Mr. Stephen Posner
Energy Facility Site Evaluation Council
WA Utilities and Transportation Commission
P.O. Box 43172
Olympia, WA 98504-3172

Subject: Tesoro Savage Vancouver Energy Distribution Terminal
EFSEC Application No. 2013-01 – UTC Docket No. EF131590
Revised Application for Site Certification per WAC 463-60-116(2)

Dear Mr. Posner:

On behalf of Tesoro Savage Petroleum Terminal LLC (the Applicant), BergerABAM is submitting a revised Application for Site Certification (ASC). This revision is being submitted pursuant to WAC 463-60-116(2). It was prepared at the request of Energy Facility Site Evaluation Council staff with the intent to incorporate revisions and supplemental information into the ASC resulting from EFSEC's review of the ASC for compliance with the requirements contained in WAC 463-60 and WAC 463-62.

The Applicant has to the best of its knowledge included all commitments and mitigation measures made to date through the various review processes, including, but not limited to, review of the ASC by EFSEC and its consultants; review under the State Environmental Policy Act; review of air and water discharge permit applications; and review under Section 401 of the Clean Water Act.

Enclosed please find five hard copies of the May 2016 revised ASC, and 20 electronic copies. The Applicant will submit the following documents under separate cover.

- AERMOD modelling archive, on CD-Rom
- A word version of Parts 1 through 5 of the revised ASC, on CD-ROM
- A strikeout/underline version of Parts 1 through 5 and select appendices, on CD-Rom
- An additional 128 copies of the revised ASC on CD-ROM

Please feel free to contact me at 206/431-2373, or irina.makarow@abam.com, should you have any questions about this submittal. We look forward to further coordination with you, your staff, and EFSEC's consultants.

Sincerely,

Irina Makarow
Senior Environmental Project Manager

IM:nb
Enclosures
Revised Application for Site Certification (5 hard copies)
Revised Application for Site Certification (20 CD-Rom)

cc: Kelly Flint, Savage Companies
David Corpron, Savage Companies
Jared Larrabee, Savage Companies
Douglas Price, Tesoro Companies, Inc.
Chris Drechsel, Tesoro Companies, Inc.
Jay Derr, Van Ness Feldman LLP

MAY 2016 REVISED APPLICATION FOR SITE CERTIFICATION
CHANGE LIST

The following table is a summary of the main revisions and updates made to the Application for Site Certification (ASC). The table indicates the source of the materials used for the revisions, as follows.

401 Response:	Letter from Irina Makarow to Stephen Posner, 401 Water Quality Certification, Public Comment Response, February 19, 2016
Appendix:	See corresponding Appendix to the May 2016 Revised ASC
ASC 2013:	ASC submitted to EFSEC August 2013
ASC 2014:	Supplement to ASC submitted February 2014
ASC Review:	Changes made in response to EFSEC review of ASC
August 2014 NOC:	Revised NOC Application submitted August 2014
DEIS Letter:	Letter from Kelly Flint to Stephen Posner, DEIS Tesoro Savage Vancouver Energy Project, Application No. 2013-01, January 25, 2016
ER:	Vancouver Energy National Pollutant Discharge Elimination System Permit Engineering Report, October 2015 (section 5.3 of ASC)
NA:	New information based on design refinements, editorial changes, or information not present in other referenced documents
NPDES Letter:	Letter from Irina Makarow to Stephen Posner, Response to 19 February 2016 Letter Regarding Industrial National Pollutant Discharge Elimination System Permit Application Review, May 27, 2016 (section 5.3 of ASC)
PRM:	Letter from Irina Makarow to Stephen Posner, Project Description Update for Draft Environmental Impact Statement (DEIS) Development, May 27, 2015
PDEIS:	Applicant prepared Preliminary Draft EIS submitted to EFSEC July-September 2014; also includes responses to EFSEC DEIS Data Requests as indicated in footnotes
Response to NOC:	Letter from Kelly Flint to Stephen Posner, Response to EFSEC Review Comments on the ASC/NOC Air permit Application for the Vancouver Energy Project, May 6, 2016

ASC Section	Revision	Referenced From
Part 1		
1.1	Updated Applicant information.	See references
1.2	Updated Applicant contact information.	NA
1.3	Updated Applicant's financial assurance commitments.	Appendix E.2
1.4	Updated per revisions to Parts 1, 2, 3, 4 and 5.	See Parts 1 - 5
1.4.1.18	Added decommissioning impacts and mitigation measures.	PDEIS
1.5	Updated per revisions to Parts 1, 2, 3, 4 and 5.	See Parts 1 - 5
1.6	Updated with Applicant's on going consultation activities	NA
Part 2		
2.1.1	Impact Acreages were updated. This revision was included throughout the ASC as applicable.	PRM
2.1.1	Number of people directly employed by businesses at the Port was updated.	See references
2.1.1.1	The status of the BHP Billiton proposal, adjacent to the Facility site, was updated.	PDEIS
Figure 2.1-1	The figure was updated with the most current Facility site boundary.	PRM
Figure 2.1-2	The figure was updated with the most current Facility site boundary.	PRM
2.1.1.2	The reference to the boilers in Area 300 was removed.	PDEIS
2.1.1.2	The current use of Parcel 1A was updated.	See references
2.1.1.5	This section was updated to reflect that steam piping facilities are included in Area 600 for purpose of the project description, and that an E-house will also be constructed at this location.	PDEIS
2.1.1.6	The description of rail improvements at Terminal 5 was revised. This revision was included throughout the ASC as applicable.	PRM
2.1.2.3	Width of the Columbia River at Terminal 4 was revised. This revision was included throughout the ASC as applicable.	PDEIS
2.1.3.1	Revised name of Portland West Hills to Tualatin Mountains. This revision was included throughout the ASC as applicable.	PDEIS
Figure 2.3-1	Revised Figure showing product flow.	PDEIS
2.3.1	Clarified grade of crude oil received, handled, stored, and loaded at the facility. This revision was included throughout the ASC as applicable.	NA
2.3.1	Clarified the Applicant will neither own nor source the crude oil shipped through the Facility.	PDEIS[1,2]
2.3.1	Summary of Primary and Ancillary Project Elements were updated. This revision was included throughout the ASC as applicable.	Appendix B

[1] Letter from David Corpron and Irina Makarow to Stephen Posner, Responding to Request for Additional Information to Assess EIS Alternatives, February 5, 2015.
[2] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Request for Review of Draft Environmental Impact Statement (EIS) Chapter 2- Proposal Description, April 1, 2015.

ASC Section	Revision	Referenced From
2.3.1	Named the private access road to Old Alcoa Facility Access Road for purposes of the ASC. This revision was included throughout the ASC as applicable.	PDEIS
2.3.1	Revised the parking at the marine terminal area to be located on a reconstructed asphalt and gravel area.	NA
2.3.1.1	Revised capacity of intermediate berms.	PDEIS
2.3.1.1	Revised capacity of stormwater facilities.	ER, Appendix C.2
2.3.1.1	Clarified the transfer pipeline conveyance locations.	PDEIS
2.3.1.1	Clarified Port lease agreement.	Appendix E.2
2.3.1.1	Clarified dredging operations at berths 13 and 14 are a separate operation and not subject to site certification.	ASC 2013
2.3.2	Clarified average of four train arrivals per day.	PDEIS[3]
Figure 2.3-2	The figure was updated with the most current Facility site boundary and updated Facility elements. This revision was included throughout the ASC as applicable.	PRM
Figure 2.3-3	The figure was updated with the most current Facility site boundary and updated Facility elements.	PRM
Figure 2.3-4	The figure was updated with the most current Facility site boundary and rail track numbers.	PRM
2.3.3.1	Revised number of cars and locomotives in each unit train. This revision was included throughout the ASC as applicable.	PDEIS[2]
2.3.3.1	Clarified duration of train unloading.	PDEIS[2]
2.3.3.1	Clarified foundation elements of the unloading structure.	PRM
Figure 2.3-5	The figure was updated with the most current rail track numbers.	PRM
Figure 2.3-6	The figure was updated with the most current Facility site boundary.	PRM
Figure 2.3-7	The figure was updated to clarify surface material under tank car.	PRM
Figure 2.3-8	The figure was updated to show the updated track numbering.	PRM
2.3.3	Clarified the collection pans will convey stormwater in addition to inadvertent releases.	PDEIS, ER
2.3.3	Revised the rail car unloading facility combined secondary containment volume. This revision was included throughout the ASC as applicable.	NA
Figure 2.3-9 and Figure 2.3-10	The figure was updated with the most current Facility site boundary.	PRM
2.3.3	The dimensions of the pump basins were revised.	PDEIS
2.3.3	The quantities and capacities of the rail car unloading facility containment tanks were revised. This revision was included throughout the ASC as applicable.	PDEIS
Figure 2.3-11	Added new figure to show heated tank cross section.	PDEIS

[3] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request 2, February 23, 2015.

ASC Section	Revision	Referenced From
Figure 2.3-12	A note was added to the Figure to indicate intermediate berms are not shown.	PDEIS
2.3.3	The dimensions of the e-houses were updated.	PDEIS[2]
2.3.3	Dimensions and components of electrical equipment for the unloading facility were refined.	NA
2.3.3	Added DOT 117 rail car or better mitigation measure.	NA
2.3.4	Description of Administrative and Support Buildings foundations was added.	PRM
2.3.5	Added conveyance of crude oil from Area 200 to Area 400. This revision was included throughout the ASC as applicable.	PDEIS
2.3.5	Updated description of the 36-inch diameter pipeline to be electrically heat-traced.	PRM
2.3.5	Updated diameter of the pipeline delivering hydrocarbon vapor.	Appendix B.5
2.3.5	Updated minimum aboveground piping vertical support height.	Appendix B.5
2.3.5	Added the belowground transfer pipeline sections will be catholically protected.	PDEIS
2.3.5	Added information regarding the crude oil transfer rates.	PDEIS[2]
2.3.5	Added information regarding the proving station located at the exit of Area 200.	PRM
Figure 2.3-14	Removed call outs to upland facilities.	NA
2.3.6	Height of storage tanks updated.	PRM
2.3.6	Shell capacity of storage tanks updated.	PRM
2.3.6	Added positioning of storage tanks.	Appendix N.1
2.3.6	Clarified potential heating components of two tanks.	PDEIS
2.3.6	Added the minimum and maximum distances between the tanks and containment berms. This revision was included throughout the ASC as applicable.	Appendix N.1
2.3.6	Revised the height of the intermediate containment berms. This revision was included throughout the ASC as applicable.	PDEIS, PDEIS[2]
2.3.6	Provided additional detail regarding the impervious liner in the containment berm. This revision was included throughout the ASC as applicable.	DEIS Letter
2.3.6	Stormwater system within the containment area was revised. This revision was included throughout the ASC as applicable.	ER
2.3.6	Tank storage pump basin description and dimensions were revised.	NPDES Letter
2.3.6	E-house footprint has been updated.	PDEIS
2.3.6	Transformer footprint has been updated.	NA
2.3.6	Added information regarding electrical switchgear.	NA
2.3.6	Refined design of fire foam skid and fire water pump house building. This revision was included throughout the ASC as applicable.	PDEIS

ASC Section	Revision	Referenced From
2.3.7.1	Added information regarding marine terminal loading operations.	PDEIS[2]
2.3.7.1	Added additional information regarding the types and capacities of vessels calling at the Facility.	PDEIS[4]
Table 2.3-3	Added table of ATB and tanker vessel dimensions.	Moved from Part 4.
Figure 2.3-13	Added new figure to show Veteran Class Crude Oil Tanker.	PDEIS
2.3.7.1	Added information regarding the operations of vessel arrivals.	PDEIS[2]
2.3.7.1	Added information regarding the booming and loading of vessels at the Facility. This revision was included throughout the ASC as applicable.	PDEIS[2], Appendix B.5
2.3.7.1	Added information regarding the operations of vessel departures and transit.	PDEIS[2]
2.3.7.2	Clarified walkway dimensions and descriptions. This revision was included throughout the ASC as applicable.	PRM
2.3.7.2	Removed steel tie back wires at the mooring points.	NA
2.3.7.2	Clarified operations to be conducted at each berth.	PRM; PDEIS[2]
2.3.7.2	Added information regarding dockside equipment.	PRM
2.3.7.2	Revised the dimensions and components of the combined fire pump foam, e-house, and control room building.	PRM
2.3.7.2	Revised booming configurations.	PRM
2.3.7.2	Revised MVCU dimensions and clarified system operations.	PRM
2.3.8	Updated natural gas delivery to boiler building.	NA
2.3.8	Revised the boiler system water treatment. This revision was included throughout the ASC as applicable.	NPDES Letter
2.3.8	Revised the boiler plant discharge pretreatment. This revision was included throughout the ASC as applicable.	NPDES Letter
2.3.8.1	Removed the Area 300 Boiler and associated references. This revision was included throughout the ASC as applicable.	PDEIS
2.3.9	Added information regarding decommissioning and lease terms.	PDEIS
2.3.10	Revised estimated capital cost of the Facility. This revision was included throughout the ASC as applicable.	PDEIS.
Figure 2.6-1	The figure was updated with the most current Facility site boundary.	PRM
2.6.3	Maximum daily water use quantity was updated.	NPDES Letter
2.6.3	Added water use for ground improvement installation.	PDEIS
2.6.4	Revised the process water descriptions. This revision was included throughout the ASC as applicable.	NPDES Letter
Table 2.6-1	Revised Table listing process water use and rates.	PDEIS, NPDES Letter
2.6.5	Revised the potable water usage and description.	NPDES Letter

[4] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request 8, May 12, 2015.

ASC Section	Revision	Referenced From
Table 2.6-2	Revised Table listing potable water use and rates.	PDEIS, NPDES Letter
2.7	Revised quantity and use of boilers, and quantity of process water discharged. This revision was included throughout the ASC as applicable.	NPDES Letter
2.8.1	Revised description of aquatic discharge systems. This revision was included throughout the ASC as applicable.	NPDES Letter
2.8.1.1	Updated description of Terminal 5 stormwater system.	ER, Appendix C.2
2.8.1.2	Updated description of Terminal 4 stormwater system.	ER, Appendix C.2
2.8.1.3	Revised the discharge amounts during a 100-year storm at the combined marine terminal and Subaru treatment and infiltration swales.	PRM
2.8.1.3	Added information regarding stormwater discharge from the containment area.	ER, Appendix C.2
2.8.1.4	Revised wastewater sources discharging to City sanitary sewer.	PRM
2.8.1.4	Added information regarding alternative disposal options.	NPDES Letter
2.8.1.5	Added information regarding haul off as an alternative disposal option.	NPDES Letter
2.8.2.1	Added information regarding Area 600 process wastewater discharge alternatives.	NPDES Letter
2.8.2.2	Added information regarding Area 300 process wastewater discharge alternatives.	NPDES Letter
2.9.1	Revised process wastewater sources and descriptions.	NPDES Letter
Table 2.9-1	Revised Table listing process wastewater sources.	NPDES Letter
2.9.1	Revised analysis for process wastewater discharge.	NPDES Letter
Table 2.9-2	Revised Table listing estimated chemical makeup of process water discharge	NPDES Letter
2.9.1	Added alternatives for discharge of the boiler plant wastewater.	NPDES Letter
Table 2.9-3	Revised Table listing domestic wastewater quantities.	NPDES Letter
2.9.3	Revised pretreatment processes requirements.	NPDES Letter
2.9.4	Added alternatives for treatment of industrial wastewater.	NPDES Letter
2.9.5	Added alternatives for discharge of industrial wastewater.	NPDES Letter
Table 2.9-4	Added Table 2.9.4 Required Wastewater Discharge Constituent Limits listing Facility wastewater discharges compared to City of Vancouver's pre-treatment limits	NPDES Letter
2.9.5	Added compliance information regarding the City of Vancouver wastewater discharges and regulatory provisions.	NA
2.1	Clarified: Oils the Facility will handle - Groups 2, 3, and 4 persistent oils as defined in WAC 173-182-030 (24) with a specific gravity less than 1 and an API gravity ranging from 15 to 45, and oils the Facility will not receive.	ASC 2013
2.10.1.2	Added WAC 173-184 regulation for advance notice of oil transfer.	PDEIS

ASC Section	Revision	Referenced From
2.10.1.2	Added WAC 463-60-205 regulation for inclusion of construction and operation SPCC plan description.	NA
Table 2.10-1	Updated table with state requirements for advance notice of oil transfer.	PDEIS
Table 2.10-3	Added table.	PDEIS, Appendix B.3
Table 2.10-4	Updated Table 2.10-4 Hazardous Materials On site during Operation and Maintenance listing hazardous materials on site during operation and maintenance.	PDEIS
2.10.2.2	Revised containment pan description and containment tank capacity.	PRM, PDEIS
2.10.2.3	Updated hydrostatic testing requirements.	PDEIS[2]
2.10.2.3	Added foundation information for storage tanks. This revision was included throughout the ASC as applicable.	PDEIS
2.10.2.4	Added information regarding ultrasonic flow meters.	PRM
2.10.2.4	Added information regarding secondary containment for underground pipe runs, aboveground pipeline construction, and applicable regulations.	PDEIS
2.10.2.4	Clarified catholically protected pipeline.	PDEIS
2.10.2.4	Added information regarding ESD valves.	PDEIS[2]
2.10.2.5	Added information regarding the risk of release from vessel loading operations.	DEIS Letter
2.10.2.6	Added information regarding booming equipment and spill response equipment.	Appendix B.5
2.10.2.6	Revised length of fence boom.	Appendix B.5, PDEIS
Figure 2.10-1	Revised Figure to show updated booming plan and location of spill response equipment.	PRM, PDEIS
2.10.3.1	Revised Facility construction spill prevention, control and contingency plan description	Appendix B.2, PDEIS
Table 2.10-5	Added Table of oils, fuels, and hazardous materials to be stored during construction.	PDEIS
2.10.3.2	Indicated submittal of preliminary spill preparedness and response plans.	NA
Table 2.11-1	Revised Table listing construction source control BMPs	Appendix C.1
2.11.2	Revised annual rainfall amount.	NA
Table 2.11-2	Revised Table listing drainage basin areas.	ER, Appendix C.2
2.11.2	Added regulation for stormwater facilities.	ER
2.11.2.1	Revised description of source control BMPs.	PDEIS, PDEIS[5], ER
Table 2.11-3	Revised Table 2.11-3 listing applicable structural source control and operational BMPs	PRM
2.11.2.3	Provided additional information regarding status of Tier II anti-degradation analysis	NPDES Letter

[5] Letter from Irina Makarow to Stephen Posner, Response to EFSEC Draft EIS Data Request on Berm Size, July 27, 2015.

ASC Section	Revision	Referenced From
All sub sections of Section 2.12	In August 2014 the Applicant submitted to EFSEC a revised air permit application. The entirety of Section 12.2 was therefore replaced with the corresponding contents of the 2014 submittal. Major changes from the August 2014 submittal are indicated below. Since that time the Applicant has also responded to an EFSEC request for information dated March 14, 2016; a response was submitted to EFSEC on May 6, 2016. The information submitted in that response has also been incorporated in these ASC revisions, as indicated below. Additional changes have been made for clarification and are also indicated below. See also the changes to Section 5.1.	August 2014 NOC
2.12	Added construction emissions from third party batch plant.	PRM
2.12.2	Corrected definition of nitrogen oxide.	NA
2.12.2.1	Added ground improvement activities to construction emissions (temporary batch plant).	PRM
2.12.2.2	Clarified the operation assumptions of the Area 600 boilers.	Response to NOC[6]
Table 2.12-1	Revised Table listing projected annual emissions based on updated boiler assumptions and errors corrected. See 5.1.2.17.	Response to NOC[6]
Table 2.12-2	Revised Table listing Facility-wide TAPs/HAPs emissions based on refined tank emission estimates. See 5.1.2.1.7	Response to NOC[6]
2.13	Added Applicant's CO2 emissions mitigation commitment.	PDEIS
Table 2.13-1	Added Table listing Facility stationary source annual GHG emissions.	PDEIS
2.15.1	Revised construction schedule and milestones. This revision was included throughout the ASC as applicable.	NA
2.15.2	Revised construction workforce.	PDEIS
Table 2.15-1	Revised Table listing construction workforce by trade for Phase I.	PDEIS
2.15.3	Revised operation workforce.	PDEIS
Table 2.15-3	Revised Table listing operations staff.	PDEIS
Figure 2.15-1	Revised Figure showing construction milestones	NA
2.16.2	Revised status and content of the Construction Safety and Health Manual. This revision was included throughout the ASC as applicable.	Appendix D.2
2.16.2	Added EFSEC's review comments of the CSHM as revisions to be made to the plan.	Appendix M
2.17	Added additional information regarding construction staging and laydown activities.	PRM
2.17	Added types of construction equipment to be used during construction.	PRM
Figure 2.17-1	Revised Figure showing temporary construction boundary and laydown areas.	PRM

[6] Additional information to this response is included in this May 2016 ASC Revision.

ASC Section	Revision	Referenced From
2.17.3	Removed description of foundations and referenced description in Section 2.18.1.4.	NA
2.17.4	Added information regarding soil excavation in Area 300.	PRM
2.17.6	Revised and added information regarding natural gas service lines that will serve the Facility.	Personal communication with NW Natural
2.18.1.4	Added compliance with City and State design standards	DEIS Letter
2.18.1.4	Added descriptions of ground improvement design and potential construction methods.	DEIS Letter, Appendix L.3, PRM
2.18.2.1	Added that ash fall will be addressed in the Construction/Operations Emergency Plan	DEIS Letter
2.19.1	Added information regarding the Port's security force.	Appendix D.4
2.19.2	Added description of Construction Security Plan contents.	Appendix D.4
2.19.2.1	Added description of security measures to be implemented at the site during construction.	Appendix D.4
2.19.2.2	Added description of access control measures to be implemented at the construction sites.	Appendix D.4
2.19.2.3	Added description of entry and exit screenings at the site to be implemented during construction.	Appendix D.4
2.19.2.4	Added description of protocols for the blockage of roadways to be implemented during construction.	Appendix D.4
2.19.2.5	Added description of monitoring and patrols to be implemented during construction.	Appendix D.4
2.19.2.6	Added description of incident procedures and emergency response to be implemented during construction.	Appendix D.4
2.19.3	Added description of Operations Security Plan contents.	Appendix D.3
2.19.4	Added description of Facility Security Plan contents.	Appendix D.3
2.20	Added information regarding additional analyses.	NA
2.22.1	Revised status of the Port of Kalama Northport facility.	NA
2.22.1	Added Port of Portland position on crude-by-rail development, and City of Portland fossil fuel resolution.	PDEIS, See references
2.22.1	Added statement regarding the use of Terminal 5.	PDEIS
2.22.2	Added statement regarding benefit of the covered unloading facility.	PDEIS
2.22.4	Added information regarding wastewater characterization for the proposed discharge streams.	NPDES Letter
2.22.6	Added refinements to the marine terminal modifications	PDEIS
2.22.7	Added information regarding design changes impacting Facility emissions.	PDEIS
Table 2.23-1	Updated Table showing applicable Federal, State, and Local permits and regulations	DEIS
2.23.2.2	Revised status of biological evaluation and ESA consultation activities. This revision was included throughout the ASC as applicable.	NA

ASC Section	Revision	Referenced From
2.23.2.4	Revised status of marine mammal monitoring plan and consultation activities. This revision was included throughout the ASC as applicable.	Appendix H.3
2.23.2.5	Added information regarding Migratory Bird Treaty Act.	DEIS
2.23.2.6	Added information regarding Bald and Golden Eagle Protection Act.	DEIS
2.23.2.7	Added information regarding Cultural Resources Inadvertent Discovery Plan.	Appendix A.3
2.23.2.8	Revised Section 10 permit application status. This revision was included throughout the ASC as applicable.	NA
2.23.2.18	Added information regarding CERCLA.	NA
2.23.2.19	Added information regarding Pretreatment Section 307(b).	NA
2.23.3.2	Added information regarding Section 401 Water Quality Certificate.	NA
2.23.3.8	Removed information regarding PSD permit (no longer applicable)	August 2014 NOC
2.23.3.16	Added information regarding Washington State Waste Discharge Permit Program	NA
2.23.4.5	Added information regarding Hazardous Materials Regulatory Fee Certificate.	NA
2.23.4.6	Added information regarding Critical Areas Protection.	PDEIS
2.23.4.7	Added information regarding Archaeological Resource Protection.	NA
Part 3		
3.1.1	Added information on the number and location of field explorations and reference to geotechnical reports in Appendix L.	Appendix L.1, L.2 and L.3
3.1.2.1	Added Appendix references.	Appendix L.1, L.2, L.3
Figure 3.1-1	Updated project boundaries.	PRM
Figure 3.1-3	Updated figure format.	NA
3.1.3.5	Added conclusions regarding geotechnical investigation of site.	Appendix L
3.1.3.6	Section reorganized to address construction mitigation followed by operation mitigation.	NA
3.1.6	Mitigation introduction revised to discuss geotechnical investigation data sets and conclusions.	Appendix L
3.1.3.6	Added discussion of ground improvement types/methods and deep structural foundations to mitigate liquefaction-induced settlement and lateral spreading deformations. Added reference locations for additional detail.	Appendix L.3, ASC 2.18.4
3.1.3.6	Added upland area Facility design information and criteria.	PDEIS
3.1.3.6	Added reference to ASC section 2.18.1.2 for preliminary ground improvement design information submitted to EFSEC for review.	PDEIS, ASC 2.17.7

ASC Section	Revision	Referenced From
3.1.3.6	Added additional plans the applicant will implement related seismic events.	DEIS Letter
Figure 3.1-7	Replaced with PDEIS figure	PDEIS
3.1.4.2	Added note concerning determination and documentation of final ground improvements.	DEIS Letter
3.1.5.1	Added description of temporary topographical modification resulting from benching at the Marine Terminal (Area 400).	PRM
3.1.5.2	Added temporary benching will be removed, shoreline restored after construction is finished, no topography impacts and no mitigation required.	PRM
3.1.7.1	Added impacts of temporary benching during ground improvement.	PRM
3.1.7.2	Section reorganized to address Construction and Operation mitigation measures.	NA
3.1.7.2	Added summary of erosion impacts.	ASC 3.1.3.5
3.1.7.2	Clarified and added mitigation measures from the DEIS Applicant Comment Letter - Attachment ES-1 (ES-1), cSWPPP BMPs for erosion control, sediment transport and construction activities associated with installation of the benches and ground improvement installation activities	ASC 2.11, Appendix C.1, DEIS Letter, PRM
3.1.7.2	Clarification and mitigation measures related to erosion control and references to oSWPPP.	DEIS Letter, Appendix C.2
3.2 and all of its subsections	In August 2014 the Applicant submitted to EFSEC a revised air permit application. The entirety of Section 5.1 was therefore replaced with the corresponding contents of the 2014 submittal. Major changes from the August 2014 submittal are indicated below. Since that time the Applicant has also responded to an EFSEC request for information dated March 14, 2016; a response was submitted to EFSEC on May 6, 2016. The information submitted into that response has also been incorporated to these ASC revisions, as indicated below. Additional changes have been made for clarification and are also indicated below	August 2014 NOC
3.2.1.1	Text was moved to this location for clarity.	NA
3.2.1.2	Text was moved to this location for clarity. The project is no longer subject to PSD review and permitting.	August 2014 NOC
3.2.1.7	Corrected statement regarding direction of prevalent winds.	NA
3.2.3	Clarified that the MVCUs may also result in a visible water vapor plume.	NA
3.2.6	Mitigation measures were updated to include reference to the Washington Associated General Contractors Brochure, "Guide to Handling Dust from Construction Projects"	PDEIS
3.3.1	Added reference to containment tank.	NA
3.3.1	Updated volume precipitation based on 47.4-acre site.	PRM
3.3.1.1	Reorganized Impacts to discuss construction impacts followed by operation impacts, added cross references to ASC sections.	NA

ASC Section	Revision	Referenced From
3.3.1.1	Added discussion of ground improvement potential impacts (jet grouting).	Appendix L.3
3.3.1.1	Updated nomenclature of Terminal 5 stormwater "lagoons".	NA
3.3.1.1	Removed that discharges from the site will contribute only to Terminal 5 ponds.	NA
3.3.1.1	Added that discharges from the site will be treated on-site and monitored for water quality compliance prior to discharge to the existing stormwater systems.	DEIS Letter
3.3.1.1	Added that this project will reduce the amount of existing impervious surface coverage at the Facility site and will convert a portion of the existing pollution-generating impervious area to non-pollution-generating roof areas.	DEIS Letter
3.3.1.2	Mitigation measures reorganized to address Construction and Operation mitigation measures.	NA
3.3.1.2	Added and revised discussion of mitigation measures: Construction Mitigation - updated with stormwater management mitigation measures from DEIS Letter, site specific BMPs from the Stormwater Management Manual for Western Washington, the NPDES Individual Construction Stormwater Permit and cSWPPP.	DEIS Letter, ASC 2.11, Appendix C.1
3.3.1.2	Added mitigation/BMPs for jet grouting activities to construction mitigation.	Appendix L.3, DEIS Letter
3.3.1.2	Added cSWPPP detail to construction mitigation.	ASC 2.11, Appendix C.1
3.3.1.2	Added NPDES Individual Construction Stormwater Permit reporting and notification details to construction mitigation.	NA
3.3.1.2	Added cSPCCP details to construction mitigation	Appendix B.2, DEIS Letter
3.3.1.2	Revised and reordered the Operation Mitigation discussion.	NA
3.3.1.2	Added details on the permanent stormwater management and treatment system for operations.	DEIS Letter
3.3.1.2	Added that the Applicant will implement secondary structural containment measures to supplement the structural source control BMPs.	DEIS Letter
3.3.1.2	Revised that equipment and parts wash (including facility washdown, and railcar exterior washing), will be conducted in a covered portion of the rail unloading building. Wastewater will be pumped to secondary containment tanks.	ER
3.3.1.2	Updated API 650 tanks inspection information.	PRM, DEIS Letter
3.3.1.2	Added that 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 25-year 24-hour rainfall event.	PRM, Appendix A, Sec 4.3.3.2
3.3.1.2	Edited transmission to transfer pipeline and added Area 500.	NA
3.3.1.2	Added that parking and access areas will be designed with a combination of catch basin spill traps and water quality filter vaults to treat stormwater runoff.	DEIS Letter

ASC Section	Revision	Referenced From
3.3.1.2	Added references to ASC sections.	NA
3.3.1.2	Added list of planning and preparedness actions required by state and federal regulations to prevent, contain, and respond to inadvertent releases that could impact surface water.	DEIS Letter
3.3.1.2	Added oSWPPP coordination with ESFEC.	DEIS Letter
3.3.1.2	Updated regarding Tier II anti-degradation analysis being completed.	NPDES Letter
3.3.2.2	Revised discussion that construction stormwater will be managed in accordance with the conditions of the Individual NPDES Construction Stormwater Permit issued to the Facility by EFSEC.	DEIS Letter,
Figure 3.3-1	Revised Mapped Floodplains using FEMA data and updated project boundaries per PRM	PRM
Figures 3.3-2 and 3.3-3	Added Figure 3.3-2 - Public Wellhead Zones and Figure 3.3-3 Private Wellhead Zone.	PDEIS
3.3.3.2	Updated title from Protective Measures to Mitigation Measures.	NA
3.3.3.2	Added construction mitigation for the 100-500-Year Flood	DEIS Letter
3.3.3.2	Clarified that certain facilities will be located in, but elevated above, the 100 year floodplain.	DEIS Letter
3.3.4.1	Added The impacts to groundwater from operations and maintenance activities are expected to be minor.	DEIS Letter
3.3.4.1	Section reorganized and information added regarding wellhead zones	DEIS Letter, ER
3.3.4.1	Clarified location of ground improvements relative to locations of existing contaminated media.	DEIS Letter, Appendix F.1
3.3.4.2	Mitigation measures reorganized to address Construction and Operation mitigation. Mitigation measures added from previous references.	DEIS Letter, Appendix F.1
3.3.5.1	Updated water consumption numbers for process and domestic potable water.	NA
3.3.6	Added reference to Figure 3.3-3	NA
3.4.1.2	Added explanation of why the Applicant has not conducted site-specific wildlife or vegetation species surveys to determine use of the Facility site or the project vicinity.	PDEIS[4]
3.4.2	Clarified distinction between vegetation communities and terrestrial habitats.	PDEIS
3.4.2.1	Changed Terrestrial habitat to Terrestrial vegetation communities and referenced Figure 3.4-2	PDEIS
Figure 3.4-2	Added Figure 3.4-2 Terrestrial Vegetation.	PDEIS
3.4.2.1	Added terrestrial habitat types for the project site	PDEIS
Figure 3.4-3	Added Figure 3.4-3 Wildlife Habitats.	PDEIS
3.4.2.1	Clarified characterization of vegetation communities in project vicinity, and discussed presence of specific communities.	PDEIS

ASC Section	Revision	Referenced From
3.4.2.1	Added discussion of specific habitats present at site and in project vicinity.	PDEIS
3.4.2.1	Identified presence of an existing aquatic habitat enhancement site approximately 350 feet downstream of the Berth 14 trestle and Port-planned mitigation activities regarding this site.	PDEIS
3.4.2.1	Renamed Upland Cottonwood Stands to Westside Lowland Conifer Hardwood Forest	PDEIS
3.4.2.1	Clarified presence of Agricultural, Pasture, and Mixed Environs Lands in vicinity of project.	PDEIS
3.4.2.1	Added descriptions of Aquatic Habitats in the project vicinity	PDEIS
3.4.2.1	Revised aquatic habitat within the project's vessel prism includes the main stem Columbia River from the project site downstream to the river mouth and includes PHS-listed aquatic habitats.	PDEIS
3.4.2.1	Added shoreline types discussion and revised Table 3.4.-1 Lower Columbia River GRP Shoreline Types.	PDEIS
3.4.2.1	Added noxious weeds discussion and Table 3.4-1 Noxious Weeds Known to Occur in Clark County.	PDEIS
3.4.2.2	Revised construction impacts in the upland portion of the project including temporary impacts for staging and construction access.	PDEIS
3.4.2.2	Revised construction impacts to ruderal upland grass/forb vegetation.	PDEIS
3.4.2.2	Revised construction of the pipeline and other improvements at Area 400 will not impact high quality vegetation and riparian function will not be affected.	PDEIS
Figure 3.4-4	Revised Figure 3.4-4 CPU Tree Plan	PDEIS
3.4.2.2	Revised that Table 3.4-4 summarizes the impacts to each of the vegetation communities present resulting from construction of the Facility, while Table 3.4-5 summarizes the corresponding impacts to habitats.	PDEIS
3.4.2.2	Added discussion of construction-related noxious weed impacts.	PDEIS
Table 3.4-1i	Deleted Table 3.4-1i Summary of Habitat Acreage Impacts.	PDEIS
Table 3.4-4	Added Table 3.4-4 Summary of Vegetation Community Acreage Impacts.	PDEIS
Table 3.4-5	Added Table 3.4-5 Summary of Habitat Acreage Impacts.	PDEIS
3.4.2.2	Clarified vessel trips per year in first and subsequent years of operation. This correction was made throughout the ASC.	NA
3.4.2.2	Added discussion of Shallow Water Habitat, Exotic Species, Temporary Water Quality Impacts and minor impacts associated with each.	DEIS Letter
3.4.2.2	Added discussion regarding temporary construction noise impacts on habitats.	PDEIS

ASC Section	Revision	Referenced From
3.4.2.2	Added discussion regarding impacts of vegetation maintenance activities.	NA
3.4.2.2	Added discussion regarding overwater coverage impacts.	PDEIS
3.4.2.2	Added discussion of the frequency of marine incidents and spill risk assessment from Appendix P.1	Appendix P.1
3.4.2.2	Added discussion of bank erosion impacts resulting from vessel wakes.	DEIS Letter
3.4.2.2	Added discussion of aquatic invasive species impacts resulting from operation.	401 Response
3.4.2.3	Referenced other sections where mitigation is also discussed.	NA
3.4.2.3	Mitigation measures reorganized to address Construction and Operation mitigation, grammar edits, single word and phrase changes for clarity.	NA
3.4.2.3	Updated acreage of ruderal upland grass/forb impacts.	Appendix H.1
3.4.2.3	Added that native species will be used to the extent practical. Area 200 will include native trees planted in groups within the landscape to provide additional mitigation for loss of trees onsite.	DEIS Letter
3.4.2.3	Added that at locations where ruderal habitat has been impacted by temporary construction laydown will be restored to previous condition so as to result in no net loss to this community.	DEIS Letter
3.4.2.3	Added compensatory habitat mitigation discussion.	PDEIS, DEIS Letter
3.4.2.3	Added that no purple martin or nest boxes would be directly affected discussion.	DEIS Letter
3.4.2.3	Added mitigation measures to minimize impacts to migratory birds during construction.	DEIS Letter
3.4.2.3	Added BMPs that will be implemented during construction to minimize the spread and establishment of noxious weeds	DEIS Letter
3.4.2.3	Added aquatic invasive species mitigation measures.	401 Response
3.4.2.3	Updated the Temporary Construction Water Quality mitigation discussion. Added detail on WQPMP, in-water work window discussion, and referenced Appendix F.2. Added footnote with further explanation of work window.	DEIS Letter
3.4.2.3	Updated spill prevention and containment discussion. Added detail related to cSPCCP BMPs and procedures. Referenced Appendix B.2	DEIS Letter
3.4.2.3	Added Vegetation Maintenance mitigation.	DEIS Letter
3.4.2.3	Added discussion regarding use of biodegradable firefighting foam.	PDEIS
3.4.2.3	Updated discussion regarding shipping related impacts relative to Bank Erosion, Exotic Species, and Vessel Transit Related Spills.	DEIS Letter
3.4.3.2	Added construction lighting and aquatic Invasive Species impacts discussions.	DEIS Letter

ASC Section	Revision	Referenced From
3.4.3.2	Added discussion of potential impacts: 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 noise during temporary pile installation and removal, permanent pile removal, and installation of ground improvements.	DEIS Letter
3.4.3.2	Added discussion related to construction is not expected to result in permanent impacts to aquatic habitat in Area 400.	ASC Review
Table 3.4-6	Revised Table 3.4-6 Special Aquatic Species and Their Potential to Occur within the Project Area	ASC Review
3.4.3.2	Clarified for consistency with JARPA submitted to USACE that the project proposes to remove 15 steel piles (eleven 18-inch steel pipe piles and four 12 3/4-inch steel pipe piles) restoring approximately 23 square feet of benthic habitat at the project site.	NA
3.4.3.2	Revised that temporary 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 recolonize following removal.	ASC Review
3.4.3.2	Discussed construction related lighting impacts.	PRM
3.4.3.2	Updated Temporary Construction Noise analysis, including impacts resulting from ground improvement construction.	PDEIS, PRM
3.4.3.2	Added discussion regarding impacts of aquatic invasive species.	401 Response
3.4.3.2	Removed assessment of impacts resulting from non-project related vessel traffic.	NA
3.4.3.2	Updated Operational Water Quality Impacts addressing propeller wash	DEIS Letter
3.4.3.2	Updated Facility size from 44.9 acres to 47.4 and acres of impervious surface from 38.2 to 44.4 acres	PRM
3.4.3.2	Added reference to Appendix P.1 regarding low probability of spills resulting from Facility-related vessel calls.	NA
3.4.3.2	Added Spill planning response discussion.	Appendix B.6
3.4.3.2	Added discussion of lighting and overwater coverage impacts.	PDEIS
3.4.3.2	Updated Wake Stranding discussion.	DEIS Letter, Appendices H.5 and H.6
3.4.3.2	Updated Bank Erosion and Exotic Species impacts discussions	DEIS Letter, Appendices H.5 and H.6
3.4.3.3	Reorganized mitigation to discuss construction followed by operation.	NA
3.4.3.3	Updated Direct Habitat Modification discussion - dock modification and in water work window.	DEIS Letter
3.4.3.3	Added mitigation measures for construction lighting impacts.	DEIS Letter
3.4.3.3	Revised Temporary Water Quality mitigation discussion.	DEIS Letter

ASC Section	Revision	Referenced From
3.4.3.3	Added Aquatic Invasive Species mitigation.	DEIS Letter
3.4.3.3	Added Temporary Construction Noise discussion including details on in-water work window, implementation of an MMMP for vibratory installation and removal of temporary piles, and upland impact pile driving associated with Area 400 improvements to minimize the exposure of fish to temporarily increased underwater noise levels	ASC 2014
3.4.3.3	Added discussion of BMPs, design measures and spill response planning measures.	ASC 2014
3.4.3.3	Revised: Stormwater from Areas 200, 500, and 600 and the rail improvements will be treated to meet the water quality benchmarks established in the Industrial Stormwater General Permit prior to its discharge to the existing Terminal 5 stormwater system.	PRM Appendix A Sec 4.3.2.2 pg. 4-43
3.4.3.3	Added discussion of turbidity impacts resulting from propeller wash.	DEIS Letter
3.4.3.3	Updated discussion regarding impacts of shoreline erosion from vessel wakes on ESA-listed species.	DEIS Letter
3.4.3.3	Added discussion of vessel operator requirements to avoid hull fouling and contaminated ballast water discharge.	401 Response
3,4,3,3	Updated discussion of Cumulative Impacts.	NA
Table 3.4-8	Added Table 3.4-8 Special Status Aquatic Species and Their Potential to Occur within the Project Site or Vicinity	ASC Review
3.4.4.2	Updated acreage impacts to habitats affected by Facility construction.	PRM
3.4.4.2	Added that no purple martin or nest boxes would be directly affected by the construction of the proposed project.	NA
3.4.4.2	Added discussion regarding WQPMP.	Appendix F.2
3.4.4.2	Added discussion regarding construction lighting impacts.	NA
3.4.4.2	Updated analysis of construction noise impacts.	PDEIS, Appendix H.4
3.4.4.2	Discussed lighting impacts.	NA
3.4.4.2	Added discussion of invasive species impacts.	401 Response
3.4.4.2	Identified Applicant's vessel traffic risk assessment.	Appendix P.1
3.4.4.2	Revised Bank Erosion information.	DEIS Letter
3.4.4.3	Reorganized mitigation to discuss construction followed by operation.	NA
3.4.4.3	Revised Temporary Construction Noise mitigation	DEIS Letter
3.4.4.3	Added Tree removal and landscape monitoring mitigation criteria.	DEIS Letter
3.4.4.3	Addressed construction nuisance wildlife impacts.	DEIS Letter
3.4.4.3	Addressed construction lighting impacts.	DEIS Letter
3.4.4.3	Updated mitigation for temporary water quality impacts.	DEIS Letter
3.4.4.3	Added discussion regarding special status wildlife and construction noise impacts.	Appendix H.4

ASC Section	Revision	Referenced From
3.4.4.3	Addressed impacts to marine mammals from construction noise.	Appendix H.3
3.4.4.3	Added construction Aquatic Invasive Species mitigation.	Appendix H.1
3.4.4.3	Added mitigation for operation- related nuisance wildlife impacts	DEIS Letter
3.4.4.3	Updated mitigation for operational water quality impacts.	DEIS Letter
3.4.4.3	Addressed mitigation of operation lighting impacts.	DEIS Letter
3.4.4.3	Added operations Aquatic Invasive Species mitigation.	401 Response
3.4.4.3	Added discussion of vessel related invasive species impacts.	401 Response, PDEIS
3.4.4.3	Addressed lack of impact of vessel wakes.	DEIS Letter
3.4.4.3	Added mitigation regarding escort tugs for vessel-related incidents.	NA
3.4.5.1	Updated USACE permitting and ESA Consultation status.	NA
3.5.1	Clarified that Areas within 300 feet of the project site were visually assessed for the presence of wetlands in accordance with the City of Vancouver's Critical Areas Protection Ordinance (VMC Chapter 20.740).	Appendix H.1
3.5.3	Clarified that shallow stormwater swales located in the southwest corner of Parcel 1A are not jurisdictional under city code.	NA
3.5.3	Corrected number of wetland mitigation sites present in the vicinity of the project site and within 300 feet of the project site.	Appendix H.1
3.5.3	Clarified relative location of wetland complexes to project facilities in terms City 300-foot CAO limit.	Appendix H.1
3.5.4	Reorganized mitigation to discuss construction followed by operation.	NA
3.5.4.2	Added discussion regarding spill response measures that would protect wetlands adjacent to Vancouver Lake.	DEIS Letter
3.5.5	Added discussion of construction spill prevention, control and countermeasures.	Appendix B.2
3.5.5	Updated mitigation measures that would protect wetlands from ground improvement water quality impacts.	Appendix H.1, PRM
3.5.5	Added Operational mitigation measures to minimize operational water quality impacts.	NA
3.5.5	Added discussion regarding spill response measures that would protect wetlands adjacent to Vancouver Lake.	DEIS Letter
3.5.5	Added discussion of impacts to wetlands resulting from shipping traffic.	DEIS Letter
3.6.1.1	Clarified that the amount of electricity consumed would be similar to other medium-sized industrial construction projects, and would not be significant in terms of overall regional supply.	PDEIS
3.6.1.1	Added information regarding the amount of electricity and fuels to be used during project construction in response to	ASC Review

ASC Section	Revision	Referenced From
	EFSEC comment on ASC. Added incidental use of propane during construction.	
3.6.1.1	Identified volumes of cement and aggregates that would be used to construct ground improvements.	PRM
3.6.1.1	Updated volume of rail ballast to be used for rail infrastructure improvements.	PDEIS
3.6.1.2	Updated natural gas consumption.	August 2014 NOC
3.6.1.2	Clarified that gas service is expected to be interruptible; if gas supply is lost, operations where it is in use will be shut down.	Personal communication with NW Natural
3.6.1.2	Added that the Facility will use leased, portable power generators (emergency engines) in the event of a power failure. These generators would be fueled with ultra-low sulfur diesel or biodiesel.	PRM
3.6.2.2	Added that the Facility will use leased, portable power generators (emergency engines) in the event of a power failure.	PRM
3.6.3	Added Clark County gravel resource information.	PDEIS
3.6.3	Added electricity use and supply information.	PDEIS
3.6.3	Added information regarding adequacy of Northwest Natural Gas information regarding natural gas supply.	PDEIS
3.6.4	Added that the Applicant will construct buildings compliant with the 2012 Washington State Energy Code (or current version at the time the project is permitted).	DEIS Letter
Part 4		
Table 4.1-1	Replaced Table 4.1-1 Common Sound Levels/Sources and Subjective Human Responses listing of common sound levels/sources and subjective human responses.	PDEIS
4.1.1.1	Added Washington Administrative Code to Noise Standards.	NA
4.1.1.1	Added Jail Work Center to *Existing Sound Levels.*	NA
4.1.1.2	Added Tidewater office building as a potential sensitive receiver.	PDEIS
Figure 4.1-1	Revised Figure 4.1-1 Background Noise Measurement Location and Receptors showing background noise measurement location and receptors.	PDEIS
4.1.1.2	Added consideration of natural attenuation to noise emissions.	PDEIS
Table 4.1-5	Updated Table 4.1-5 Summary of Major Facility Noise Sources listing summary of major Facility noise sources.	PDEIS
4.1.1.2	Updated noise impacts analysis based on PDEIS.	PDEIS
Table 4.1-6	Revised Table 4.1-6 Modeled A-Weighted Model-Calculated Hourly Facility Sound Level listing Modeled A-Weighted model-calculated hourly Facility sound levels.	PDEIS
Figure 4.1-2	Added Figure 4.1-2 Noise Model Receptor Locations showing noise model receptor locations.	PDEIS
4.1.1.3	Added noise monitoring in accordance with construction wildlife monitoring plan	DEIS Letter

ASC Section	Revision	Referenced From
4.1.1.3	Added procurement process for equipment contributing to noise emissions will take into consideration analyses to ensure the overall noise emissions from the Facility do not exceed Washington State noise thresholds.	ASC 2014
4.1.2.1	Added construction materials consideration to fire risk.	PDEIS
4.1.2.1	Added description of the construction fire prevention plan.	Appendix D.2
4.1.2.1	Added status of Construction Safety and Health Manual status and that Applicant will develop a construction emergency response plan to ensure compliance with WISHA WAC 296-155-260 and NFPA requirements.	Appendix D.2
4.1.2.1	Added summary of the main elements of the preliminary construction fire prevention plan presented in Appendix D.3.	Appendix D.2
4.1.2.1	Added applicability of regulations to construction safety plans	Appendix D.2
4.1.2.2	Updated description of crude oil composition.	PDEIS
Table 4.1-9	Updated Table 4.1-9 NFPA 704 Table 6.2 Degrees of Flammability Hazards showing NFPA 704 Table 6.2 degrees of flammability hazards	PDEIS
4.1.2.2	Added discussion of additional parameters potentially influencing the flammability of any specific crude oil in transportation.	DEIS Letter
4.1.2.2	Added Summary of risk assessments completed relative to fires and explosions potentially occurring at the Facility.	Appendix P.3
4.1.2.2	Added Description of types of fire events.	Appendix P.3, DEIS Letter
4.1.2.2	Added discussion of non-explosive nature of crude oil and description of deflagrations	DEIS Letter
4.1.2.2	Added Shipping requirements of crude by rail.	See references
4.1.2.2	Added to examples of risk-based management approaches that will be implemented.	Appendix D.3
4.1.2.2	Added Information regarding fire safety design	Appendix N.1, PRM, DEIS Letter
4.1.2.2	Added information regarding Fire Protection Engineer design requirements.	DEIS Letter
4.1.2.2	Added information regarding boiler requirements.	ASC section 2.23
4.1.3.1	Revised number and description of locations at the Facility that are subject to the Ecology consent decree and environmental restrictive covenants. This revision was included throughout the ASC as applicable.	Appendix F.1
4.1.3.2	Revised construction methods within the restrictive covenant areas.	DEIS Letter
	Updated that one additional train loop will be constructed within the SPL Storage Area, North/NN2 cap, and shoreline restrictive covenant area and ingot plant cap.	Appendix F.1
4.1.3.2	Revised that if not exceeding state water quality levels, dewatering water will be managed in accordance with the NPDES Construction Stormwater Permit requirements.	NA

ASC Section	Revision	Referenced From
4.1.3.3	Added Description of waste handling resulting from inadvertent releases.	Appendix C.2
4.1.4.2	Renamed cargo tanks to cargo compartments. This revision was made throughout the ASC.	NA
4.1.4.4	Added description of methods of compliance with safety standards during project construction.	PDEIS
4.1.4.4	Updated description of safety monitors (H_2S, LEL, and oxygen (O_2) monitors) to be used during project operation.	Appendix D.3
4.1.4.4	Added description of Operations Facility Safety Program contents including items to address EFSEC review comments.	Appendix M
4.1.6.2	Added additional information regarding the operational emergency response plan.	Appendix D.3
4.1.6.2	Added that a copy of this emergency response plan will be provided to the City and the Clark Regional Emergency Services Agency	PDEIS
4.2.1.1	Revised status of West Vancouver Freight Project elements. This revision was included throughout the ASC as applicable.	See references
Table 4.2-1	Revised Table 4.2-1 showing status of WVFA project elements.	See references
Figure 4.2-1	Revised Figure 4.2-1 WVFA Rail Construction Project elements showing status and elements of the WVFA rail construction project	See references
4.2.1.1	Updated status of BHP Billiton project.	PDEIS, DEIS Letter
Figure 4.2-2	Updated Figure 4.2-2 BHP Billiton Proposed Site with the most current Facility site boundary and updated Facility elements.	PRM
Figure 4.2-3	Revised Figure 4.2-3 City of Vancouver Zoning in Site Vicinity with the most current Facility site boundary and updated Facility elements.	PRM
Figure 4.2-4	Revised Figure 4.2-4 General Comprehensive Land Use Designations format revised	PDEIS
Figure 4.2-5	Updated Figure 4.2-5 Comprehensive Plan updated with the most current Facility site boundary and updated Facility elements.	PRM
4.2.2.1	Clarified distant sources of light.	ASC Review
4.2.2.2	Added references to lighting standards.	PDEIS
4.2.2.4	Added mitigation for temporary construction lighting	DEIS Letter
4.2.2.4	Added paint color of storage tanks.	NA
Figure 4.2-7	Added Figure 4.2-7 Current Aerial Photo showing current aerial photo.	NA
Figure 4.2-8	Revised Figure 4.2-8 Bird's Eye Photo Simulation showing bird's eye photo simulation.	PDEIS
Figure 4.2-9	Revised Figure 4.2-9 Viewpoints and Vicinity revised for consistency with aerial photo.	NA

ASC Section	Revision	Referenced From
4.2.3.5	Added aesthetics mitigation measures during construction.	DEIS Letter
4.2.3.5	Added aesthetics mitigation measures during operation.	DEIS Letter
Table 4.2-7	Revised Table 4.2-7 Public Park and Recreation Facilities in the Immediate Vicinity of Project showing public park and recreation facilities in the immediate vicinity of Project.	NA
Figure 4.2-7	Added Figure 4.2-7 Public Park and Recreation Facilities in the Immediate Vicinity of Project.	PDEIS
4.2.3.5	Mitigation reorganized to address Construction, Design and Operation mitigation.	DEIS Letter
4.2.3.5	Added that construction activities to be conducted during daylight hours, if night construction is required lights will be directed toward the Facility and use minimum wattage.	DEIS Letter
4.2.3.5	Added operation mitigation for paint colors, lighting and screening.	DEIS Letter
Table 4.2-7	Revised Table 4.2-7 Public Park and Recreation Facilities in the Immediate Vicinity of Project resulting from reorganization of County and City recreational facilities.	NA
4.2.4.1	Added that while schools are not designated recreation facilities, many schools offer play equipment and soccer fields for public use.	NA
Figure 4.2-24	Revised Figure 4.2-24 Recreational Facilities added recreational facilities.	NA
4.2.4.4	Added no other mitigation measures will be used.	NA
4.2.5.6	Added description of a geoarcheological survey, findings as requested by DAHP and final conclusions of the survey.	Appendix A.2
4.2.5.6	Updated that all of the study area and the surrounding area have been studied extensively for cultural resources through previous surveys and the project-specific survey completed in 2014.	Appendix A.2
4.2.5.6	Added If the depth of impact will exceed 3.05 m (10 feet) below surface in the vicinity of the dune ridge in Area 500, which would be a change from the current design plan, monitoring during construction in this portion of Area 500 would be appropriate.	Appendix A.2
4.2.5.7	Mitigation reorganized to address Construction and Operation mitigation.	NA
4.2.5.7	Added Description of the inadvertent plan	DEIS Letter
4.2.5.7	Added Protection measures described in the inadvertent discovery plan.	DEIS Letter, Appendix A.3
4.2.5.7	Added The inadvertent discovery plan will be used in the event ground disturbing activities are required in response to an emergency event during operations.	DEIS Letter
Figure 4.2-25	Revised Figure 4.2-25 Historical Shoreline Configuration – added project boundary.	PDEIS
Figure 4.2-26	Revised Figure 4.2-26 Previous Cultural Resource Studies.	PDEIS

ASC Section	Revision	Referenced From
4.2.6.3	Revised that no impacts are anticipated and therefore no mitigation measures are proposed.	NA
Figure 4.3-1	Revised Figure 4.3-1 Existing Roadway Transportation System	Appendix J.1
4.3.1	Updated NW Gateway Avenue description.	Appendix J.2
Table 4.3-1	Updated Table 4.3-1 Immediate Vicinity of Project	Appendix J.1
Table 4.3-2	Updated Table 4.3-2 LOS Criteria	Appendix J.1
4.3.3	Revised LOS and v/c discussion	Appendix J.1
Table 4.3-3	Updated Table 4.3-3 Existing Intersection Traffic Conditions Summary	Appendix J.1
4.3.3	Updated The Port has constructed modifications to its rail system	See references
4.3.3	Added Reference - C-TRAN 2013	Appendix J.1
4.3.2.2	Updated 2020 baseline traffic volumes for the Terminal 5 bulk potash facility	Appendix J.1
Table 4.3-6	Updated Table 4.3-6 Estimated Trip Generation updated all columns for light industrial	Appendix J.1
Table 4.3-7	Updated Table 4.3-7 Build-Out Year 2020 Total Traffic Conditions Summary updated v/c and LOS	Appendix J.1
4.3.3.2	Updated train arrivals for consistency with project description.	PDEIS
4.3.3.2	Revised WVFA new access has been completed.	See references
4.3.3.3	Described vessels consistently with section 2.3.7.1	NA
4.3.3.3	Updated ATB call information.	PDEIS[4]
4.3.3.3	Updated discussion regarding historic range of vessel trips on Columbia River and recent changes in arrivals at Port of Portland.	PDEIS
Table 4.3-10	Table 4.3-10 moved to Section 2.3.7.1	NA
4.3.3.5	Daily trip information revised, Facility construction phases updated	Appendix J.2
Table 4.3-11	Updated data.	Appendix J.1
4.3.3.5	Updated status of BHP Billiton proposal at Terminal 5.	NA
4.3.4	Updated status of WVFA.	NA
4.3.5	Mitigation reorganized to address Construction and Operation mitigation.	NA
4.3.5	Added Construction mitigation for barge movement.	DEIS Letter
4.3.5	Added Operation mitigation for yield control signage.	Appendix J.1
4.3.5	Added Operation mitigation for Terminal 5 rail.	PDEIS
4.3.6	Added Operation mitigation for maintenance of landscaping, signs and aboveground utilities.	DEIS Letter
4.4.1.1	Updated Construction completion date.	NA
4.4.1.6	Updated Tax information.	Appendix K

ASC Section	Revision	Referenced From
Table 4.4-27	Replaced Table 4.4-27 Impact on Local Workforce with Economic Impacts of Construction on Study Area	Appendix K
Table 4.4-28	Deleted old data in Table 4.4-28 Economic Impacts in Construction Study Area.	Appendix K
4.4.2.1	Revised Construction Impact discussion.	Appendix K
4.4.2.2	Revised Operation Impact discussion.	Appendix K
Table 4.4-28	Added Table 4.4-28 Direct Employment from Operation at Startup and Full Build-Out.	Appendix K, PDEIS
4.4.2.3	Updated Housing Impact discussion.	PDEIS
4.4.3.1	Revised value of total state B & O tax associated with construction.	Appendix K
4.4.3.1	Revised value of state and local taxes generated by construction.	Appendix K
Table 4.4-30	Added Table 4.4-30 Construction and Operation Taxes.	PDEIS
4.4.3.2	Operations-related tax discussion was updated.	PDEIS
Part 5		
All sub sections of Section 5.1	In August 2014 the Applicant submitted to EFSEC a revised air permit application. The entirety of Section 5.1 was therefore replaced with the corresponding contents of the 2014 submittal. Major changes from the August 2014 submittal are indicated below. Since that time the Applicant has also responded to an EFSEC request for information dated March 14, 2016; a response was submitted to EFSEC on May 6, 2016. The information submitted into that response has also been incorporated to these ASC revisions, as indicated below. Additional changes have been made for clarification and are also indicated below.	August 2014 NOC, Response to NOC[6]
5.1.2.1.2	Information regarding the submerged fill configuration for vessel loading was added.	Response to NOC
5.1.2.1.2	The hydrogen sulfide treatment system was identified.	NA
5.1.2.1.2	The Applicant confirmed the level of VOC destruction achievable by the MVCUs.	Response to NOC
5.1.2.1.3	The Facility throughput and number of storage tank turnovers was updated.	Response to NOC
5.1.2.1.3	The assumptions regarding the electrical heating of two of the storage tanks were clarified; the methods to estimate heated tank emissions were added. The oil storage tank emission rates were updated in table 5.1-6.	Response to NOC Response to NOC[6]
5.1.2.1.5	The emissions from components were updated.	Response to NOC[6]
5.1.2.16	Clarification was added regarding exemption of emissions from mobile sources used in transportation.	NA
5.1.2.1.7	Annual Area 600 Boiler emissions were incorrect in the August 2014 submittal and are corrected in this revision.	Corrected information
5.1.2.1.7	Facility-wide emissions summaries were updated as a result of refined assumptions identified above and below. Emission rates for and emissions of Benzene, Cyclohexane,	Response to NOC[6]

ASC Section	Revision	Referenced From
	Ethylbenzene, Formaldehyde, Hexane, Hydrogen Sulfide, Toluene, and Xylene (-m, -o, and -p) were updated based on updated emissions factors. Two additional TAPs (Formaldehyde and Hydrogen Sulfide) were identified as exceeding the ASIL and required modelling.	
5.1.2.2.1	Annual emission rates for TAPs from Area 600 Boilers were updated.	Response to NOC[6]
5.1.2.2.2	Formaldehyde emission rates were updated for the MVCUs. Hydrogen Sulfide emissions were included in the table.	Response to NOC[6]
5.1.2.2.3	Oil storage tank emission rates were updated based on refined information regarding emissions from heated storage tanks.	Response to NOC[6]
5.1.2.2.5	Fugitive Component Leak emissions were updated based on the composite speciation profile derived from the composite fugitive unheated crude oil storage tanks.	Response to NOC[6]
5.1.4.4.1	The August 2014 version incorrectly showed the maximum overall annual average PM2.5 concentration for comparison to the ASIL in Tables 5.1-21 and 5.1-22. It was corrected to show the maximum annual average concentrations at each receptor averaged over the five modeled years, as stated in the text.	Corrected information
5.1.4.4.2	Hydrogen Sulfide and Formaldehyde maximum predicted TAP concentrations were added, and Benzene predicted concentrations were updated.	Response to NOC[6]
5.1 - Attachment 2	Updated to reflect the emissions calculations supporting the additional information in response to the March 14, 2016 EFSEC letter.	Response to NOC[6]
5.1 - Attachment 3	Additional equipment specifications added supporting the additional information in response to the March 14, 2016 EFSEC letter.	Response to NOC[6]
5.3	October 2015 NPDES Permit Engineering Report was included as an attachment to this section.	ER
5.3	Letter responding to EFSEC information request dated February 19, 2016 was added.	NPDES Letter

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Vancouver Energy 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 Vancouver Energy Terminal (Facility). The Applicant is Tesoro Savage Petroleum Terminal LLC, doing business as Vancouver Energy (Applicant).

This Application was professionally prepared by BergerABAM and subconsultants under the direction of the Applicant. 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 100 company, is an independent refiner and marketer of petroleum products (Tesoro Corporation 2016). Tesoro, through its subsidiaries, operates six refineries in the western United States with a combined capacity of approximately 875,000 barrels per day. Tesoro's retail marketing system includes over 2,300 branded retail stations, operating under the ARCO ®, Shell®, Exxon®, Mobil®, USA Gasoline™, Rebel™, and Tesoro® brands.

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

Tesoro Refining & 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 and industrial solutions tailored to meet the needs of customers across a variety of industries including electric power generation, coal production, oil refining, railroads, chemicals, and more. The operations of Savage Companies include over 200 locations and more than 3,000 employees in North America and internationally, handling more than 100 million tons of materials annually (Savage Services 2016).

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.

Kelly Flint
Savage Companies
Executive VP – Group Leader – General Counsel
901 West Legacy Center Way
Midvale, UT 84047
Office: 801-944-6600
Fax: 801-944-6519
Email: generalcounsel@savageservices.com

David Corpron and Jay Derr will serve as secondary contacts. Their contact information is as follows.

David Corpron
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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

The Applicant will establish and maintain, or cause to be established and maintained, several forms of insurance during the construction and operation of the Facility. Insurance will be maintained as required by law and customary business practice and to satisfy third-party participants and lenders. The amounts described in sections 1.3.1 through 1.3.5.2 are the amounts required by the lease agreement with the Port of Vancouver (Appendix E.2). The amounts described in section 1.3.5.3 are amounts required by applicable state law.

1.3.1 Commercial General Liability Insurance

The Applicant 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 operation of the premises with limits not less than ten million dollars ($10,000,000) per occurrence/fifteen million dollars ($15,000,000) aggregate (Appendix E.2, Articles 1.K and 15.B), and will include contractual liability insurance coverage, coverage against claims for bodily injury, property damage, personal injury, products and completed operations, and advertising injury occurring on or about the premises leased from the Port.

The Applicant and/or its contractors and subcontractors will be required to obtain and maintain in full force and effect Commercial General Liability insurance with the same limits and same coverages during the period of construction and startup phases to be specified in the terms of those construction agreements.

Limits can be achieved through a combination of primary and Excess/Umbrella Liability coverage.

1.3.2 Automobile Insurance

The Applicant will obtain and maintain in full force and effect Automobile Liability insurance covering owned, non-owned, and hired automobiles during use and operations with limits not less than one million dollars ($1,000,000) (Appendix E.2, Article 1.K).

The construction contractor and subcontractors will be required to obtain and maintain in full force and effect Automobile Liability insurance with the same limits and the same coverages during the period of construction and startup phases to be specified in the terms of those construction agreements.

1.3.3 Property Insurance

The Applicant will obtain and maintain at all times during the term of construction, use and operation of the Facility, Property Physical Damage insurance on the buildings and improvements that are to be erected on the premises. The insurance will be provided with a maximum deductible of one million dollars ($1,000,000) and 5 percent of values per Facility area.

The Applicant will purchase and maintain Builders Risk insurance upon the work at the Facility site to the full value until final completion of Facility Construction (Appendix E.2, Article 15.A). The insurance will include coverage against the “all-risk” perils including earthquake and flood for physical loss and damage. Upon final completion, The Applicant will maintain at all times “all-risk” property insurance (including boiler and machinery insurance) upon all Facility buildings and facilities (Appendix E.2, Article 15.A). The insurance will include coverage

extension for the perils of earthquake, windstorm and flood coverage, in an amount equal to the full replacement cost thereof. The insurance will contain an agreed valuation provision in lieu of any co-insurance clause, an ordinance and law endorsement and debris removal coverage and a waiver of subrogation endorsement.

1.3.4 Worker's Compensation and Washington Stop Gap Liability

The Applicant 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. The Applicant also will insure its exposure with Employer's Liability insurance (Washington Stop Gap Liability). The Applicant will 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. The Applicant will maintain Employer's Liability insurance or stop gap insurance coverage with limits not less than one million dollars ($1,000,000) (Appendix E.2, Article 1.K and 15.D).

In the event that the workers at the Facility are employed by one or more contractors of the Applicant rather than the Applicant directly, the Applicant will not be required to maintain such coverage, but will require such contractor or contractors to maintain such coverage for all workers at the Facility.

The Applicant 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. The Applicant also will require Employer's Liability insurance for exposure under Washington Stop Gap Liability.

1.3.5 Environmental Impairment

Environmental Impairment Liability coverage is intended to address liability for pollution that occurs on the facility site. Pollution Legal Liability coverage is intended to address liability for pollution that leaves the site.

1.3.5.1 Pollution Legal Liability Insurance

The Applicant and its operator(s) will be responsible, as required by law, for acts of environmental impairment related to the construction, use and operation of the Facility. Such losses may, in some circumstances, be covered by Commercial General Liability insurance, which the Applicant and the construction contractor will carry. This section describes limits specified in the Port Lease (Appendix E.2).

The Applicant and/or its contractors and subcontractors will provide Pollution Legal Liability insurance with combined limits not less than twenty-five million dollars ($25,000,000) per occurrence and provide coverage against claims for bodily injury, property damage, natural resource damages, and clean up and defense costs.

1.3.5.2 Environmental Impairment Liability

In addition, the Applicant and/or its contracted operator(s) will obtain Environmental Impairment Liability insurance with combined limits not less than twenty-five million dollars ($25,000,000) (Appendix E.2, Article 1.L) and provide coverage against claims for bodily injury, property damage, natural resource damages, and clean up and defense costs occurring on the Facility site. The policy will include coverage for sudden and accidental releases, as well as any gradual releases arising in any way from the Applicant's occupancy of and operations at the Facility site.

1.3.5.3 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. To date, Ecology has not adopted regulations that specify an amount or a specific method for calculating an amount for facilities, in the same way that amounts or methods of calculation have been specified for rail transportion to and marine vessel transportion from the Facility, as described in the next paragraph.

There are laws and regulations (already in place or recently put in place), for Financial Responsibility for those parties responsible for transportation of crude oil to and from the Facility. The Applicant will not source, own or transport the crude oil to or from the Facility. The Applicant will receive its customer's crude oil by rail, unload and stage that crude oil in the on-site tanks, and load the crude oil onto vessels provided by those customers. Rail carriers and vessel operators are required to maintain financial responsibility in accordance with RCW 80.40. The Applicant is not responsible for providing such financial responsibility for transportation of crude oil to or from the facility; however the following information is presented to describe the existing regulatory requirements for rail and marine vessel operators.

Cargo vessels transporting crude oil must provide evidence of financial responsibility pursuant to RCW 80.40.020[1]. For vessels operating in Washington, financial responsibility is based on the type of vessel and the total capacity for storage of product, and range between $5 million and $1 billion, with the vessels expected to call at the Facility predominantly in the latter category (Ecology 2015).

Washington Utilities and Transportation Committee recently adopted financial assurance requirements for rail transportation of crude oil, applying a formula that includes volume of crude oil being transported by rail, maximum train speed and a cost per barrel for cleanup. WAC 480-62-300. For a typical unit train of crude oil, the amount specified in this regulation is approximately $800 million to $1 billion, depending on tank car volume.

[1] Vessels transporting crude oil are also required to demonstrate financial responsibility under National Contingency Plan (NCP) as found in 40 CFR Part 300.

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

No set-aside from operating funds is anticipated for site abandonment, but the Applicant will obtain a site closure bond in an amount to be determined by EFSEC upon approval of an initial site restoration plan. Decommissioning is addressed in additional detail in section 2.3.9.

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 impacts to the elements of the natural and built environment potentially resulting from the Facility and the measures identified in this application to avoid, minimize, and mitigate such impacts. Each element addresses construction and operation mitigation, and notes where appropriate if mitigation is not required. The section number associated with the element corresponds to the section in this application where additional information can be found.

Impacts and mitigation measures from decommissioning of the Facility are described in section 1.4.1.18 below.

1.4.1.1 Section 2.3.1 Project Overview

The Facility will receive, handle, store and load pipeline quality light, medium, and heavy crude oils with an American Petroleum Institute (API) gravity ranging from 15 to 45 degrees.

1.4.1.2 Section 2.3.3.1 Rail Car Unloading

The Applicant will impose standard requirements on crude oil specifications (specs) and quality with all shippers in order to manage the integrity of the crude oil received at the Facility (Wright 2016).

Vancouver Energy will only accept tank cars for crude oil shipment into the Facility that meet or exceed the U.S. DOT-117 standards specified in 49 CFR 179.202 (including any related federal agency or congressional modifications to those standards). All Facility customers will be required to ship crude oil using tank cars that meet or exceed these standards. Vancouver Energy is committed to making this requirement for all customers concurrent with startup of the Facility and in advance of the phase-out schedule allowed by the U.S. DOT.

1.4.1.3 Section 2.3.7.1, Vessel Departure and Transit

Loaded vessels departing from the Facility will be escorted by a suitably matched tug until the escorted vessel arrives in the vicinity of the river mouth. Once in the vicinity of the river mouth the tug will be released from the escorted vessel and will standby as a sentinel tug until the vessel crosses the Bar and is safely underway in the open ocean.

The Applicant will implement procedures that will only allow vessels calling at the Facility to depart a dock or enter the river when they can make the transit of the entire river with a minimum 2 feet of underkeel clearance and 10 feet across the bar.

1.4.1.4 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.

1.4.1.5 Section 2.10, Spill Prevention and Control

The Facility proposes to only receive, handle, store, and load Groups 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 15 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 15.0, which are heavier than water.

1.4.1.6 Section 2.13, Carbon Dioxide Mitigation

While the legal requirement to comply with the mitigation obligation applicable to new fossil-fueled thermal electric generating facilities does not apply to the Facility, the Applicant proposes to voluntarily implement these mitigation requirements. Note that the mitigation program in WAC 463-80 applies exclusively to stationary sources based on CO_2 emissions (i.e., not to all greenhouse gases [GHGs] as CO_2e). The Applicant has, however, agreed to implement the mitigation requirements of WAC 463-80 based on CO_2e emissions from stationary source operations at the Facility. With total annual operational GHG emissions of about 86,172 metric tons (Table 2.13-1), over a 30-year life of the Facility at 12 percent of the total CO_2e emissions (i.e., based on the WAC 463-80 mitigation formula that assumes 60 percent capacity operations and 20 percent of total emissions), this amounts to mitigation of 310,270 metric tons of GHGs. This obligation would be met by payment of $496,440 to the Climate Trust for the implementation of projects to reduce GHG emissions. This commitment fully meets the Applicant's voluntarily assumed obligation to mitigate Facility operations GHG emissions.

1.4.1.7 Section 2.18, Protection from Natural Hazards

The potential impacts of earthquakes and seismicity include ground motion, soil liquefaction, lateral spreading, and volcanic eruptions with related ash fall. The potential impacts of flooding include soil erosion of unprotected soils and contamination of floodwater.

Earthquake Hazards

A preliminary ground improvement design was submitted to EFSEC for review (Appendix L.3). The design proposes the use of deep soil mixing (DSM) columns, jet grout columns, and wick drains to mitigate the liquefiable soils at the Facility site. Combinations of these methods have been selected as appropriate to the subsurface soils present within each area of the Facility. These methods are described above and in greater detail in section 2.18.1 for each Facility area. The Applicant continues to actively evaluate ground improvement design alternatives and will consult with EFSEC to review and evaluate the various options to best address the need to provide adequate seismic protection and to minimize the risk to water quality from ground improvement activity.

The Applicant believes that whatever ground improvement design alternative is selected after consultation with EFSEC, it would not pose impacts beyond the range of those already identified in this application. The Applicant has committed to conducting 3 D modelling to verify efficacy of proposed ground improvements and has requested coordination with EFSEC's subject matter experts to select appropriate modelling assumptions (Derr, J.P., 2016).

The final design of ground improvements for the Facility will comply with the provisions of the building codes and requirements for seismic hazards that apply to the Facility 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.

See section 2.18, Tables 2.18-1 and 2.18-2, for a list the seismic design criteria for the Facility.

The upland Facility elements will be designed assuming a Facility importance factor of 1 combined with the site classification recommendations from the geotechnical investigation report. The upland facilities will meet the design criteria of IBC 2012 as supplemented by city and state amendments and ASCE 7. Based on the site classifications of D and E and the site specific hazards analysis conducted, API 650, Appendix B, requires that mitigation measures be constructed to address seismic, and in particular, liquefaction. The API standards are designed for the protection of life and to prevent catastrophic collapse of the storage tanks. To meet the mitigation requirements of the API standard, a combination of ground improvements as described above will be constructed for the essential facilities to meet or exceed the standards. Foundations for upland aboveground structures are described in section 2.17.3. Ground improvements are described in section 2.18.1.4.

Design of the dock modifications will conform to IBC 2012, as amended and adopted by the state of Washington and the City with the exception of mooring and berthing design, seismic design, and structural load combinations, which are not adequately addressed by IBC; these will be supplemented with applicable industry standards. Seismic design will be a performance-based design approach using multi-level earthquake performance objectives. The dock design considers ground motion from the three levels of seismic hazards:

- Operational Level Earthquake—5.8 magnitude
- Contingency Level Earthquake—8.4 magnitude
- Design Earthquake—9.0 magnitude

During the Operational Level Earthquake, the structure will reach the operational limit on utilities with minor repairs necessary to regain dock operations. During the Contingency Level Earthquake, damage will occur to the structure but repairs could be accomplished. During the Design Earthquake, the structure will not collapse but significant damage could occur, likely beyond reasonable levels of repair. The dock improvements are described in section 2.17.7.

Final analysis of the seismic conditions and determination of the building foundation and ground improvement designs will be completed to address seismic conditions found at the site prior to construction. It is anticipated that EFSEC will contract with the City for the review of final project design for compliance with the required code provisions as well as for providing the required inspections and issuance of occupancy permits. The Applicant will submit the required plans which will be designed in compliance with the codes and requirements referred to above.

The Applicant will also implement the following plans.

- Construction Emergency Plan to address actions and responses related to seismic activities
- Operations Emergency Plan to address actions and responses to site emergencies, including those related to seismic events

Volcanic Eruptions

The primary potential impact impact from volcanic eruptions at the Facility site is ash fall. Should an eruption occur and pose a risk to the Facility, the operations will be shut down until conditions allow for safe operation. Construction and Operations Emergency Plans will be implemented as needed to address ash fall.

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 demonstrated by the Applicant in its final Facility design submitted to EFSEC for its review for consistency with City construction permit requirements.

In order to prevent the contamination of flood water, operating procedures will require that any crude oil spill, including minor leaks and drips, be contained and affected surfaces cleaned promptly limiting the amount of any residue that could comingle with flood waters inundating the containment pans, containment piping, and below-grade trenches. In the event of flood events exceeding the 100-year or 500-year flood stages, the Applicant will monitor the rate of flood water rise and suspend threatened Facility operations prior to the flooding occurring.

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

Tsunami

The potential for tsunami and seiche impacts at the Facility location are negligible. No mitigation meausures are considerd necessary for these hazards.

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. 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.

1.4.1.8 Section 3.1, Earth

The primary impacts of the project on soils at the Facility are from the foundation construction, excavation, grading, trenching, backfill, compaction, and subsurface soil improvements associated with site development. The impacts generally will be limited to shallow soil at the site and will not exceed 20 feet in depth. Potential impacts include localized soil erosion during construction and disturbance of riverbed soils during in-water work.

Seismicity

Mitigation measures for seismicity are identified under 1.4.1.8, sections 3.1.3.6, Seismicity, and 2.18, Protection from Natural Hazards, *Earthquake Hazards*.

Soils

The site-specific geotechnical engineering investigation conducted for the project identified site improvement alternatives and methods of construction that will be employed as mitigation. 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. As described in section 3.1.3.6, appropriate types of ground improvements will be selected during final design based on the specified performance criteria for the elements of the Facility. Final ground improvement methods will be determined during design refinements and documented in construction plans submitted to EFSEC for review.

Erosion/Enlargement of Land Area (Accretion)

Construction

The Applicant submitted a preliminary construction stormwater pollution prevention plan (cSWPPP) to EFSEC for review (Appendix C.1). The cSWPPP identifies the stormwater pollution prevention measures to minimize potential erosion impacts (temporary, long-term, and sedimentation) at the construction site and is described in section 2.11. The Applicant will also implement city, county, and state best management practices (BMPs).

Construction staging and laydown activities will only occur in areas that have been previously disturbed and developed. Construction activities will be sequenced and controlled to limit areas of exposed soil. In some locations light surface leveling might be required to provide safe access to the site by construction employees and equipment. Surface disturbance in these areas is not anticipated. Clearing, excavation, and grading will be limited to the areas necessary to construct the Facility. Individual excavations will be used for equipment foundations. Following completion of foundations the site will be filled and compacted to the final grade.

Disturbed areas will be surrounded with silt fencing, wattles to prevent migration of eroded materials to other areas. Interim surface protection measures, including temporary ditches, sediment fences, silt traps, dust control, straw matting, and erosion control blankets, will be required to prevent erosion. Earth movement and other construction activities associated with

installation of the benches and ground improvement installation activities will be subject to the cSWPPP and associated BMPs.

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 in section 3.1.4, soils found on the site are classified as having little to no erosion hazard.

Fill, grade, and excavation areas will be completed per final construction plans submitted to EFSEC. Permanent erosion control will be installed as necessary upon completion of construction activities, including on-site stormwater collection systems.

Operation

Permanent erosion control will be installed as necessary upon completion of construction activities, including on-site stormwater collection systems.

The Applicant will use the following erosion control measures during operation of the facility:

- Design site surfacing to capture stormwater directly from hardscape to limit erosion
- Design industrial yards and landscape areas to either infiltrate or use flow dispersion to avoid concentration of runoff that contributes to erosion
- Incorporate BMPs from the 2012 Stormwater Management Manual for Western Washington for erosion and sediment control during operations
- Stabilize surfaces that may become exposed during operation in accordance with Facility National Pollutant Discharge Elimination System (NPDES) construction stormwater permit and final construction plan requirements
- Collect and convey stormwater from new impervious surfaces using systems that avoid contact of stormwater with bare soil
- Incorporate BMPs from the stormwater manual addressing soil erosion and sediment control for industrial yard areas

The Applicant will be responsible to ensure Facility stormwater components operate in compliance with the stormwater permits issued by EFSEC relative to the facility. The Port will continue to be in charge of compliance with permit requirements applicable to Port systems.

1.4.1.9 Section 3.2, Air

The potential air quality impacts may include airborne dust and particulates during construction activities, emissions from equipment and vehicles and odors generated during construction activities and by vehicles during operation; however, odors are likely to not be differentiated from the background odor in the surrounding industrial area.

The Applicant has designed the project to meet all federal and state emissions standards, including New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAPs), and applicable air quality permitting requirements. The Applicant is proposing measures to reduce emissions, including handling crude oil in equipment, which minimizes exposure of the oil to the ambient atmosphere 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 Facility

includes control equipment to limit emissions of hydrocarbons when the marine vessels are loaded using a collection system and a thermal combustor (Marine Vapor Combustion Unit, [MVCU]). 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). The Applicant has conducted air emissions modeling in accordance with approved methods to demonstrate compliance with all applicable air quality standards.

The Applicant will implement the following measures during construction:

- Dust and diesel emission control measures will be implemented consistent with Washington Associated General Contractors Brochure, "*Guide to Handling Dust from Construction Projects,"* including the following
  - Proper maintenance of off-road mobile equipment
  - Use off-road mobile equipment that meets applicable emission standards
  - Encourage carpool and trip reduction strategies for construction workers
  - Minimize construction truck and other vehicle idling time
  - Spray exposed soil with water or other suppressant to reduce wind-blown emissions
  - Pave or gravel staging areas
  - Use appropriate methods to control dust from trucks transporting materials
  - Rock exits or provide wheel washers to reduce particulate matter carried off site by vehicles
  - Cover dirt/gravel/debris piles to reduce dust and wind-blown debris

1.4.1.10 Section 3.3, Water

Surface Water

Potential construction surface water impacts to the Columbia River ma occur resulting from in- and overwater construction activities and potential stormwater runoff into the Columbia River from upland construction and ground improvement activities. Potential operational surface water impacts would be from inadvertent spills and releases, or inappropriate permanent stormwater controls.

Construction

Construction Stormwater Capture and Treatment - 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 sections 2.11.2 and the Engineering Report at section 5.3. It 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 Applicant will use management techniques to reduce the discharge of contaminated stormwater runoff. These techniques will be implemented on site prior to beginning construction activities and will include establishment of stormwater monitoring and maintenance programs to ensure compliance of erosion control practices.

The Applicant will also implement site-specific BMPs selected from the Stormwater Management Manual for Western Washington and meet the following water quality criteria:

- Chapter 173-200 WAC
- Chapter 173-201A WAC
- Chapter 173-204 WAC

During construction, the contractor will be directed to implement an environmental protection program for construction-related activities that complies with specific site conditions. Impacts to surface water will be mitigated through the use of on-site stormwater management. Best management practices that reduce erosion will be emphasized to reduce the sources of stormwater contamination. Ground disturbing activities will be limited to necessary construction areas. Construction methods will be modified as needed to protect surface water quality, and sequenced and controlled to limit potential erosion and sediment transport, including monitoring the installation and removal of temporary piles. Sediment control measures will be designed based on 10-year design storm. Water quality measures (other than sediment control) will be designed on a 6-month, 24-hour design storm.

The Applicant will conduct construction activities in accordance with the provisions of the NPDES Individual Construction Stormwater Permit issued for the Facility. Under the provisions of this permit, the Applicant's responsibilities will include, but not be limited to:

- Prepare and implement a cSWPPP.
- Install and maintain stormwater BMPs as specified in the cSWPPP.
- Provide training to construction employees regarding provisions of the cSWPPP.
- Conduct site inspections at least once a week and within 24 hours following any discharge from the site and as required by the Permit.
- Implement the construction water quality protection and monitoring plan (WQPMP) (Appendix F.2)
- Monitor and sample construction storm water discharges in compliance with permit provisions, and report such results as required.

As required by WAC 173-240-110, before constructing or modifying industrial stormwater facilities, engineering reports, plans, and specifications for the project must be submitted to EFSEC. The project therefore will require compliance with the following standards and regulations.

- Water Quality Standards WAC 173-201A
- Ecology's Stormwater Management Manual for Western Washington
- 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.

Construction Stormwater Pollution Prevention Plan - The preliminary cSWPPP (February 27, 2015) has been submitted to EFSEC for review. The cSWPPP, identifies specific

construction stormwater BMPs to address stormwater within the ground improvement construction areas, techniques to reduce the discharge of contaminated stormwater runoff, establishment of stormwater monitoring and maintenance programs to ensure compliance of erosion control practices, and specific applications for installation of BMPs to prevent and mitigate any construction-related impacts to surface water. The final cSWPPP will be submitted to EFSEC for review and approval before any Facility-related ground disturbance begins.

The cSWPPP places specific emphasis on protecting surface water quality of nearby wetlands and the Columbia River. Downslope and perimeter protection was identified for all construction areas and where ground improvements are necessary. Specific BMPs identified in the cSWPPP are summarized in Table 2.11-1 in section 2.11.1. The following BMPs are identified specifically for use during ground improvement activities. See Appendix C.1 for additional detail.

- Wheel washes will be provided at applicable construction entrances where ground disturbing acitvities exist during all ground improvement activities and rough grading.
- Groundwater or jet water used and brought to the surface during ground improvements at the marine terminal will be collected and pumped into weir tanks for turbidity control.
- Silt fencing will be installed along the top of bank where the transfer pipelines and ground improvements are constructed along the river. Compost socks would be installed along river embankment above the OHWM or waterline whichever is higher.
- All groundwater or jet grout slurry resulting from ground improvements will be processed through chemical treatment BMPs, such as pH reducers and/or polymer assisted stormwater filtration and will be used between areas of ground improvement (stone columns, soil mixing, jet grouting, etc.) and surface waters and wetlands.
- Wick drains will be used between areas of ground improvement (stone columns, soil mixing, jet grouting, etc.) and surface waters and wetlands.
- At Area 300, wick drains will be installed at a minimum of 16 feet on center where ground improvements are within 150 feet of the adjacent wetlands to the north and east. At areas 400 and 500, wick drains will be installed along the top of bank at 8 feet on center for the entire bank area receiving ground improvement. Visual monitoring of turbidity within the wetlands or Columbia River will occur daily during ground improvement. If any turbidity is observed as a result of ground improvement, ground improvement activities will be stopped and additional mitigation measures will be installed, including additional wick drains, turbidity curtains, or change in ground improvement methods will be considered.
- Cutoff channels will be installed in Area 300 – Storage tanks along the downslope construction area to capture construction stormwater where existing site grading is insufficient to direct stormwater into conveyances for the construction stormwater. These channels would also be used to contain ground improvement runoff where necessary.
- Channel lining and check dams will be used to protect channels from erosion, and check dams to assist in flow control.
- Install and maintain an erosion/sediment control barrier along the top of the Columbia River embankment for the areas adjacent to stone column installations consisting of silt fencing, filtration fabric, and straw wattles or similar measures approved by EFSEC. Monitor the water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If the water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved. These measures would reduce impacts to minor levels.

Any required surface restoration will the completed within 14 days after an area's final construction-related disturbance.

Additional Measures for Jet Grouting Activities - The potential stormwater and non-stormwater runoff from jet grout-related spoils will be mitigated to reduce the likelihood of contaminants released into the Columbia River.

The Applicant will conduct additional monitoring of surface water quality within the Columbia River upstream and downstream of the ground improvement installation to monitor for changes in pH and sulfate levels.

The mitigation measures listed above as part of the cSWPPP were specified in the Applicant's Project Refinement Report (May 2015). These mitigation measures were listed specifically for the containment and handling of jet grout-related spoils. The BMPs are in addition to those already included in the cSWPPP.

Where ground improvement may extend below top of the river embankment, the following additional stormwater BMPs were also identified to protect downslope water quality:

- Install temporary sheet pile wall between the jet grout installation areas and landward of the OHWM with sufficient freeboard to contain slurries and spoils and prevent them from entering the Columbia River. The sheet pile is most likely to be installed using vibratory hammer.
- Install the first row of jet grout columns landward of the temporary sheet pile first to act as a barrier to potential grout migration during the installation of subsequent jet grout columns landward. This will reduce the potential for later grout installations to migrate through seams in the wall, or under the wall, toward the Columbia River.
- Provide isolation measures to contain, extract, and dispose of spoils. Earthen berms, sheeting, straw wattles, or shallow trenches, will be used to isolate the work area and contain spoils exiting the grouting hole to prevent their entry into surface water, in addition to the temporary sheet pile stated above.
- Extract spoils from the containment area by vacuum pumps. Spoils may be loaded to trucks to be removed from the site, or may be handled on site to separate solids from liquids for additional treatment and disposal. If handled on site, soils will be removed and placed in a temporary holding area, such as lined ponds or tanks; these will temporarily hold spoils until they can be treated as necessary and disposed of holding ponds would be constructed in previously disturbed locations and would be located away from sensitive resources. Holding areas would be lined to prevent the migration of high pH water into the ground.
- Pump high pH water from holding areas or tanks into portable water quality treatment systems and neutralized. Following neutralization, the water will be discharged similar to other construction site groundwater that has been treated to the appropriate water quality standards.
- Remaining solid materials in holding areas or tanks will be tested as necessary and disposed of in accordance with applicable regulations if they classify as hazardous waste. If the solids do not classify as hazardous waste they will be used on site (for construction of the Area 300 containment berm for example, or will be disposed off site at an appropriate location.
- Conduct water quality monitoring. A Water Quality and Monitoring Plan has been prepared and submitted to EFSEC; the monitoring provisions of this plan will continue to address how activities are monitored to identify potential surface water exceedances. The plan will be

revised to address protection measures specific to ground improvement construction activities.

- Conduct site inspections will be conducted at least once a week and within 24 hours following any discharge from the site and as required by the NPDES Individual Construction Stormwater Permit to be issued by EFSEC. The water quality monitoring plan (Appendix F.2) also identified additional in stream monitoring within the Columbia River to monitor construction activities.

The NPDES Individual Construction Stormwater Permit is anticipated to include reporting and correction requirements that are substantially similar to those of the Construction Stormwater General Permit (Ecology 2015). These reporting notifications and noncompliance standards within the General Permit section S5.F require the steps below: (note: for EFSEC issued permits, "Ecology" would be replaced by "EFSEC").

- Ecology will be immediately notified of the failure to comply.
- Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable sampling and analysis of any noncompliance will be repeated immediately and results submitted to Ecology within five days of becoming aware of the violation.
- A detailed written report describing the noncompliance will be submitted to Ecology within five days, unless requested earlier by Ecology.

Construction Spill Prevention Control and Countermeasures - The construction Spill Prevention Control and Countermeasure Plan (cSPCCP) (Appendix B.2) will also be implemented and includes a listing of responsible personnel, spill reporting procedures, project and site information, pre-existing contamination at the Facility site, potential spill sources, spill prevention and response training, spill report form(s), plan approval, and cSPCCP acknowledgement forms (to be signed by all project personnel). The cSPCCP will meet NPDES permit requirements.

Operation

Permanent Stormwater Capture and Treatment - Surface water quality will be protected during operations through the use of the BMPs designed in accordance with Ecology's stormwater manual. 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 sections 2.11.2 and 2.11.3, 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 installation of the permanent stormwater management system.

Once all permanent stormwater BMPs are in place, operations-related impacts to surface water will be minimized through the use of operational and structural source control BMPs and operational procedures The Applicant will implement secondary structural containment measures

to supplement the structural source control BMPs. BMPs are from Volume IV of the Stormwater Management Manual for Western Washington and will meet the following water quality criteria:

- Chapter 173-200 WAC
- Chapter 173-201A WAC
- Chapter 173-204 WAC

The Applicant submitted to EFSEC for review a preliminary operations SWPPP (oSWPPP) (Appendix C.2) based on the preliminary design in place when this Application was submitted. BMPs are described in the preliminary oSWPPP. A final oSWPPP will be submitted for review prior to the beginning of Facility operations.

In accordance with the permitted levels of the downstream system, discharge stormwater meeting established water quality benchmarks will be consistent with the Industrial Stormwater General Permit. To the maximum extent possible, stormwater will be protected and segregated from contact with industrial activity and crude product. With the oSWPPP, mitigation measures and BMPs in place, stormwater discharges from the Facility will meet state and local water quality standards. A Tier II anti-degradation analysis is being completed in accordance with WAC 173-201A-320 to demonstrate water quality compliance. The final report will be submitted to EFSEC.

Spill Prevention, Control and Countermeasures - 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 or spill during an exceptionally high rainfall event. Numerous spill prevention and control systems have been included in the design of the Facility. Containment pans, pumps, and containment sump tanks will be provided for the rail unloading area (Area 200). Approximately three double-shelled containment tanks, with a total capacity of approximately 1500 barrels, will be constructed south of the Area 200 parking lot. The combined volume of the tanks is sized to contain the entire contents of a single tank car plus at least an additional 10 percent. Equipment and parts wash (including facility washdown, and railcar exterior washing), will be conducted in a covered portion of the rail unloading building. Wastewater will be pumped to secondary containment tanks.

Containment rail drip pans, pumps, and containment sump tanks will be provided for the rail unloading area (Area 200); 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 anda 100-year 24-hourrainfall 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.

In Area 300 a secondary containment berm (approximately 6 feet high with a full impervious liner), will be designed with a capacity at least equal to 110 percent of the volume of the API 650 maximum capacity 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 (Makarow 2015b). The containment berm will be designed in accordance with the requirements of WAC 173-180-320. WAC 173-180-320 (9)(c) specifically

states “Secondary containment systems must be designed to withstand seismic forces,” and sub (e) that “Secondary containment systems must be designed and constructed in accordance with sound engineering practice and in conformance with the provisions of this section.” Spill, containment will be designed to also meet or exceed API, EPA, City and other applicable requirements.

As additional protection, 24-inch-high intermediate berms will be installed within the larger area to separate each tank area from the larger containment area (see Figure 2.3-10). Each intermediate berm will be designed to contain at least 10 percent of the volume of the tank it encircles. The tank containment area will be lined with a flexible impervious membrane to prevent any inadvertent releases from leaving the containment area via the ground.

A flexible impermeable liner will be used to mitigate the possibility of oil penetrating through the berm in the event of a seismic event. See section 2.18.1.4 for additional information on Protection from Natural Hazards, Mitigation Measures for Earthquake Hazards.

The tanks will be constructed to API 650 which requires initial testing at construction. Tank monitoring, inspection, and testing will be in accordance with API 653, the industry standard for the inspection of aboveground petroleum storage tanks. For example, API 653 requires tanks to be inspected every 10 years to assess the tanks’ physical condition and determine suitability for continued use.

The transmission pipeline (Area 500) 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 secondary containment with leak detection provided for pipe installed underground.

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.

Parking and access areas will be designed with a combination of catch basin spill traps and water quality filter vaults to treat stormwater runoff.

See sections 2.10 and 2.11.2 and Appendices B.3 and C.2 for additional Facility design features and spill control and prevention measures.

Spill Preparedness and Response - The Applicant will implement planning and preparedness actions required by state and federal regulations to prevent, contain, and respond to inadvertent releases that could impact surface water, including, but not limited to:

- A comprehensive site-specific operations SPCCP (oSPCCP) developed in accordance with 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
- Prepare coordinated plans to meet all applicable local, state, and federal requirements

Runoff/Absorption

Potential runoff/absorption impacts include erosion and sedimentation, which are expected to be minimized by BMPs that address 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

There are no impacts to the site for the 5- and 50-year flood events. 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.

Construction

Construction activities will cease if a flood event is predicted and move, to the extent possible, hazardous materials and equipment from the site to above the 500-year floodplain.

Operation

Within Area 200, below-grade watertight trenches will be used to eliminate inundation concerns during the 100-year flood or from seasonal shallow groundwater.

Where the pipeline route is located in the floodplain, the pipeline will be elevated above the 100-year flood elevation. 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 structures or portions of structures located in Area 400 will be located outside the 100-year floodplain. These include a dock transformer pad, combined control room/E-house, 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 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.

Floodwaters are anticipated to inundate the facilities with approximately 1-foot of water during the 500-year event and a maximum of 3 feet in the lowest areas. The Facility will be designed to maintain integrity in these worst-case flood conditions. The containment berm around the product storage tanks (Area 300) provides protection against inundation. The unloading facility is located within the inundation area of the 500-year floodplain. Flood waters inundating the unloading area would fill the below-grade trenches and containment pans. In order to prevent the contamination of flood water, operating procedures will require that any crude oil spill, including minor leaks and drips, be contained and affected surfaces cleaned promptly limiting the amount of any residue that could comingle with flood waters inundating the containment pans, containment piping, and below-grade trenches.

In the event of flood events exceeding the 100-year or 500-year flood stages, the Applicant will monitor the rate of flood water rise and suspend threatened Facility operations prior to the flooding occurring.

Groundwater Resources

Construction

Construction of foundations and utility and pipeline excavations for the project may require dewatering of the excavations. 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.

During construction, the Applicant will conduct on-site investigations where production wells were known to be located. If a borehole is located, confirmation will be made that the borehole has been properly sealed to a depth at least 10 feet below the finished ground surface with a cementitious grout.

As part of the Contaminated Materials Management, construction activities will be identified that could potentially impede monitoring and access of groundwater through existing water supply wells if access is necessary for ongoing remediation activities.

The Applicant has submitted a preliminary cSWPPP to EFSEC for review (Appendix C.1). The cSWPPP identifies the stormwater pollution prevention measures to be implemented at the construction site and as described in section 2.11 of this application.

Operation

Secondary containment systems will be provided under storage tanks and in buried transfer piping to capture leaks, preventing discharges directly into the soil, which could impact groundwater.

The potential for the discharge of contaminants to the groundwater due to surface water infiltration will be limited through development of surface water control infrastructure and the implementation of water quality control protocol.

Site design monitoring and control systems will be incorporated to allow early detection of a release when containment and remediation can be most effective.

During final design, potential contaminants in the soil will be identified and addressed in the plans and specifications to establish procedures to minimize the potential for groundwater impacts, including the following:

- Restrictions on work in portions of the site
- Minimize/controlling grading to prevent ponding water that would promote leaching
- Use of temporary covers over disturbed areas, and controlling tracking of contaminants from one portion of the Site to another

An oSPCCP (Appendix B.3) and oSWPPP (Appendix C.2) will be implemented to establish procedures to prevent and control the impact of spills on the natural environment. The oSPCCP, 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 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. The oSPCCP will be used for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. Applicable spill response equipment and material designated in the oSPCCP will be maintained at the job site. In the event of an inadvertent release, containment and begin cleanup efforts will begin immediately and be completed in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work. Cleanup will include proper disposal of any inadvertently released material and used cleanup material. The cause of the inadvertent release will be assessed and appropriate action will be taken to prevent further incidents or environmental damage. Inadvertent releases will be reported to Ecology's Southwest Regional Spill Response Office.

There are no anticipated adverse impacts to existing groundwater sources resulting from the use of City-supplied potable, process, and emergency fire suppression water.

Public Water Supplies

The development of new water sources or wells is not required for this Facility. The Facility will purchase its water supply from the City. Based on the City's current excess source capacity described in section 3.3.5 and the Facility impact of approximately 87,400 gallons per day represents 0.3 percent of the available capacity. Citywide long-term growth is not anticipated to be affected by the water demands of this project.

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.

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

Habitat and Vegetation

The primary potential impacts at the project site will be the direct, permanent removal of vegetation during construction and temporary construction noise impacts. The project will implement several impact minimization measures and BMPs to minimize the potential for impacts to habitats and vegetation. In addition to the following discussion, see the Fish and Wildlife sections below for additional mitigation measures and BMPs for these habitats in addition to the habitiat and vegetation measures discussed in this section.

Construction

Direct Habitat Modification - The project has been designed to avoid and/or minimize impacts to terrestrial habitat and vegetation 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. Construction fencing will be used to protect existing vegetation to be retained. The project will provide 1.13 acres of compensatory habitat mitigation, including urban landscaping. Approximately 2.21 acres of planted areas, including trees and shrubs in areas 200 and 300 will offset the removal of nine trees associated with construction. Area 200 will include in the landscape plan for the Support Buildings the use of native trees planted in groups within the landscape to provide additional mitigation for the loss of trees onsite. These landscaped areas will provide wildlife habitat typical in an urban environment. In addition, the Applicant will adhere to the requirements of VMC 20.770[2] and plant a minimum of 30 tree units per acre for undeveloped sites, and based on a development area of 10,550 square feet, plant a minimum of eight tree units in other areas of the Facility.

No purple martin or nest boxes would be directly affected by the construction of the proposed project. The construction activities do not include removal of any creosote-coated wood piling. All existing piles at the marine terminal are steel and do not contain cavities for nesting wildlife. Purple martin have a low suspected occurrence within the Facility site as noted in DEIS Table 3.5-3.

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[2] VMC 20.770.070(B)(4) allows trees planted in landscaped islands and other areas to meet the tree density requirements. The project includes a Landscaping Plan in Area 200 that calls for the planting of buffer landscape trees and parking lot trees that would exceed the eight tree units required for the project under VMC 20.770. The planted trees would be deciduous and planted at a minimum of 2-inch caliper. These landscaped areas would provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. In total, about 2.21 acres of planted areas would be completed.

Mitigation measures will be implemented for each of the habitats impacted by construction of the Facility as follows:

- *Unvegetated Industrial Land*: Impacts to unvegetated industrial land do not require mitigation.
- *Ruderal Upland Grass/Forb and Upland Cottonwood Stands*: The 0.96 acre of ruderal upland grass/forb habitat on the project site have very limited value. Nevertheless, even if no net loss to this impact was required, when combined with the Upland Cottonwood Stands (0.07 acre), 1.03 acres of compensatory habitat mitigation is warranted for no-net loss. To mitigate for the removal of these habitats, the Applicant will install urban landscaping including trees and shrubs in areas 200 and 300. Native species will be used to the extent practical. Area 200 will include native trees planted in groups within the landscape to provide additional mitigation for loss of trees onsite. These landscaped areas will provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. This action also complies with VMC 20.770 and planted areas will include additional trees to compensate for development that will impact pervious surfaces. Trees will be planted as part of landscaped buffers and parking lot landscaping where currently no trees exist. In total approximately 2.21 acres of planted areas will be completed.

  Locations where ruderal habitat has been impacted by temporary construction laydown will be restored to previous condition so as to result in no net loss to this community.
- Riparian: The riprapped bank has very limited riparian vegetation, and the Applicant is not disturbing any existing high quality vegetation or negatively impacting existing habitat function. No mitigation is therefore warranted.

As stated above, the Applicant will adhere to the requirements of VMC 20.770[3] and will plant a minimum of 30 tree units per acre for undeveloped sites, and based on a development area of 10,550 square feet, plant a minimum of eight tree units in other areas of the Facility.

The Applicant has identified the following construction mitigation measures to minimize impacts to avian habitat during construction:

- Perform tree removal outside of the nesting season (February 15 to September 1), to avoid potential impacts to active nests of protected migratory birds. If trees are to be removed during the nesting season, a preconstruction nesting survey will be completed no more than two weeks prior to removal to ensure that no active nests are present. If active nests of protected migratory birds are found, tree removal activities will be suspended until after nests have hatched and young have fledged.
- Monitor the approximate 2.21 acres of landscape plantings (discussed above) for two years after planting and replace all trees that do not become successfully established.

[3] VMC 20.770.070(B)(4) allows trees planted in landscaped islands and other areas to meet the tree density requirements. The project includes a Landscaping Plan in Area 200 that calls for the planting of buffer landscape trees and parking lot trees that would exceed the eight tree units required for the project under VMC 20.770. The planted trees would be deciduous and planted at a minimum of 2-inch caliper. These landscaped areas would provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. In total, about 2.21 acres of planted areas would be completed.

BMPs will be implemented during construction to minimize the spread and establishment of noxious weeds, including the following:

- Complete a weed survey for the Facility site, followed by eradication of any noxious weeds and invasive plants established at the site prior to initiation of construction to help prevent the spread of noxious weeds to nearby wetland mitigation and wildlife areas.
- Provide wheel wash equipment at the Area 200 access to limit the dispersion of noxious weed seeds.
- Restrict construction activities to the area needed to work effectively to limit ground disturbance and prevent the spread of noxious weed species.
- Use weed-free straw hydromulch, or similar ground cover for temporary erosion control during construction.

Aquatic Invasive Species - WDFW hydraulic code rules require that the transportation and introduction of aquatic invasive species be prevented by thoroughly cleaning vessels, equipment, boots, waders, and other gear before removing the gear from a job site [WAC 660-120 (7)(j)]. Contractors would be required to provide documentation that all equipment and materials that will be used in- and over-water have be cleaned to comply with applicable aquatic invasive species statutes and rules, including WAC 660-120 (7)(j). This includes providing documentation that in-water equipment and construction materials have either not been in contact with waters containing state prohibited aquatic invasive species, which could potentially be transferred to the Columbia River, or that equipment and materials have been appropriately decontaminated from potentially transferrable aquatic invasive species prior to arrival at the project site.

Temporary Water QualityImpacts - A water quality protection and management plan (WQPMP) (Appendix F.2) has been developed and describes how the project will monitor and control releases of turbidity, suspended sediment, concrete, and other construction-related materials that may be generated during Facility construction activities in, over, and adjacent to the Columbia River and other adjacent water bodies. The plan describes water quality protection measures; monitoring parameters, methods, evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during such construction activities.

All in-water temporary pile installation and removal below the OHWM will be conducted within the published in-water work period for the project, which is November 1 to February 28[4]. This

[4] In the Applicant-prepared PDEIS for the project, and in the JARPA and Biological Evaluation (BE) for the project, the Applicant has proposed to conduct work below the Ordinary High Water Mark (OHWM) within the US Army Corps of Engineers' (USACE) published in-water work window for the Columbia River mainstem between the mouth of the river to the Snake River confluence (November 1–February 28).[1] This work window has been established by the USACE, in coordination with resource agencies, for the protection of fish life, including ESA-listed species.

In the Advisory HPA, as well as in Sections 3.6.3.1 and 3.6.5 of the DEIS, EFSEC proposes a modified in-water work window of September 1 - January 15 to avoid peak migration and larval stages of salmonid and nonsalmonid species.

work window has been established to minimize potential impacts to aquatic habitat and native fish species and avoids the peak migration timing for marine mammals in the Lower Columbia River.

Construction at the site will be governed by a a construction Spill Prevention, Control and Countermeasures Plan (cSPCCP), which the Applicant has submitted to EFSEC for review (Appendix B.2).The cSPCCP defines specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills and outlines responsive actions in the event of a release, and notification and reporting procedures. 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. The cSPCCP will be used for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. Applicable spill response equipment and material designated in the cSPCCP will be maintained at the job site. In the event of an inadvertent release, containment and begin cleanup efforts will begin immediately and will be completed in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work. Cleanup will include proper disposal of any inadvertently released material and used cleanup material. The cause of the inadvertent release will be assessed and appropriate action will be taken to prevent further incidents or environmental damage. Inadvertent releases will be reported to Ecology's Southwest Regional Spill Response Office.

Temporary Construction Noise - Construction of the Facility has the potential to result in temporarily elevated terrestrial habitat and underwater habitat noise levels at the project site and in the project vicinity. Noise levels will be elevated during the operation of construction equipment, in-water pile removal and installation by vibratory methods, and impact pile driving of upland piles, mooring points, movable walkway foundations and pipeline supports. These construction activities have the potential to temporarily affect marine mammals and the quality of their habitat at the project site and within the project vicinity. During construction aquatic species may tend to avoid the work area or move through the area faster.

Aquatic and terrestrial habitat noise associated with construction has been minimized to the extent practicable. The dock modifications have been designed to use vibratory pile removal and installation methods and no in-water (below OHWM) impact pile driving, which will greatly reduce the extent of terrestrial and underwater noise generated during construction. This reduction in the intensity of underwater noise will limit the potential for adverse effects to

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The USACE is currently reviewing the JARPA and BE for the project and consulting with National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) as obligated under Section 7 of the Endangered Species Act (ESA). Each of these regulatory agencies may have additional feedback on the preferred window for in-water work.

In the absence of a consensus among the resource agencies regarding a modified work window, EFSEC should defer to the USACE-published in-water work window of November 1 – February 28, as this is the window under consideration with the federal permitting agencies.

If USACE, NMFS, USFWS, and EFSEC can agree upon a modified window in which the project can be accomplished, and which is no shorter in duration than the window proposed in the federal permit application, then the Applicant would support discussions regarding a modified in-water work window.

wildlife, including special status species that may utilize habitats at the project site and within the project vicinity.

All in-water work that generates temporary noise, including temporary pile vibratory installation and removal, will occur during the published work window from November 1 to February 28 to minimize potential impacts to native fish species, and avoid the peak migration timing for marine mammals in the Lower Columbia River. Marine mammals are not expected to be present within the action area during the in-water work period. Drilling for casing installation may also generate underwater noise and will follow the same work window.

The Applicant has submitted a marine mammal monitoring plan (MMMP) (Appendix H.3) to EFSEC for review to address vibratory installation and removal of temporary piles and upland impact pile driving. The MMMP was developed to minimize the exposure of marine mammals to temporarily increases in underwater noise levels. The plan describes procedures to identify the presence of marine mammals during construction activities, which may result in "take," and establishes actions that will be taken to minimize impacts to such marine mammals. The MMMP will include, in addition to the current plan, two additional observers to assist in monitoring the 6-mile zone where marine mammals could be affected by in-water vibratory pile driving.

The impacts of peak terrestrial construction noise have been minimized through construction sequencing that will complete work as efficiently as possible when loud noises are expected. Additionally, all noise sources occur outside of recommended management buffers for priority species; therefore, no work window is proposed for terrestrial pile driving. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity. The Applicant has committed to conduct upland impact pile driving associated with Area 400 elements (shore based mooring points, foundations for the mooring dolphin access points, and the trestle abutment) during the published work window from November 1 to February 28 to minimize the potential for adverse impacts to aquatic habitat. Upland impact pile driving located outsideof Area 400 (e.g., Area 200 rail unloading building and Area 500 pipeline supports) would not be subject to the in-water work window.

The Applicant has developed a construction wildlife monitoring plan (Appendix H.4) that describes the means and methods to monitor noise levels during upland impact pile-driving in order to demonstrate that noise levels attenuate to a level of non-disturbance to PHS species potentially present in the vicinity of the construction site. See section 3.4.4.3 for additional information on species of concern.

Operation

The operation of the Facility could affect vegetation and terrestrial wildlife habitats through operational water quality impacts including an increased potential for impacts associated with stormwater management at the site, spills or leaks associated with on-site equipment, and through an increase for potential spills to surface water. There may also be effects associated with the shipping traffic using the Facility. Effects associated with bank erosion will be temporary and localized, and will result in only minor negative impacts to vegetation and terrestrial wildlife habitat.

Operation Water Quality - As described in section 2.11, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge.

Stormwater treatment facilities will be sized to accommodate the 6-month, 24-hour event as estimated using Ecology's hydrology model.

The stormwater treatment will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and will ensure that vegetation and terrestrial wildlife habitat are not adversely affected by operational stormwater. See section 2.11 for a more detailed description of how operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge.

Transport vessels calling at the Facility will be double hulled to minimize the potential for the release of cargo in the event of a spill. International convention requires that a shipboard oil pollution emergency plan (SOPEP) govern the operation of each ship. Vessel operators are required to comply with state spill prevention and contingency plans. The likelihood of a catastrophic spill is very low, and the Facility BMPs and safety and security measures will minimize the risk of impacts to vegetation and terrestrial wildlife habitat.

Spill Prevention and Response - As described in section 2.10, the Facility will include design measures aimed at avoiding releases, secondary containment measures to prevent releases from reaching terrestrial and aquatic habitats, and will implement a comprehensive suite of spill response planning and response plans. For example, operations at the site will be governed by an operations SPCCP (oSPCCP)(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 BMPs include inspecting equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.

Lighting, Waste Management and Vegetation Maintenance - Facility lighting will be directional in areas adjacent to sensitive wildlife areas, including the north side of Area 300 to ensure lights are not pointed in the CRWMB, and Area 400 to minimize the amount of light in aquatic habitats. Lighting will be directional and aimed away from sensitive habitats to the extent possible to minimize nightlight and glare. The Applicant will incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations. The marine terminal loading area will only use spot lighting during loading operations if approved by the USCG in compliance with 33 CFR Part 105 and/or Part 154.

The Facility will implement a waste management plan, to control and contain food waste. The plan will include measures to educate workers on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife.

Facility vegetation maintenance activities will be conducted using methods and products consistent with local, state, and federal regulations. To control weeds during operations, vegetation maintenance practices to be implemented by the Applicant include maintaining areas clear of vegetation to manage noxious weed infestations and reduce fire risk. Maintenance-related impacts to vegetation will be minimized by limiting activities to the Facility location, i.e., tracks, pipeline corridors, and tank farm. Vegetation maintenance will not occur outside the Facility location.

Shipping - Operation of the proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. Oceangoing vessel traffic on the Columbia River has the potential to result in impacts to vegetation and terrestrial habitat (note: mitigation for fish and fish habitat are discussed in the Fish section below) through increased potential for shoreline erosion associated with vessel wakes, propeller wash, and through the potential introduction of exotic species. The Applicant does not control the operation of these vessels calling at the Facility, however, vessel operators are required to comply with state and federal regulations to mitigate certain impacts.

Bank Erosion

As presented in section 3.4.2.2, Operation, Shipping, *Bank Erosion*, impacts related to vessel wakes caused by vessels calling at the Facility are not measurably different from those already occurring on the Columbia River navigational channel and will not cause any additional adverse impact (Flint 2016). Terrestrial habitats along the shoreline are already exposed to a baseline level of vessel wakes. The impact of vessel traffic on these habitats adjacent to the Facility will be negligible and as a result there are no recommended mitigation measures. See section 3.4.2.2 for additional detail on bank erosion.

Exotic Species

The importation of aquatic invasive species as a result of vessels calling at the Facility is minized through vessel operator compliance with applicable state and federal regulations, which address hull fouling and ballast water exchanges. Facility specific activities involving in-water placement of equipment (e.g. booming, skiff usage, third party vessels participating in spill response traingina and drills) would abide by applicable state regualtions and rules mandating cleaning of equipment prior to its introduction into the Columbia river if it was sourced from a location where invasive species are present. See section 3.4.2.2 for additional detail on exotic species.

Fish

In addition to the construction and operation mitigation and BMPs stated in the Habitat and Vegetation section above, the following mitigation measures and BMPs have been specifically identified for fish and fish habitat.

Construction

Direct Habitat Modification - Construction of the project will result in no net new direct, permanent impacts to fish habitat in the Columbia River. Design modification to the existing dock will only require temporary support pilings during construction. No new structures, no new permanent piles below the OHWM and no net increase in overwater structure will be installed. The removal of 15 piles and existing overwater coverage will further minimized the extent of potential impacts.

All in-water construction activities, temporary pile installation, and removal activities below the OHWM will be conducted within the published in-water work period for the project (November 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 November 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

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 following BMPs will be used during construction to further protect aquatic habitat.

Pile removal and installation BMPs:

- Work below OHWM will only occur during the in-water work window.
- Remove piles with a vibratory hammer when possible.
- The piles will be removed in a single, slow, and continuous motion to minimize sediment disturbance and turbidity in the water column.
- If a pile is unable to be removed with the vibratory hammer, cut or push it into the sediment consistent with agency-approved BMPs.
- Removed piles and associated sediments (if any) will be contained on a barge. If piles are placed directly on the barge and not in a container, the storage area will consist of a row of hay or straw bales, filter fabric, or similar material placed around the perimeter of the storage area.
- The vibratory hammer method will be used to drive temporary steel piles to minimize noise levels.

Overwater concrete BMPs:

- Wet concrete will not come into contact with surface waters.
- Forms for any concrete structure will be constructed to prevent leaching of wet concrete.
- Concrete process water would not enter waters of the United States. Any process water/contact water would be routed to a contained area for treatment and disposal.
  - Construction will be completed in compliance with Washington State Water Quality Standards (WAC 173-201A) including: No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials will be allowed to enter surface waters.
  - There would be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
  - Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. will be checked regularly for leaks, and materials would be maintained and stored properly to prevent inadvertent releases.

Additional construction mitigation measures and BMPs include:

- Work barges will not be allowed to ground out on the river bottom during construction.
- Check construction vessels and equipment for leaks and/or other problems that could result in discharge of petroleum-based products or other material into the Columbia River.
- Do not dispose of or abandon excess or waste materials generated during construction waterward of the OHWM or allow to enter waters of the state. Dispose of waste materials in an appropriate landfill.
- Store demolition and construction materials where wave action or upland runoff cannot cause materials to enter surface waters.
- Keep oil-absorbent materials on site to be used in the event of an inadvertent release or if any fuels, lubricants, or other oil-based product is observed in the water during construction.

- Use grating on all walkway surfaces between the docks and the dolphins to allow light penetration.
- Add anti-perch pile caps to the tops of any exposed piles to prevent perching of piscivorous birds.

Construction will be completed in compliance with Washington State Water Quality Standards (WAC 173-201A) including:

- No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials would be allowed to enter surface waters.
- There would be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.
- Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. would be checked regularly for leaks, and materials would be maintained and stored properly to prevent inadvertent releases.

The impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Construction Lighting - If ground improvement installation requires the use of temporary night lighting, all lights will be shielded and directed away from the water to the extent practicable. Installation of jet grout columns directly adjacent to the shoreline will be scheduled for daylight hours to the extent practicable.

Aquatic Invasive Species - WDFW hydraulic code rules require that the transportation and introduction of aquatic invasive species be prevented by thoroughly cleaning vessels, equipment, boots, waders, and other gear before removing the gear from a job site [WAC 660-120 (7)(j)]. Contractors would be required to provide documentation that all equipment and materials that will be used in- and over-water have be cleaned to comply with applicable aquatic invasive species statutes and rules, including WAC 660-120 (7)(j). This would include providing documentation that in-water equipment and construction materials have either not been in contact with waters containing state prohibited aquatic invasive species which could be potentially transferred to the Columbia River, or that equipment and materials have been appropriately decontaminated from potentially transferrable aquatic invasive species prior to arrival at the project site.

Temporary Water Quality - The project has the potential to result in temporary water quality impacts during pile removal, which could affect aquatic habitat by temporarily disturbing sediments and elevating levels of turbidity during construction. However, 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 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.

A water quality protection and management plan (WQPMP) (Appendix F.2) has been developed and describes how the project will monitor and control releases of turbidity, suspended sediment,

concrete, and other construction-related materials that may be generated during Facility construction activities in, over, and adjacent to the Columbia River and other adjacent water bodies. The plan describes water quality protection measures; monitoring parameters, methods, evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during such construction activities.

All in-water temporary pile installation and removal below the OHWM will be conducted within the published in-water work period for the project (November 1 to February 28). This work window has been established to minimize potential impacts to aquatic habitat and native fish species and avoids the peak migration timing for marine mammals in the Lower Columbia River.

In response the Advisory HPA dated April 16, 2015 (Howe, D. 2015), the applicant is also providing the following mitigation during in-water construction to protect fish and fish habitat:

- Work below the OHWM shall only occur between November 1 to February 28.
- If at any time the stone column seismic stability work is expected to cause release of sediments below the high waterline, this work shall also adhere to the above-mentioned work window.
- The Region 5 Habitat Program Manager will be notified in writing (e-mail, FAX, or mail) from the agent/contractor no less than three working days prior to the start of construction activities. The notification will include the contractor's name, project location, and starting date for work.
- If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), immediate notification will be made to the Washington Military Department's Emergency Management Division at 1-800-258-5990, and to the Region 5 Habitat Program Manager.
- Work will be accomplished per plans and specifications entitled "Tesoro Savage Vancouver Energy Distribution Terminal – Dock Maintenance and Utility Infrastructure" project, dated February 2014, except as modified by these provisions. A copy of these plans will be available on site during construction.
- Extreme care will be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the stream.
- Equipment used for this project will operate stationed on a barge, boat, bank, or pier.
- All work operations will be conducted in a manner that causes little or no siltation to adjacent areas.
- Piling installation or removal will be accomplished primarily by vibratory methods, and will use an impact hammer and "proofing" will occur only when sound attenuation devices, such as a "bubble curtain" are employed.
- Any impact hammer pile driving will be accomplished during daytime hours to avoid attracting fish to lights at night.
- The existing piling will be removed and disposed of in an upland location such that they do not enter waters of the state. In the event that the piles cannot be completely removed then the remainder of the piles will be removed with a clamshell bucket, chain, or similar means, OR cut off 2 feet below the mudline.
- All holes or depressions will be backfilled with clean native bed materials to reduce leaching of residual chemicals into the water column.

- Replacement grating for walkways will be designed to pass a minimum of 60 percent sunlight in areas over shallow-water habitat (less than 30 feet deep).

Construction at the site will be governed by an cSPCCP, which the Applicant has submitted to EFSEC for review (Appendix B.2).The cSPCCP will be implemented during construction and defines specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. The plan also outlines responsive actions in the event of a release, and notification and reporting procedures. See the Habitat and Vegetation section, above, for additional details on applicable procedures.

Temporary Construction Noise - The proposed project has the potential to result in elevated underwater noise during in-water vibratory pile installation and removal, and impact pile driving of shore-based mooring structures, which can temporarily affect fish and fish habitat quality.

The dock modifications have been designed to require no impact pile driving, which will greatly reduce the extent of underwater noise generated during construction. Temporary support piles for dock modifications will be installed and removed with vibratory methods. This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish.

In addition, all in-water work below the OHWM will be conducted within the published in-water work period for the project (November 1 to February 28). The upland impact pile driving for the mooring points located above the OHWM will also be conducted within the in-water work window to minimize the potential for effects from potential sound flanking. 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 completely absent from the project vicinity, the window between November 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

A MMMP will be implemented for vibratory installation and removal of temporary piles, and upland impact pile driving to minimize the exposure of fish to temporarily increased underwater noise levels. See the Temporary Construction Noise Impacts section in Habitat and Vegetation above for additional information.

Operation

Standard BMPs and Design Measures - The following standard operational BMPs will be implemented to minimize potential impacts to fish and fish habitat during operation of the facility.

- Location of crude oil unloading areas that ensure oil never comes into contact with unprotected ground surfaces that could runoff to aquatic systems. Use containment pans and berms would be used to capture unanticipated leaks.
- Construct transfer piping such that crude oil exposure to the ambient atmosphere is minimized. Design the transfer pipelines in conformance with applicable industry standards.
- Equip transfer pipelines and the associated pumping systems 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.
- Equip transfer pipelines with valves at the exit of and entry to the unloading area, the storage area, and the marine vessel loading area. These valves would 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.

- Install transfer piping aboveground when possible to facilitate inspections and maintenance. Where road or rail crossings occur, house the piping in underground steel casings or raised aboveground using standard check for spellout clearances. Design and install pipelines at each railroad, highway, or road crossing and to withstand the dynamic forces exerted by anticipated traffic or rail loads.
- Coat and cathodically protect transfer pipelines segments constructed underground to prevent corrosion.
- Install sections of transfer pipelines constructed underground so that they are not in electrical contact with any metallic structures. This requirement would not preclude the use of electrical bonding to facilitate the application of cathodic protection. Tests would be carried out to determine the presence of stray currents and protective measures provided when stray currents are present.
- Equip transfer pipelines with leak detection systems meeting regulatory standards.
- Equip the trestle at Berth 13 with piping and hoses to transfer the crude oil from the transfer pipeline system to the receiving marine vessel. In accordance with 33 CFR § 154.530, a facility transferring oil or hazardous materials to or from a vessel with a capacity equal to or greater than 250 barrels (bbl) 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 would be coupled or uncoupled as part of the transfer operation. For the Facility, it is anticipated that the hose diameter would be between 6 and 12 inches, requiring that discharge containment capacity must be at least 3 bbl.
- Construct a catchment and sump at Berth 13, 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 would be discharged within 1 hour of completion of any transfer by pumping into the return line.

The following design elements will be used to prevent discharges of oil during conveyance, including:

- Design hoses and their supporting equipment to meet the applicable hose protection requirements of WAC 173-180 Part B and 33 CFR 156.
- Design vessel mooring systems to meet the applicable requirements of 40 CFR 156.

Plans will be prepared and implemented to comply with state and federal requirements, including:

- Operations oSPCCP, prepared under 40 CFR 112 and WAC 173-180, Part F
- Safe and effective threshold determination report, prepared under WAC 173 180 224
- Pre-loading Transfer Plan according to WAC 173-180-230
- Facility operations manual in compliance with WAC 173-180 400 to -435
- Oil transfer training program in compliance with WAC 173-180, Part E
- Certification program in compliance with WAC 173-180, Part E
- Spill Contingency Plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F

Aquatic Invasive Species - During operations, the Facility may source spill response equipment from other locations in the event of larger and more complex spill drills or response activities. In

such cases, contractors and mutual aid providers will comply with applicable state statutes and rules aimed at preventing the introduction of such species, as identified above.

Operational Water Quality - 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. See the Operational Water Quality section in Habitat and Vegetation above for mitigation measures and BMPs.

Spill Control and Containment Plan - Operations at the site will be governed by an oSPCCP(Appendix B.3), 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.

Shipping - The proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. 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. During vessel berthing, temporary impacts to water quality (increased turbidity) could occur from sediment suspended by propeller wash. Temporary increases in turbidity are likely to be short in duration and dissipate naturally in response to river currents.

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 vessel wakes. Because shoreline erosion is a natural phenomenon at susceptible locations and vessel wakes from existing shipping activity also occur, the ESA-listed fish that use these habitats have typically adapted to the conditions that attend the erosion, primarily temporary, localized turbidity. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to fish and fish habitat (Flint 2016).

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 requirements. These practices include requirements 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.

Vessels calling at the Facility are expected to be crude oil tankers and articulated tug barges operating within the Exclusive Economic Zone (EEZ). These vessels will be subject to the U.S. Environmental Protection Agency's Vessel General Permit (VGP) (EPA 2013) issued under the National Pollutant Discharge Elimination System (NPDES) for discharges incidental to operation of such vessels, including ballast water discharges[5]. The Washington State ballast water requirements added to the VGP as 401 WQC conditions include the state requirements codified in Chapter 220-150 WAC, administered by WDFW. These requirements include technology-driven treatment requirements and management practices so that vessel discharges meet state water quality standards, Chapter 173-201A WAC.

These impact minimization measures and BMPs fully mitigate for the increased shipping-related impacts associated with the project.

Wildlife

Direct impacts to special status species have been minimized by locating all project activities within an existing industrial site. According to WDFW Priority Habitats and Species (PHS) data, there are no occurrences of special status species within the project site. Within the project vicinity, there are several occurrences of PHS point, including bald eagle nests (approximately 1.2 miles to the west), bald eagle concentration areas (approximately 1.2 miles northwest), sandhill crane concentrations (approximately 3,000 feet west), and great blue heron breeding (approximately 4,000 feet northeast). Waterfowl concentrations are also known to occur on Vancouver Lake, approximately 1 mile north of the project.

In addition to the construction and operation mitigation and BMPs stated in the Habitat and Vegetation section above, the following mitigation measures and BMPs have been specifically identified for wildlife (terrestrial) habitat.

Construction

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.

See the Habitat and Vegetation, Direct Habitat Modification section above for additional information on mitigation measures and BMPs.

Temporary Water Quality - 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.

The Applicant has submitted a preliminary cSPCCP to EFSEC for review (Appendix B.2). The cSPCCP will be implemented during construction, that will define specific BMPs to minimize

[5] See: http://www.epa.gov/npdes/vessels-incidental-discharge-permitting-2.

the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills, including daily inspection of construction equipment leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbodies and outside environmentally sensitive areas. Spill plans will be used for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. See the Habitat and Vegetation section, above, for additional details on applicable procedures.

Temporary Construction Noise -Temporary construction noise has been minimized to the extent practical to reduce impacts to special status species using habitats (e.g., foraging and resting) within the project vicinity. Peak construction noise would be generated by impact pile driving for the rail unloading facility upland mooring points. These areas are located outside of WDFW- and USFWS-recommended management buffers for bald eagle nests (660 feet and 0.5 mile, respectively) and great blue heron rookeries (656 feet). Foraging or resting species may be temporarily displaced from habitats within the project vicinity during periods of construction noise. These impacts have been minimized during construction sequencing to complete the noise generating aspects of construction as efficiently as possible. See section Habitat and Vegetation, Temporary Construction Noise above for additional detail on mitigation measures and BMPs.

A construction wildlife monitoring plan will be implemented during upland pile-driving activities to demonstrate that noise levels attenuate to a level of non-distrubance to PHS species potentially present in the vicinity of the construction site.

A MMMP will be implemented during in-water construction activities related to Area 400 modifications, including removal of existing piles, temporary pile installation and removal, and pile strengthening; and upland work related to impact pile driving of shore-based mooring points. Monitoring will be conducted prior to and during the activities listed above with the potential to impact marine mammals. Work activities will be stopped when a marine mammal is detected within the monitoring area and will not restart until after the marine mammal has left the monitoring area.

Operation

See the Operation section in Habitat and Vegetation for mitigation measures and BMPs.

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.3), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills.

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 vessel operators are 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.

1.4.1.12 Section 3.5, Wetlands

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, direct wetland impacts are avoided. However, three wetlands are present within 300 feet of the proposed Facility site. These include a wetland mitigation site located immediately east of the proposed storage tank area (Parcel 1A mitigation site), the CRWMB located north of SR 501, and a wetland mitigation site west of the proposed Facility site (Parcel 2 Mitigation Site). All three of these wetlands are separated from the Facility site by rail lines and/or roads.

Construction

Temporary Water Quality - 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 will only occur within the marked construction boundaries at the proposed Facility site. Construction at the site will be governed by an cSPCCP (Appendix B.2), which will define specific BMPs to minimize the potential for leaks and spills from construction equipment and the extent of damage from any unavoidable leaks or spills and related impacts to wetlands. The BMPs 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 sensitive areas include wetlands and regulated wetland buffers that are present within 300 feet of the proposed Facility site as described above.

The cSPCCP will also outline responsive actions in the event of a release, and notification and reporting procedures. For additional information see section 2.10, Spill Prevention and Control, and Appendix B.2, cSPCCP.

The Applicant will also implement the following construction mitigation measures to address temporary water quality impacts:

- Install drains to reduce the risk of water and/or air moving laterally underground during the installation of vibro replacement stone columns.
- Conduct daily visual inspections of wetlands during installation of vibro replacement. Temporarily suspend installation activities until counteractive measures (i.e., additional wick drains) can be installed if there is any observation of lateral movement of water or air.
- Provide stormwater treatment to a level that is consistent with or exceeds existing treatment at the site to ensure that off-site wetlands are not adversely affected by operational stormwater.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with construction of the project.

Operation

<u>Operational Water Quality</u> - The 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 oSPCCP (Appendix B.3), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills The oSPCCP will also outline responsive actions in the event of a release, and notification and reporting procedures.

Should a spill occur, the Applicant will implement the Operations Oil Spill Contingency Plan which includes planning and and spill response measures. These spill response measures are known to be effective. As confirmed in a recent internal assessment (spill drill) for the project of spill response actions and capabilities to a worst-case discharge, the proposed equipment and personnel response times meet and/or exceed timelines to mobilize equipment to address Geographic Response Plans in a timely manner given likely oil trajectories (see Appendix B.6, Vancouver Energy Spill Response Exercise Report). The report explains in detail the exercise determined the adequacy of response action resources. The Applicant was able to locate, allocate, and deploy adequate response equipment and trained personnel in accordance with all application spill planning standards. The results of this exercise to test the adequacy of proper execution of the response actions (along with pre-booming and secondary booming) show that response actions significantly impact oil spill trajectories positively. In addition, safety measures will be built into the design of the Facility and operating procedures including containment at the facility, automatic shut-off valves in the pipeline, tank car design standards, and vessel design. These are important elements to the risk assessment of the facility and transport.

The Applicant will also implement the following operational mitigation measures to minimize operational water quality impacts:

- Provide stormwater treatment to a level that is consistent with or exceeds existing treatment at the site to ensure that off-site wetlands are not adversely affected by operational stormwater.
- Design the Area 300 secondary containment berm to have a capacity at least equal to 110 percent of the API 650 maximum capacity of the largest tank, plus precipitation from a 100-year, 24-hour rainstorm event.
- Design the rail unloading area (Area 200) to include containment pans, pumps, and containment sump tanks. Approximately three double-shelled containment tanks, with a total capacity of approximately 1500 barrels, will be constructed south of the Area 200 parking lot. The combined volume of the tanks is sized to contain the entire contents of a single tank car plus at least an additional 10 percent. , of sufficient size to contain and store the entire volume of a single rail car staged within the unloading building.

These impact minimization measures and BMPs will fully mitigate for the operational water quality impacts associated with the project.

Shipping - 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. See the Shipping discussion in section 3.4.2.3 Habitat and Vegetation for additional information.

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. Vessel operators are 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.

1.4.1.13 Section 3.6, Energy and Natural Resources

Energy and Natural Resources

Regional Energy and Natural Resources are readily available to meet the needs of the construction and operation of the Facility, without adversely affecting the needs of other development in the Vancouver-Portland metropolitan area.

Construction

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

Operation

Operational BMPs will be implemented that include conservation measures for nonrenewable resources such as water, fuel, and electricity. These BMPs will 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;
- Sending used oils, lubricants, and greases to facilities where they can be recycled when possible; and
- Using vehicles that comply with current fuel consumption and emission standards.
- The Applicant will construct buildings compliant with the 2012 Washington State Energy Code (or current version at the time the project is permitted).

1.4.1.14 Section 4.1, Environmental Health

Noise

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 of Vancouver, 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. In association with the final design of the Facility, the procurement process for equipment contributing to noise emissions will take into consideration the estimates used in the analyses presented above so as to ensure the overall noise emissions from the Facility do not exceed Washington State noise thresholds.

Risk of Fire and Explosion

Construction

The Applicant will conduct construction activities and provide firefighting and response equipment in compliance with WAC 296-155 Part D, National Fire Protection Association (NFPA) 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations) and NFPA 5000 (Building Construction and Safety Code).

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.

A preliminary construction fire prevention plan, part of the Construction Safety and Health Manual (Appendix D.2, Section 19, Fire Protection), has been submitted to EFSEC for review and approval. The Applicant will develop a construction emergency response plan, modelled on the operations emergency response plan presented in the Operations Facility Safety Program (Appendix D.3, Section 3.1, Emergency Response Plan). Final versions of the plans will be prepared and submitted to EFSEC prior to the beginning of construction. These plans will be based on the preliminary construction plans. The final plans will establish the minimum requirements for the construction contractor and its subcontractors for developing and implementing their plans to address the prevention of and protection from fire hazards and emergency response procedures to ensure compliance with WISHA WAC 296-155-260 and NFPA requirements.

As detailed in section 4.1.2.2 and Appendix D.2, the construction fire protection plan will address employee responsibilities, general requirements and implementation activities.

Operation

Crude Oil Characterization Prior to Receipt

For all of quality, commercial, regulatory classification, and safety purpose, the Applicant will manage and monitor the properties of crude oil being shipped by rail into the facility.

- The Applicant will require all terminals shipping crude oil trains to adhere to ANSI/API Recommended Practice 3000 for the Classifying and Loading of Crude Oil into Rail Tank Cars ("API RP 3000"). The Applicant will effectively verify all shipping terminals' compliance by sampling and testing inbound crude oil and by checking the inbound condition and loading of rail tank cars.
- The Applicant will contractually require certain crude oil quality and specifications in order to manage the integrity of the crude oil received at the Facility. These requirements would cover the full range of relevant hazard classification, safety, and commercial needs for the crude oil. Vancouver Energy will require all terminals shipping crude oil trains to us to regularly demonstrate their compliance with the crude oil quality and specifications. In addition, Vancouver Energy will effectively verify all terminals' compliance by sampling and testing received crude oil.

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;
- Installing stationary H_2S detectors in relevant locations around the facility to detect H_2S concentrations that could be unsafe to personal health (which is substantially very well below the levels at which flammability is possible).
- 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.
- Monitoring for fugitive emissions from pipes, valves, seals, tanks and other components with vapor detection equipment and maintaining and/or replacing components as needed.
- Using environmentally friendly firefighting foam, such as Universal Gold Foam (National Foam, 1999) or Solberg self-healing biodegradable foam.

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.

In addition to the FPRP, a licensed Fire Protection Engineer from the state of Washington will be responsible for the 100 percent design documents, shop drawings, system installation, and final commissioning/acceptance testing of the fire suppression and detection systems for these facilities. The respective Fire Protection Engineer will work closely with the fire department and local code enforcement agencies to ensure the systems are code compliant and within the limitations of the codes and standards adopted by the local jurisdiction applicable to these facilities.

See section 4.1.2.2 for additional information regarding the design of fire suppression systems for specific project elements.

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 Texas A&M Engineering Extension Service Emergency Training Services Institute on a biannual basis. Such training would include crude oil train derailment response, crude oil transshipment response at a marine terminal, industrial rescue, industrial fire suppression, flammable liquids handling and fire suppression, and foam application. Participants would also obtain NFPA 1081 certification.

These measures will be documented in the operations site safety plan and the fire protection 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). A preliminary Fire Protection Plan (Appendix D.3, Operations Facility Safety Program, 16.0 Fire Protection) has been developed in compliance with WAC 296-24-567. A final fire protection plan will be prepared and submitted to EFSEC prior to the beginning of operations.

Explosion Prevention

Operation

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;
- Implementing spill containment measures, spill preparedness and planning described in section 1.4.1.5 above; and
- Equipping the Facility with stationary H_2S monitors personnel with wearable H_2S detectors, which will trigger alarms at personal safety levels substantially very well below the explosive concentrations of emitted H_2S gases.

In addition to the Fire Protection Response Plan, a licensed Fire Protection Engineer from the state of Washington will be responsible for the 100 percent design documents, shop drawings, system installation, and final commissioning/acceptance testing of the fire suppression and detection systems for these facilities. The respective Fire Protection Engineer will work closely with the fire department and local code enforcement agencies to ensure the systems are code compliant and within the limitations of the codes and standards adopted by the local jurisdiction applicable to these facilities.

The gas-fired Area 600 boilers will be designed, installed and operated in accordance with the applicable provisions of Labor and Industry's Boiler and Unfired Pressure Vessel laws (RCW 70.79) and rules (WAC 296-104).

Releases or Potential Releases to the Environment Affecting Public Health

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.

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, MTCA, RCRA, and Dangerous Waste Regulations.

A final contaminated materials management plan will be prepared to address existing contamination conditions. In Shoreline Restrictive Covenant Areas, excess materials will be tested and disposed of in accordance woth Ecology-approved Port procedures. Clean fill or back fill will be used. 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 would substitute for 1 foot of clean fill to prevent a future direct contact hazard. Soils that are excavated will either be direct loaded or stockpiled, sampled, and analyzed for PAHs and total petroleum hydrocarbons and other parameters based on the anticipated contaminants, and disposed of off site, or reused on site in accordance with applicable regulations and covenant restrictions. Standard dust control measures, such as spraying exposed soil surfaces with water would 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. Construction workers will employ appropriate health and safety measures during the handling of contaminated soils.

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.

Construction

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

The Applicant will prepare and implement a Construction Safety Program, a Construction Fire Prevention and Response Plan, and cSPCCP. Potentially flammable liquids will be stored in accordance with local, state, and federal requirements.

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.1 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

Operation

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/shut down 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.

1.4.1.15 Section 4.2, Land and Shoreline Use

Land Use

No direct or indirect impacts to existing land uses that would require mitigation have been identified. Therefore, no mitigation measures are proposed.

Light and Glare

Construction

During construction, minor temporary outdoor lighting impacts may occur; however, most construction activities will occur during daylight hours and will be temporary in nature. During operation of the Facility 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.

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.

Operation

Development elements, except for storage tanks, will be painted with earth tones. The storage tanks will be painted with nonreflective white 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. The American Petroleum Institute (API) 540 – Electrical Installations in Petroleum Process Plants, Section 7 – Lighting, and Illuminating Engineering Society (IES) codes and standards will be used for the basis of design for Facility lighting. Light fixtures will be selected during final project design to achieve the levels of illuminance established by the above-listed standards.

Facility lighting impacts will also be minimized with the use of the following mitigation measures:

- Provide directional lighting in areas adjacent to sensitive wildlife areas, including the north side of Area 300 to ensure lights are not pointed in the CRWMB and Area 400 to minimize the amount of light in aquatic habitats.
- Aim direction lighting away from sensitive habitats to the extent possible to minimize nightlight and glare.
- Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations.
- In the marine terminal loading area use spot lighting only during loading operations if approved by the USCG in compliance with 33 CFR Part 105 and/or Part 154.

Aesthetics

Construction

Visual impacts to the overall landscape setting resulting from construction of the Facility are expected to be low.

During construction, major construction activities will be conducted during daylight hours to avoid light and glare on adjacent communities. At night, lights will be directed towards the Facility location and be limited to the minimum wattage required for safety and operations.

Operation

The operational uses are similar to the historic, existing and ongoing land disturbances created by other industrial development. The assessed visual impacts were found to generally be low.

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.

During the operation, developed elements of the Facility, including all building features except for storage tanks, will be painted with earth tones. The storage tanks will be painted with non-reflective paint to reduce surface glare from direct sunlight during the day, and area lighting and headlights at night. Impacts from spillover and glare on adjacent lands from area lighting at the location will be reduced by incorporating covered, directional lighting.

The use of screening requirements for industrial facilities under the existing municipal code Section 20.925.070 will serve to further reduce visual impacts to adjacent lands and roadways from any new open storage facilities that will be maintained as part of the proposed Facility. As a result of these measures, adverse impacts on visual resources and aesthetics occurring during the operational lifetime of the Facility will not be significant.

Recreation

Parks and recreational facilities are not anticipated to be impacted by the construction and operation of the Facility. It is expected that no additional mitigation measures would be necessary during construction or operation of the Facility.

The Applicant will participate in Lower Columbia River Harbor Safety Committee efforts to develop additional boater safety educational outreach through programs such as the PTP (Prevention Through People) model used by the San Francisco Harbor Safety Committee.

Historic and Cultural Preservation

Construction

While findings from previous studies and the geoarchaeological investigation indicate a low likelihood for encountering cultural material during construction, the Cultural Resources Inadvertent Discovery Plan (Appendix A.2) will be implemented in the event of an unanticipated discovery during construction activities. The protection measures described in the inadvertent discovery plan include the following elements:

- Should any archaeological resources be found, all work adjacent to the discovery will stop 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 the Port, EFSEC, U.S. Army Corps of Engineers (USACE), Washington State Department of Archaeology and Historic Preservation (DAHP), and the consulting tribes will be notified to define a course of action.

- If human remains are suspected, the Facility senior project manager will contact the Clark County coroner, EFSEC, and USACE. All work must stop in the area where human remains are found or suspected, and the area is to be safe-guarded; work may continue after all consultation regarding the human remains has been completed and required procedures have been completed.
- An archaeologist will prepare a summary report detailing any inadvertent discoveries and procedures that followed as a result of a discovery. The report will identify any artifacts or features found, describe the findings, and summarize the results of data analysis. The report will be provided to the Port, EFSEC, USACE, DAHP, and the affected tribes.
- Construction staging and laydown activities would only occur in areas that have been previously disturbed and developed. Although in some locations light surface levelling might be required to provide safe access to construction employees and equipment, deep surface disturbance in these areas is not anticipated. If the depth of impact will exceed 3.05 m (10 feet) below surface in the vicinity of the dune ridge in Area 500, which would be a change from the current design plan, monitoring of soil disturbance activities during construction in this portion of Area 500 would be conducted.

Operations

The inadvertent discovery plan described above for construction will also be used in the event ground disturbing activities are required in response to an emergency event during operations.

1.4.1.16 Section 4.3, Transportation

Construction

The Applicant will develop and implement a construction transportation management plan. The Applicant will coordinate preparation of the final plan with the City, the Port, and WSDOT.

The use of construction-realted barges will be coordinated to have barge movements at the berths conducted outside of the Columbia River navigation channel.

Operation

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.
- Based on a review of existing turn movement patterns, existing intersection configuration, and the Manual on Uniform Traffic Control Devices, the Applicant will coordinate 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. A YIELD sign is appropriate given that northbound

right-turn drivers have sufficient sight distance to make a decision to enter and merge with the highway traffic stream, and the ability to enter the highway without stopping reduces the time and distance drivers need to fully merge into the through lane, benefiting both side street and highway traffic.

- 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 will 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.
- The Applicant will coordinate Facility design activities with the Port and future Terminal 5 tenants to ensure that the location of Facility-related tracks does not interfere with the rail operations of other Terminal 5 users.

1.4.1.17 Section 4.4, Socioeconomic Impact

There will be no adverse impacts to population, housing, or economics. Therefore, it is expected that no mitigation measures will be necessary.

1.4.1.18 Decommissioning

WAC 463-60-085 (1) requires the Applicant to identify impacts and mitigation resulting from decommissioning. As discussed in section 2.3.9, Decommissioning, the lease entered into by the Applicant and the Port anticipates a variety of options for decommissioning of the project-related improvements upon termination of the lease. See also page 2-83.61 of the ASC. At such time that the project is ripe for termination, the Port and the Applicant will come to an agreement on what improvements are to remain, or will be removed. In accordance with the requirements of WAC 463-72-050, the Applicant will then prepare a detailed plan that addresses the decommissioning activities, impacts that might result from the decommissioning activities, and appropriate mitigation measures.

Determining which impacts could occur from decommissioning at this time is speculative because the actual scope of decommissioning is unknown. For example, the Port could chose to retain all of the improvements constructed by the Applicant, and no decommissioning actions would occur. Or, the Port could request that some or all of the improvements be removed, and the site returned to its prior configuration. In this case, the project would be dismantled, foundations demolished, features located underground could be left in place or removed, and the site regraded.

For purposes of describing the *potential* impacts of decommissioning and appropriate mitigation as required by WAC 463-60-085(1), this section of the Application considers the full decommissioning of the facility (i.e., dismantling and removal) as the scenario with the potentially greatest impacts. It is conservatively assumed that decommissioning would consist of removal of most of the aboveground structures to allow redevelopment by another tenant, as summarized in the following table.

Table 1.4-1. Summary of Assumptions for Facility Decommissioning

Facility Area	Primary and Ancillary Project Elements	Status at Decommissioning
Rail Infrastructure	Rail facility loops and associated infrastructure	Retained
200, Unloading and Office	Rail unloading facility	• Aboveground structures and unloading equipment removed • Transfer piping removed • Rail infrastructure retained • Below-ground level sumps and vaults retained
	Control rooms/E-houses	Removed
	Fire pump and foam building	Removed
	Administrative and support buildings	• Buildings retained • Parking and landscaping retained • Pedestrian access ways to unloading structure removed
	Stormwater collection and conveyance system	Retained
300, Storage	Crude oil storage tanks	Disassembled and removed
	Secondary containment berm and liner	Retained
	Storage building	Removed
	Pump basin	Retained
	Control room/E-House	Removed
	Fire pump and foam building	Removed
	Stormwater collection and treatment system	Retained

Facility Area	Primary and Ancillary Project Elements	Status at Decommissioning
400, Marine Terminal	Dock improvements	Retained
	Marine vessel loading hoses and dockside equipment	Removed
	Control room/E-House	Removed
	Crane control room	Removed
	MVCU, vapor blower skid	Removed
	Spill prevention, response, and containment equipment	Removed
	Fire pump and foam building	Removed
	Stormwater collection and treatment system	Retained
500, Transfer Pipelines	Transfer piping from Area 200 to Area 300	• Aboveground portions removed • Below-ground sections under existing rail and road retained
	Transfer piping to and from Area 300 to Area 400	• Aboveground portions removed • Below-ground sections under existing rail and road retained
	Piping from vessel loading to MVCU	• Aboveground portions removed • Below-ground sections under existing rail and road retained
600, Boiler	• Boiler Building	Removed
	• Piping to carry steam to Area 200	Removed
Utilities	Aboveground	Retained
	Below-ground	Retained

Under this scenario, the following main steps would be implemented to decommission the Facility:

- Prior to demolition, Facility elements used to handle crude oil would be cleaned; cleaning residues would be handled, contained, and disposed of in accordance with appropriate waste handling regulations and requirements.
- The Facility would be de-energized and utility connections would be terminated.
- Aboveground Facility elements would be demolished; steel structures, piping, and equipment would be cut and removed from the site. It is likely that most steel from the site could be recycled.

- Aboveground concrete structures would be demolished, and demolition debris would be removed from the site for disposal at an approved location and recycled as road base or similar materials.
- Below-ground piping would be decommissioned and would remain in place.
- Finally, site elevations would be established to facilitate Facility maintenance until future use of the site is made; ground stabilization covers would be applied consistent with surrounding uses and future industrial use of the site.

The impacts resulting from decommissioning activities are expected to be similar in nature to the impacts of construction of the Facility. The following table provides a summary of decommissioning impacts and associated mitigation measures that would result from the full decommissioning scenario for each element of the natural and built environment.

Table 1.4-2. Summary of Decommissioning Impacts and Mitigation Measures

Element of the Environment	Impact from Decommissioning	Mitigation
3.1 Earth		
3.1.2 Geology	The primary impacts of Project decommissioning on geologic conditions and materials at the site are related to earth disturbance to remove above ground structures, excavation of shallow foundations, and backfilling or grading surfaces to match adjacent site topography.	Project decommissioning will have no adverse impacts on geologic conditions at the site and mitigation is not considered necessary for impacts to geology.
3.1.3 Seismicity	Decommissioning of the Facility would have no influence on the level of seismic hazard within the area.	The demolition contractor would implement an emergency response plan; this plan would address actions and responses to site emergencies including those related to seismic events. This plan would identify measures to be taken to protect personnel and equipment, and activities to minimize negative adverse effects.
3.1.4 Soils	Project activities, including removal of above-ground structures, excavation of shallow foundations, and grading and backfilling, may disturb soils resulting in a localized increase in soil erosion susceptibility. Most of the soils on the site consist of fill or have been modified by prior industrial activities, no adverse impacts are expected from decommissioning activities.	Graded areas would be smooth and compacted, free from irregular surface changes, and sloped to drain. Temporary ditches, sediment fences, and silt traps would be installed as necessary to minimize the impacts of erosion during decommissioning of the Facility. Ground stabilization covers would be applied consistent with surrounding uses and future industrial use of the site.
3.1.5 Topography	Impacts to the topography due to the decommissioning of the project will include localized excavation related to removal of above ground structures and shallow foundation, and grading of disturbed areas to match adjacent site topography.	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 site is located at an industrial site and there are no unique physical features.	There are no unique physical features therefore mitigation measures are not required.
3.1.7 Erosion/Enlargement of Land Area (Accretion)	Project activities, including removal of above-ground structures, excavation of shallow foundations, and grading and backfilling, may disturb soils resulting in a localized increase in soil erosion susceptibility.	The potential erosion impacts will be minimized through the use of erosion and sedimentation control measures that will sequence decommissioning activities control to limit erosion. An erosion control plan will be developed prior to decommissioning. Clearing, excavation, and grading will be limited to the areas necessary to demolish the Facility. Interim surface protection measures, including dust control, silt traps, and erosion control blankets, will be used to prevent erosion. All decommissioning practices will emphasize erosion control over sediment control. Ground surfaces would be graded to match with existing surrounding topography and surface soils would be stabilized at the completion of decommissioning activities.
3.2 Air		
3.2.1 Air Quality	Decommissioning would require the use of heavy trucks, excavators, graders, work vessels, pile drivers, and a range of smaller equipment, such as generators, pumps, and compressors. Emissions from diesel equipment could reduce ambient air quality, resulting in potential health risks.	The following measures, consistent with the Washington Associated General Contractors brochure titled *Guide to Handling Fugitive Dust from Construction Projects*, would be implemented to reduce emissions from diesel equipment: • Maintaining off-road mobile equipment to minimize air emissions through proper operation • Using off-road mobile construction equipment that meets applicable emissions standards • Encouraging car-pooling or other trip-reduction strategies for workers • Minimizing construction truck and other vehicle idling Decommissioning activities would comply with applicable federal and state air quality rules requiring minimization of construction-related vehicle emissions. With appropriate controls, construction-related diesel emissions would not be likely to substantially affect air quality in the project vicinity.
3.2.2 Odor		

Element of the Environment	Impact from Decommissioning	Mitigation
3.2.3 Climate, Visible Plumes, Fogging, Misting and Icing	No off-site fogging, misting, visibility impairment, or icing is expected during decommissioning activities.	No off-site fogging, misting, visibility impairment, or icing is expected; therefore, no mitigation measures will be required.
3.2.4 Climate Change	Decommissioning activities would require the use of heavy trucks, excavators, graders, and a range of smaller equipment, such as generators, pumps, and compressors.	Decommissioning activities will not generate significant greenhouse gas emissions, therefore no mitigation measures are required.
3.2.5 Dust	Decommissioning would include ground moving, ground improvement, and structure demolition activities typical to an industrial facility. Such activities could result in temporary, localized increases in particulate concentrations due to emissions from decommissioning-related sources. For example, dust from decommissioning activities such as excavation, grading, sloping, and filling would contribute to ambient concentrations of suspended particulate matter.	The following measures, consistent with the Washington Associated General Contractors brochure titled *Guide to Handling Fugitive Dust from Construction Projects*, would be implemented to control dust: • Spraying exposed soil with water or other suppressant as needed to reduce wind-blown emissions of particulate matter and deposition of particulate matter • Minimizing dust emissions from trucks transporting materials by using appropriate methods such as covering truck loads, wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck bed), to reduce particulate matter emissions and deposition during transport. • Rocking exits or providing wheel washers to remove particulate matter that would otherwise be carried offsite by vehicles to decrease deposition of particulate matter on area roadways. • Covering dirt, gravel, and debris piles as needed to reduce dust and wind-blown debris
3.3. Water		
3.3.1 Surface Water Resources	Note: Impacts to surface water associated with decommissioning of the Facility are anticipated to be similar to those related to construction activities described above in 1.4.1.1 section 2.6, Water Supply System, Surface *Waters* and involving similar mitigation. Additional mitigation measures are to the right in Mitigation. Surface water may be impacted by ground disturbances during decommissioning activities including ground moving, ground improvement, and removal of above-ground structures. No natural surface water features exist at the site; therefore, no impacts will occur to natural surface water features as a result of the decommissioning of the Facility. The dock improvements will be retained therefore no decommissioning activities will occur in the Columbia River.	During removal of transfer pipelines and vessel loading equipment hydrocarbon residuals will be contained. Hydrocarbon residuals will be removed and tested to determine applicable disposal options. Other containment systems —Contaminants may accumulate in secondary containment systems during site operations. Structure cleaning and disposal of possible contaminants may occur legally off site. Demolition and extraction of remaining contaminated structures will be conducted to ensure residues do not enter soil or groundwater. Protecting surface water during decommissioning will focus on erosion control resulting from the interaction of surface water conditions with active ground disturbances. A site-specific SWPPP will be developed and implemented during decommissioning to prevent and mitigate any decommissioning-related impacts to surface water. Surface water quality will be protected through the use of the BMPs previously designed and constructed in accordance with Ecology's stormwater manual for the Facility operations. Stormwater collection and conveyance systems will be retained during and after project decommissioning. With the stormwater BMPs already in place, decommissioning-related impacts to surface water will be minimized and stormwater discharges will meet state and local water quality standards.
3.3.2 Runoff/Absorption	It is assumed that stormwater does not infiltrate the site based on the previous developments and industrial nature of the site. Stormwater runoff may be impacted by ground moving, ground improvement, and removal of above-ground structures during decommissioning. 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. Selected construction stormwater BMPs will	Surface soils would be stabilized at the completion of decommissioning activities. Decommissioning-phase erosion and sedimentation control BMPs Erosion control plans and a SWPPP will be developed prior to decommissioning. Stormwater and discharge permits will be obtained as necessary and decommissioning activities will be in compliance with the permit requirements. Decommissioning activities will be sequenced and controlled to limit erosion. Clearing, excavation, and grading will be limited to the areas necessary to decommission the project. Interim surface protection

Element of the Environment	Impact from Decommissioning	Mitigation
	provide water treatment and will discharge stormwater to the existing on-site conveyance systems. Construction stormwater will not be routed to infiltration facilities.	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.
3.3.3 Floodplains	There will be no impacts to the site for the 5- and 50-year flood events. Activities within the 100-year floodplain include removal of above-ground structures and equipment at Area 400, and removal of above-ground pipelines.	Decommissioning activities are not anticipated to have an effect upon the floodplains and therefore mitigation measures are not required. Decommissioning activities will be conducted outside of the 100-year floodplain. Implement the same erosion control practices designed for Facility construction during decommissioning processes. Demobilize hazardous material and equipment from the site and relocate above the 500-year floodplain during decommissioning processes.
3.3.4 Groundwater Reserves	Municipally supplied water will be obtained from the existing City water system; therefore no new groundwater wells will be required during decommissioning. There are no anticipated adverse impacts to existing ground water sources resulting from City supply of potable, process and emergency fire suppression water. Some foundation excavations may require dewatering during demolition. Groundwater extraction during demolition will result in the temporary drawdown of groundwater in the areas immediately surrounding the work site. Because the foundation excavations are shallow, 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 foundation extraction 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 decommissioning activities will have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the	Disposal will be conducted in accordance with the stormwater permit issued for the project. If dewatering wells are necessary, well points used for demolition dewatering will be completed in accordance with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells. If groundwater extracted for demolition 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. During decommissioning of tank, pipelines, equipment, and other containment systems a Site Inspection and Sampling Plan will be developed prior to decommissioning to identify areas where contaminants could be trapped. Inspection and sampling to identify potential handling and disposal requirements will be completed. Sampling and remediation of subsurface soils will be completed as necessary following the removal of tanks and containment structures housing hazardous materials and crude oil. Evaluate the need for surface controls, based on the proposed decommissioning plan, of ground improvement systems, that if left exposed provide a conduit for surface contaminants into lower portions of the formation.

Element of the Environment	Impact from Decommissioning	Mitigation
	proposed facilities. Therefore, impacts to groundwater resources are considered negligible.	
3.3.5 Public Water Supplies	The water demand during decommissioning is conservatively estimated at 20,000 gallons per day, with a peak demand of approximately 500 gallons per minute. In addition to the average daily needs during decommissioning, water will be required for cleaning and flushing of the pipeline and tank facilities. Cleaning residues would be handled, contained, and disposed of in accordance with appropriate waste handling regulations and requirements.	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 Facility will use water supplied from the City for decommissioning activities.	Decommissioning is not anticipated to have an effect upon the private water supplies in the vicinity of the project site and therefore mitigation is not required.
3.4 Habitat, Vegetation, Fish and Wildlife		
3.4.2 Habitat and Vegetation	Ground disturbance and vegetation removal would be limited to the minimum amount necessary to remove the above-ground structures and grade the Facility. New ground disturbance could potentially allow the existing weed populations to spread. Seeds could also be introduced through vehicles entering and leaving the proposed Facility location, which could result in the establishment and spread of new species. The landscaping and habitat in Area 200 will be retained and no adverse impacts are expected as a result of decommissioning activities.	Temporary fencing would be used to protect existing vegetation to be retained. Indirect impacts from equipment would be minimized by restricting equipment access to designated work and staging areas. To minimize the spread and establishment of noxious weeds, the following BMPs would be implemented during decommissioning: • Provide wheel wash equipment at the Area 200 access to limit the dispersion of noxious weed seeds • Restrict decommissioning activities to the area needed to work effectively to limit the ground disturbance and prevent the spread of noxious weed species • Use weed-free straw, hydromulch, or similar ground cover for temporary erosion control during decommissioning
3.4.3 Fish	The dock improvements will be retained and no in-water work is expected during decommissioning. There is a potential for leaks and/or spills from construction equipment and the potential for debris to enter the waterway during overwater work. Over-water work during decommissioning includes removal of the following: • Marine vessel loading hoses and dockside equipment, • Above-ground pipelines • Spill prevention, response and containment equipment • Dock safety unit Temporary indirect effects to stormwater quality may occur as a result of uncontrolled runoff from earthwork associated with decommissioning, which could temporarily affect fish habitat quality.	Decommissioning of the Facility would be unlikely to result in any significant, adverse effects to fish species, fish habitat, or to any designated or proposed critical habitats for ESA-listed fish species. Decommissioning activities at the site will be governed by an SPCCP, 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. Erosion control and pollution prevention BMPs will be implemented during decommissioning, which would minimize the potential for any adverse impacts to fish or fish habitat as a result of decommissioning activities.
3.4.4. Wildlife	The existing habitat within the immediate Facility location is low quality and located within a highly developed industrial area. Temporary impacts to terrestrial wildlife would result from increased noise during decommissioning activities. Noises from the decommissioning activities would likely increase ambient noise levels in the immediate area of the Facility and result in avoidance behaviors by any wildlife in the area. Because wildlife habitat is low quality, and	Decommissioning activities at the site would be governed by a SPCCP, which would 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 demolition/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. Incorporation of an SPCCP would minimize impacts to aquatic habitat by providing for containment and cleanup of inadvertent spills. While inadvertent spills could still occur, impacts would be minor following containment and cleanup.

Element of the Environment	Impact from Decommissioning	Mitigation
	species most likely to use this habitat are highly mobile, decommissioning-related noise would have no impact. Demolition and removal of equipment and structures on the dock would involve overwater work to upgrade the existing dock structure. Overwater work increases the potential for leaks and/or spills from construction equipment and debris to enter the Columbia River. The inadvertent release of demolition debris or leaks or spills of fuel or other chemicals into the waters of the proposed Facility location could affect local water quality, which may impact prey species for foraging fish, waterfowl, and marine mammals. Demolition and removal of equipment and structures on the dock can result in noise generation. Noise can interfere with intra- and inter-species communication. Because the proposed Facility location is located within a working industrial waterfront, existing noise levels are high. Existing noise sources likely interfere with intra- and inter-species communication to a small degree. The additional temporary decommissioning noise may result in avoidance behaviors by wildlife, but it is not expected to significantly impact aquatic wildlife or habitat.	Proposed lighting would be directional and aimed away from sensitive habitats to the extent possible to minimize impacts from night light and glare. Typical BMPs for demolition and decommissioning activities over and near water would be applied, including: • Decommissioning vessels and equipment would be checked for leaks and/or other problems that could result in discharge of petroleum-based products or other material into the Columbia River. • Excess or waste materials generated during decommissioning would not be disposed of or abandoned waterward of the OHWM or allowed to enter waters of the state. Waste materials would be disposed of in an appropriate landfill. • Demolition materials would not be stored where wave action or upland runoff can cause materials to enter surface waters. • Project demolition would be completed in compliance with Washington State Water Quality Standards (WAC 173-201A), including: – No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials would be allowed to enter surface waters. – There would be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters. – Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. would be checked regularly for leaks, and materials would be maintained and stored properly to prevent inadvertent releases. • An SPCCP would be prepared for use during decommissioning of the Facility. A copy of the plan with any updates would be maintained at the work site. • The project would follow an SPCCP, which would outline BMPs, responsive actions in the event of a release, and notification and reporting procedures. The SPCCP also would outline management elements such as personnel responsibilities, proposed Facility location security, site inspections, and training. • A decommissioning SPCCP would outline measures to be taken to prevent the release or spread of hazardous materials, either found onsite and encountered during decommissioning but not identified in contract documents, or any hazardous material that is stored, used, or generated on the construction site during decommissioning activities. These items include, but are not limited to, gasoline, oils, and chemicals. • Applicable spill response equipment and material designated in the decommissioning SPCCP would be maintained at the proposed Facility site. • Corrective actions, including those listed below, would be taken in the event of any release of oil, fuel, or chemicals from vessels, equipment, or materials into the water: – In the event of inadvertent release of fuels, lubricants, or other materials during decommissioning, containment and cleanup efforts would begin immediately and be completed in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work. Cleanup would include proper disposal of any inadvertently released material and used cleanup material.

Element of the Environment	Impact from Decommissioning	Mitigation
		– The cause of the inadvertent release would be assessed, and appropriate action would be taken to prevent further incidents or environmental damage. – Inadvertent releases would be reported to Ecology's Southwest Regional Spill Response Office at 360-407-6300.
3.5 Wetlands	There are no wetlands present on the project site, and decommissioning 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 temporarily affected by decommissioning water quality impacts.	The project has the potential to result in temporary water quality impacts during decommissioning which could affect off-site wetlands within the project vicinity. Decommissioning activities at the site will be governed by an SPCCP (Appendix B.3), 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. Conduct decommissioning processes only within marked decommissioning boundaries.
3.6 Energy and Natural Resources		
3.6.3 Non Renewable Resources	Removal of infrastructure would require temporary energy consumption related to decommissioning activity. Energy sources would be used to operate onsite construction equipment; for example, fuel for mobile equipment, electricity for lighting of workspaces and powering of construction equipment, and welding gases for torch cutting employed for equipment disassembly. Because the amounts of energy used would be relatively small, decommissioning would not result in long-term impacts to energy consumption, supply, or availability. It is anticipated the fuels supplied to the Facility for decommissioning activities would be available from existing local and regional market sources, similar to those used for construction.	The quantities of non-renewable materials used during decommissioning activities would be negligible in the context of regional resource availability therefore no mitigation measures are required
3.6.4 Conservation Measures and Renewable Resources	Decommissioning of the Facility will generate waste from the removal of above-ground structures and shallow foundations.	During decommissioning, conservation measures will include demolition waste recycling when possible and the coordination of carpooling between demolition/construction workers to reduce vehicle emissions.
3.6.5 Scenic Resources	The visual quality of the decommissioned area will be consistent with the existing conditions within the Port.	No scenic resources will be affected during decommissioning therefore no mitigation measures are required.
4.1 Environmental Health		
4.1.1 Noise	Noise generated during decommissioning activities will be similar to those generated at a construction site.	Construction noise is exempt from the Washington noise limits during daytime hours. Decommissioning activities will be limited to daytime hours of 7:00 a.m. and 8:00 p.m., 7 days a week per VMC Section 20.935.030(4). The restriction of work to daytime hours, temporary nature of the demolition noise, the distances between the residential uses and most of the demolition areas, and the presence of noise from existing sources at nearby sensitive receivers would serve to minimize potential noise impacts from decommissioning activities.
4.1.2 Risk of Fire and Explosion	Decommissioning of the Facility is discussed in section 2.3.9. The Applicant anticipates that fire and explosion prevention measures similar to those implemented during construction will be implemented during decommissioning and site restoration.	Prior to beginning decommissioning the Applicant will submit a detailed facility decommissioning plan, and such plan will address fire and explosion prevention measures. Potentially flammable liquids and gases would be stored in accordance with local, state, and federal requirements. With proper storage of these materials onsite and proper material handling and work practices,

Element of the Environment	Impact from Decommissioning	Mitigation
	Fire and explosion hazards may result from the presence of flammable or combustible gases and liquids in the presence of ignition sources during decommissioning activities. Mobile equipment fuel and oils and solvents would be present at the site in small quantities. Cutting torches would be used to disassemble Facility components and transfer pipelines, resulting in the use and storage of flammable gases.	the risk of fire during decommissioning would be very low. The Applicant would conduct decommissioning 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*). Although the risk for fires to spread beyond the decommissioning boundary is possible, the nature of the materials to be demolished at the site (e.g., metals, soils, aggregates, versus lumber) would minimize the potential for a fire to extend beyond the project area, especially if fire control and response is quickly coordinated in accordance with a pre-established Fire Prevention and Response Plan. A Fire Prevention and Response Plan would already be in place during the operation of the facility. An emergency response plan would be implemented addressing the procedures for fire prevention and response during decommissioning activities. The plan would address: • A list of the major demolition 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 site personnel responsible for maintenance of equipment and systems installed to prevent or control demolition-related ignitions or fires • Names or regular job titles of those personnel responsible for control of fuel source hazards at the site Fire prevention and control would include, but not be limited to: • Ensuring that appropriate firefighting equipment (i.e., extinguishers) is staged in the decommissioning 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 to prevent fires (e.g., hot work and welding) • Limiting smoking to approved areas • Providing fire safety training to all decommissioning personnel, including the identification of ignition 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
4.1.3 Releases or Potential Releases to the Environment Affecting Public Health	Hazardous materials present at the site during decommissioning would be typical of a large, industrial construction site. Fuels such as gasoline and diesel would be used to power mobile construction equipment; maintenance of such equipment could require the use of lubricants and oils and generate spent antifreeze. Solvents could be used to clean facility components, resulting in solvents and cleaning materials with oil residue. Welding gases would be used to allow cutting of larger steel elements (storage tanks, transfer pipelines, structural metal materials) into sizes that can be removed from the site. Hazardous materials that are likely to be generated would include used oil, spent antifreeze,	A detailed Site Restoration Plan within 90 days from the time EFSEC is notified of the termination of the Facility. The detailed Site Restoration Plan would identify, evaluate, and resolve major environmental and public health and safety issues related to decommissioning (WAC 463-72-040). As part of this plan, the Applicant would identify in detail decommissioning activities and mitigation measures required to conduct these activities in a manner to protect environmental health and safety. The Site Restoration Plan would include, but not be limited to, the following: • Avoidance of sensitive areas during decommissioning activities • Waste handling and storage • Stormwater management

Element of the Environment	Impact from Decommissioning	Mitigation
	discarded water treatment chemicals and residuals, and spent lead acid batteries. In the event of the unintended release of hazardous materials used during decommissioning, and if such releases are not contained and reach the ground, contamination of soil could occur; these soils may classify as hazardous. Non-hazardous solid waste associated with decommissioning activities could include empty containers, scrap wood, scrap metals, concrete, and other refuse. Decommissioning activities involving the use or generation of hazardous materials can cause releases to the environment. Disassembly of Facility equipment without prior removal of residual hazardous materials could result in the release of contaminants to the environment. If decommissioning activities involve removal of Facility foundations or concrete work that was constructed in locations with contaminated soils, these activities could release contaminated material back into the environment. Decommissioning activities near capped areas would not be expected to breach the caps, but may temporarily disrupt surface water drainage patterns or otherwise impact ongoing/previous remediation activities.	• Spill prevention and control The contractor would be responsible for inspections; training its employees in spill prevention and control; and if an incident occurs, for containment and cleanup. The plan would 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 SPCCP acknowledgement forms (to be signed by all project personnel). In addition, prior to the decommissioning of systems, the former use of Facility components and its potential to contain residual crude oil would be considered to ensure that appropriate cleaning procedures are implemented prior to disassembly and removal. If equipment is proposed to be left onsite, it would be cleaned as appropriate to ensure residual hazardous materials are not left onsite potentially exposing future workers.
4.1.4 Safety Standards Compliance	The risks to workers conducting decommissioning activities would be similar to occupational hazards during construction of the Facility, including the following: • Work around heavy equipment • Work around mobile equipment • Seasonal weather conditions, particularly the potential for hypothermia during cold weather or heat exhaustion/heat stroke during hot weather • Work around water during dismantling of piping on the Facility dock and active rail lines • Potential exposure to electrical hazards, mechanical hazards, fall hazards, and noise hazards typical of a construction site • Exposure of workers to hazardous materials if residual hazardous materials in Facility equipment are not properly removed and equipment cleaned prior to disassembly beginning	Occupational safety risks to Facility decommissioning workers would be mitigated through the application of safety and emergency plans. The demolition contractor would be required to develop a Safety Plan that applies to the employees of the demolition contractor and all subcontractors working at the decommissioning site. The Safety Plan would require compliance with all applicable laws, ordinances, regulations, and standards concerning health and safety. The contractor's safety manager would have the authority to issue stop work orders when health and safety procedures are violated by the employees of either the contractor or a subcontractor. Upon identification of a health and safety issue, the safety manager would work with the responsible site managers and employees to correct the issue. Workplace hazards would be controlled using controls such as lockout/tagout procedures, safe work practices, and the appropriate use of PPE, in accordance with applicable WISHA requirements. An Emergency Response Plan would be developed by the demolition contractor 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*).
4.1.5 Radiation Levels	The Facility will not handle, store or use or release any radioactive materials during decommissioning.	The Facility will not handle, store or use or release any radioactive materials during decommissioning, therefore no mitigation measures will be required.
4.1.6 Emergency Plans	Emergencies that may potentially occur during decommissioning include: on-site materials or chemicals release, flood, medical emergency, major power loss, fire, extreme weather, earthquake, volcano eruption, and security threat.	The Applicant will establish an emergency response plan for the decommissioning 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 as described in section 4.1.6.2.

Element of the Environment	Impact from Decommissioning	Mitigation
4.2 Land and Shoreline Use		
4.2.1 Land Use	No impacts to existing land uses at or surrounding the Facility are anticipated during decommissioning activities.	No impacts to existing land uses are anticipated. Therefore, no mitigation measures are specifically identified.
4.2.2 Light and Glare	During decommissioning, minor temporary outdoor lighting impacts may occur; however, most activities will occur during daylight hours and will be temporary in nature. The estimated duration of decommissioning is 9 to 12 months.	Most decommissioning activities 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.
4.2.3 Aesthetics		
4.2.4 Recreation	Decommissioning of the Facility is not anticipated to have any long-term direct or indirect impact on current or planned park and recreation areas. There may be temporary noise and/or visual impacts related to decommissioning, but the demolition-related noise and visual impacts would be similar in nature to other existing Port activities and are not anticipated to result in any significant adverse impacts to recreational facilities or users of those facilities.	Parks and recreational facilities are not anticipated to be impacted by the decommissioning of the Facility and it is expected that no additional mitigation measures would be necessary.
4.2.5 Historic and Cultural Preservation	During decommissioning the Facility would be removed, with the majority of above ground elements deconstructed, but with below ground improvements remaining. Given that decommissioning-related ground disturbance, if any, would occur in areas previously disturbed, the presence of cultural resources (or lack thereof) would have already been documented. Furthermore, areas where construction occurred in native soils would not be re-excavated or disturbed in any additional way, as these Facility elements would remain. Decommissioning has minimal potential to impact undiscovered buried archaeological resources in native soils below the fill in the proposed Facility development location. There are no recorded historic buildings or structures on the site. The dock on the Columbia River would not be removed during decommissioning and thus no potential shoreline underwater cultural resource impacts are anticipated.	A detailed Site Restoration Plan will be submitted prior to commencement of decommissioning activities. This Site Restoration Plan would identify the extent of, and methods by which, facility elements would be removed. The Site Restoration Plan would document if any activities would occur in areas that have not previously been surveyed for the presence of cultural resources. If this is the case, the plan would document measures to identify, and if necessary mitigate, impacts to cultural resources.
4.2.6 Agricultural Crops and Animals	The site does not contain any areas used for agriculture. While there are agricultural lands within the vicinity of the project area, decommissioning of the Facility will not impact these areas because they fall outside of the boundary of the decommissioning activities. Decommissioning of the Facility will not result in any impacts to agricultural crops or animals.	No impacts to agricultural crops and/or animals are anticipated, therefore no mitigation measures are required.
4.3 Transportation		
Surface Transportation	During decommissioning, vehicle trips would be required to allow worker access to the various Facility locations being decommissioned, deliver equipment necessary for decommissioning activities, and remove materials from the site. The surface transportation impacts of decommissioning the Facility would be less than the traffic impacts associated with the permanent Facility employees and presumably less than the Facility and ground improvements construction impacts to build the Facility. As such, future decommissioning is not expected to have added impacts to the roadway network in the vicinity of the Facility.	No mitigation measures are necessary since decommissioning activities would reduce the surface transportation impacts created during construction and operation of the Facility.

Element of the Environment	Impact from Decommissioning	Mitigation
Rail, Marine and Air Transportation	Decommissioning activities may temporarily interrupt service to rail lines within Terminal 5. Activities that may disrupt other's use of existing or future tracks within Terminal 5 include the following elements: • Demolition of the rail unloading facility • Demolition of the pedestrian access ways to the unloading structure • Removal of above-ground pipelines • Demolition of the Boiler Building Some of the equipment and structure removal at Area 400 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 decommissioning-related vessels will not be positioned in the main Columbia River navigation channel and will therefore not create any impacts to other river users. The project site is not located within the regulated airport approach services per VMC 20.570-1 and will have no impact on air transportation.	Decommissioning activities will be coordinated with the Port and existing and future users of Terminal 5 loop tracks to appropriately time and minimize disruptions to other's use of existing or future tracks, either within Terminal 5 or on the Port's spur from the mainline. No impacts are anticipated to marine and air transportation and therefore mitigation measures are not required.
4.3.4 Movement /Circulation of People and Goods	Decommissioning activities may interrupt service to rail lines within Terminal 5, temporarily impeding the movement/circulation of goods. Activities that may disrupt other's use of existing or future tracks within Terminal 5 include the following elements: • Demolition of the rail unloading facility • Demolition of the pedestrian access ways to the unloading structure • Removal of above-ground pipelines • Demolition of the Area 600 Boiler Building The public will not be allowed admittance to any decommissioning areas unless in accordance with the decommissioning site safety plan and applicable federal security requirements	Decommissioning activities will be coordinated with the Port and existing and future users of Terminal 5 loop tracks to appropriately time and minimize disruptions to other's use of existing or future tracks, either within Terminal 5 or on the Port's spur from the mainline. No impacts are anticipated to the movement/circulation of people and therefore mitigation measures are not required.
4.4 Socioeconomic Impact		
Workforce	If an assumed total of 250 workers will be employed during decommissioning, with a maximum of 125 workers on site per day, the Portland-Vancouver metropolitan area will be capable of supplying most of the needed workforce. If a higher number of specialized trades are required (i.e. ironworkers), a portion of these workers may need to travel from outside of the Portland-Vancouver region.	There would be adverse impacts to the workforce, therefore it is expected that no mitigation measures would be necessary.
Housing	With an assumed maximum daily employment of 125 workers during decommissioning and total rental housing inventory of nearly 1.2 million rental units in the study area, decommissioning of the Facility should have no noticeable impact on housing in the study area. In Clark County there are more than 9,600 vacant housing units and an occupancy rate	Decommissioning activities will have no noticeable impact on housing, therefore mitigation measures are not required.

Element of the Environment	Impact from Decommissioning	Mitigation
	of 94.3%. If each of the 125 workers rented on vacant unit in Clark County, the housing occupancy rate would grow from 94.30% to 94.37%, an increase of less than 0.1%. This small an increase in occupancy rate should also have no noticeable impact on median gross rent, median housing values, or new housing construction.	
Fire Police and Medical Services	Potential decommissioning-related impacts may include impacts to fire and emergency response services associated with demolition fires and emergencies; and impacts to local health care providers as a result of demolition–related medical emergencies.	Any fires or other incidents requiring emergency response associated with decommissioning of the Facility would be within the capacity of existing fire protection and police services. Hospitals within the study area have sufficient capacity, range of services, and equipment to handle any medical emergencies resulting from decommissioning of the Facility. An emergency response plan will be implemented for the decommissioning of the Facility to ensure employee safety and emergency response 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 would be developed based on industry standards and state and federal regulatory requirements. In addition, decommissioning activities would be coordinated with the Vancouver Fire Department and the Port to ensure that Emergency Response Plans coordinate with both of these organization's needs with respect to both on-Facility-, and off-Facility-site events. It is expected that the incorporation of these measures would mitigate impacts to public services resulting from emergency response incidents.
Schools	The majority of the workforce for the decommissioning activities is anticipated to come from the Portland-Vancouver metropolitan area and would not result in a population increase; therefore school enrollment is not expected to be affected.	Decommissioning of the Facility is not anticipated to generate any increase in population; therefore, no related impacts to schools are not anticipated.

1.4.2 Fair Treatment

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 Clark County (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.

Within the study area, the Fruit Valley neighborhood is the closest residential population to the proposed Facility. Fruit Valley is the westernmost neighborhood in the City and has a population of about 2,370 (U.S. Census Bureau 2014). The Census tract that includes Fruit Valley has the second-highest poverty rate in the City, with 35 percent of the people living in poverty. This is triple Vancouver's overall poverty rate of 12 percent (City of Vancouver 2010) and well above the study area poverty rate of 14.8 percent. Median household income in Fruit Valley is $31,121, which is 38 percent lower than the City median household income of $50,387 (U.S. Census Bureau 2014). In addition, Fruit Valley's race and ethnic make-up includes a higher percentage of Hispanic, Asian, and Native American individuals than the overall City (City of Vancouver 2010). Forty-seven percent of the population resides in owner-occupied housing units, while 53 percent of the population resides in rental units (U.S. Census Bureau 2014). Within the Fruit Valley neighborhood, the closest homes to the proposed Facility are located approximately 0.6 mile northeast. 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 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.

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. As presented in section 4.3.3.5, project construction activity would not require modification of any existing roads to accommodate construction-related traffic, and existing LOS conditions would not be adversely degraded. The traffic impact to adjacent residential neighborhoods would therefore be minimal. Although the potential for an increase in public traffic accidents exists as a result of increased construction traffic, the risk would be mitigated through existing traffic control devices to ensure safe vehicular and pedestrian transit regardless of traffic levels. As discussed in section 4.1.1.2, construction-related noise emissions from pile driving have been estimated to be lower than existing background noise levels in residential neighborhoods closest to the construction site. Impacts to residents in these areas will be negligible. Temporary air quality impacts resulting from construction (see sections 2.12.2.1, 2.12.3, and 3.2) will occur in proximity to the areas where active ground disturbance and concrete batching are occurring. With the mitigation measures proposed these emissions would be minimized and would not be expected to adversely impact air quality in adjacent neighborhoods. Visual impacts resulting from construction

activities will be negligible, as most construction would be scheduled for daylight hours, and lights will be directed downwards and limited to minimum wattage necessary at night (section 4.2.3.5). Security will be managed directly at the construction site, where the public will not have access (see section 2.19.2). Similarly the public would not have access to the construction site and would therefore not be directly exposed to construction site occupational safety risks. The construction site Emergency Response Plan will be developed in coordination with local emergency responders and will consider and prepare for unintended construction-site incidents that could have the potential to spread beyond the construction-site boundary (see section 4.1.4.4).

Operation of the Facility will have negligible impacts on low income or minority populations. As presented in section 4.3.3.1 project operations activity will not result in a significant increase in the total number of weekday PM peak hour trips entering the City's concurrency corridors. The traffic impact to adjacent residential neighborhoods would therefore be negligible. As discussed in section 4.1.1.2, operations-related noise emissions have been estimated to be lower than existing background noise levels in residential neighborhoods closest to the construction site. Impacts to residents in these areas will be negligible. Air emissions resulting from operation of the Facility (see sections 2.12.2.2, 2.12.3, and 3.2) will be controlled in accordance with applicable air quality regulations so as not to adversely impact air quality in adjacent neighborhoods. Visual impacts resulting from the Facility (see section 4.2.3.3) will be most noticeable to the public when travelling on SR 501. Security will be managed directly at the Facility site, where the public will not have access (see section 2.19.2). Similarly the public would not have access to the Facility site and would therefore not be directly exposed to construction site occupational safety risks. Hazards related to an incident which could cause an off-site impact would be managed in accordance with the operations emergency response (section 4.1.4.4) and operations spill response plans (section 2.10.3.2) implemented by the Applicant. These plans specifically address the protection of the public from any possible hazards.

As discussed in section 4.4.2, 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. Therefore, no social or environmental justice impacts are anticipated to result from the construction and operation of the Facility and no mitigation is proposed.

While the project is not proposing specific mitigation measures for impacts, 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 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.

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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1.5.1.3 Assurances

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1.5.2.2 Legal Description

None.

1.5.2.3 Construction on Site

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1.5.2.4 Energy Transmission Systems

None.

1.5.2.5 Electrical Transmission Facilities

None.

1.5.2.6 Water Supply System

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1.5.2.8 Characteristics of Aquatic Discharge Systems

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1.5.2.12 Emission Control

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1.5.2.13 Carbon Dioxide Mitigation

None.

1.5.2.14 Greenhouse Gases Emissions Performance Standards

None.

1.5.2.15 Construction and Operation Activities

None.

1.5.2.16 Construction Management

None.

1.5.2.17 Construction Methodology

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 both prior to and following submittal of this Application to EFSEC. Table 1.6-1 is a summary of the consultation activities that were conducted prior to submittal of the Application in August 2013, 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, Prior to Application Submittal

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.
U.S. 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.

Organization	Meeting Date	Meeting Description
	August 15, 2013	Applicant meet with Muffy Walker, USACE Seattle 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.

Organization	Meeting Date	Meeting Description
Hazel Dell/Salmon Creek Business Assoc.	July 17, 2013	Applicant met with Ginger Schmidt, President to 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.

Following submittal of the Application, the Applicant conducted a public open house on September 30, 2013, 7:00 to 9:00 p.m., at the Hudson's Bay High School in Vancouver, Washington. Following a presentation by Vancouver Energy, Applicant representatives were available to discuss the following topics with members of the public: project design and operation; marine sfety and operations; spill reponse and planning; the nature of crude oil; rail safety and operations; Port infrastructure; and understanding the EFSEC process. BNSF representatives were also available to answer questions. Aproximately 200 members of the public attended.

Since submittal of the Application, Vancouver Energy representatives have continued to meet with public, local, state, federal, and tribal representatives, many of which have been contacted on multiple occasions. The following list summarizes the scope of this outreach.

- Local Agencies (elected representatives or staff): City of Vancouver, Clark County, Port of Vancouver, City of Ridgefield, City of Camas, Port of Camas-Washougal, Port of Ridgefield, City of Spokane, City of Spokane Valley and Vancouver Fire Department
- State Agencies: DAHP, Washington Department of Commerce and Ecology
- Federal Agencies: USACE, USFWS and NMFS
- Tribal Governments: Cowlitz Indian Tribe, Confederated Tribes of the Grand Ronde, Chinook Nation, Chehalis Tribe and Yakama Nation

- Nongovernmental Organizations: Sierra Club, Audubon Club, Friends of Clark County, Pacific Northwest Waterways Association, Columbia River Pilots, Columbia River Steamship Operators' Association, Maritime Fire and Safety Association (MFSA and F-PAAC), Hispanic Community Public Affairs Liaison, Kiwanis Club Cascade Park, YWCA Clark County, Red Cross, Columbia Springs, Police Activities League (PAL), Clark County Skill Center, Clark College, YWCA Clark County, Daybreak Youth Services, Fruit Valley Foundation, Fruit Valley Elementary School, Habitat for Humanity, Hough Foundation, Nonprofit Network, Community Foundation for Southwest Washington, Mount Saint Helens Institute, School of Piano Technology for the Blind, SELF (Support for Early Learning and Families), Rock Solid Community Teen Center, Washinton First Robotics and Foundation for Vancouver Public Schools
- Neighborhood and Community Associations: Fruit Valley Neighborhood Association, Neighborhood Association Council of Clark County, Vancouver Neighborhood Alliance, Arnada Neighborhood Association, Esther Short Neighborhood Association, Harney Heights Neighborhood Association, Hough Neighborhood Association, Hudson's Bay Neighborhood Association, Maplewood Neighborhood Association, Northwest Neighborhood Association, Shumway Neighborhood Association, Vancouver Heights Neighborhood Association, Wildwood Neighborhood Association, Riverview Neighborhood Association, Columbia Way Neighborhood Association, East Old Evergreen Highway/Old Evergreen Highway Neighborhood Association, Evergreen Highlands Neighborhood Association, South Cliff Neighborhood Association, Bella Vista and Lewis and Clark Neighborhood Associations, Evergreen Shores Neighborhood Association, Carter Park Neighborhood Association, and Village at Fisher's Landing Neighborhood Association, Vancouver Metro Sunset Rotary, Vancouver Sunrise Rotary Club, Rotary Club of Camas-Washougal, Rotary Club of Greater Clark County, Rotary Club of Vancouver and City Club of Portla Pacific Northwest Economic Region, Southwest Workforce Development Council
- Businesses and Economic Development Organizations: Gramor Development, Hi-School Pharmacy, Columbia River Economic Development Council, Identity Clark County, Washington Council on International Trade, Greater Vancouver Chamber of Commerce, East Vancouver Business Association, Hazel Dell/Salmon Creek Business Association, Vancouver's Downtown Association, and Columbia Corridor Association, Association of Washington Businesses, Southwest Washington Labor Council, Washington Association of General Contractors, Vancouver Executives, Greater Spokane Inc., Spokane Valley Chamber of Commerce, Greater Portland Inc., Washington State Council of Fire Fighters, and Southwest Washington Contractors Association
- Media Organizations: The Columbian, The Camas-Washougal Post Record, The Longview Daily News, The Oregonian, Oregon Public Broadcasting, The Seattle Times, The Reflector, The Spokane Review, The Olympian, Vancouver Business Journal, Puget Sound Business Journal, Portland Business Journal, KOIN, KGW, KATU, KPTV, KOIN, KOMO, KIRO, KING and KUOW

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Vancouver Energy 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 Vancouver Energy Terminal

Vancouver Energy Terminal (the "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 501 (SR 501) (NW 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 47.4 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 3,200 people are directly employed by businesses at the Port (Port of Vancouver 2016).

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 1/4 of Section 18, NW 1/4 of Section 19, and the NW and NE 1/4 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 1/4 Section 19 & S 1/2 Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000	7.8
Area 300 – Storage	No site address N 1/2 Section 20, T2N, R1E WM Parcel: 152173-000	20.8
Area 400 – Marine Terminal	No site address NW 1/4 Section 20, T2N, R1E WM Parcels: 152166-000, 503030-000, 503030-003	7.7
Area 500 – Transfer Pipelines	No site address NE 1/4 Section 19 & NW 1/4 Section 20, T2N, R1E WM Parcels: 152184-000, 152177-000, 152179-000, 986027-146, 986027-027, 50303-001, 152166-000	4.9

Project Element	Site Location	Area (acres)
Area 600 – Boiler	No site address SW 1/4 Section 19, T2N R1E WM Parcel: 152799-000	0.8
Rail Infrastructure	5501 NW Lower River Road N 1/2 Section 19 & S 1/2 Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000, 152905-000, 152798-000	5.4

The final Facility design will take into account actual Site Certification Agreement conditions that are not available at the time of preparation of this ASC; such conditions may result in further adjustments to the final site boundary and resulting Facility footprint acreage.

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 7.8 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 southwest portion of 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. In addition, BHP Billiton has proposed to construct a potash export facility on portions of Terminal 5.[1] The approvals, received in 2012, for this facility included an additional rail loop track, a 301,400-square-foot storage building, an administrative and maintenance building, fuel station, conveyors, surge bin, shiploaders, and marine berthing facilities (City of Vancouver 2011). Initial grading and ground improvements have been completed. See Figure 2.1-2 for existing conditions at Terminal 5.

[1] The BHP Billiton proposal is currently not being pursued; however, several permits are still actively in place and the improvements could be pursued if the proposal status changes.

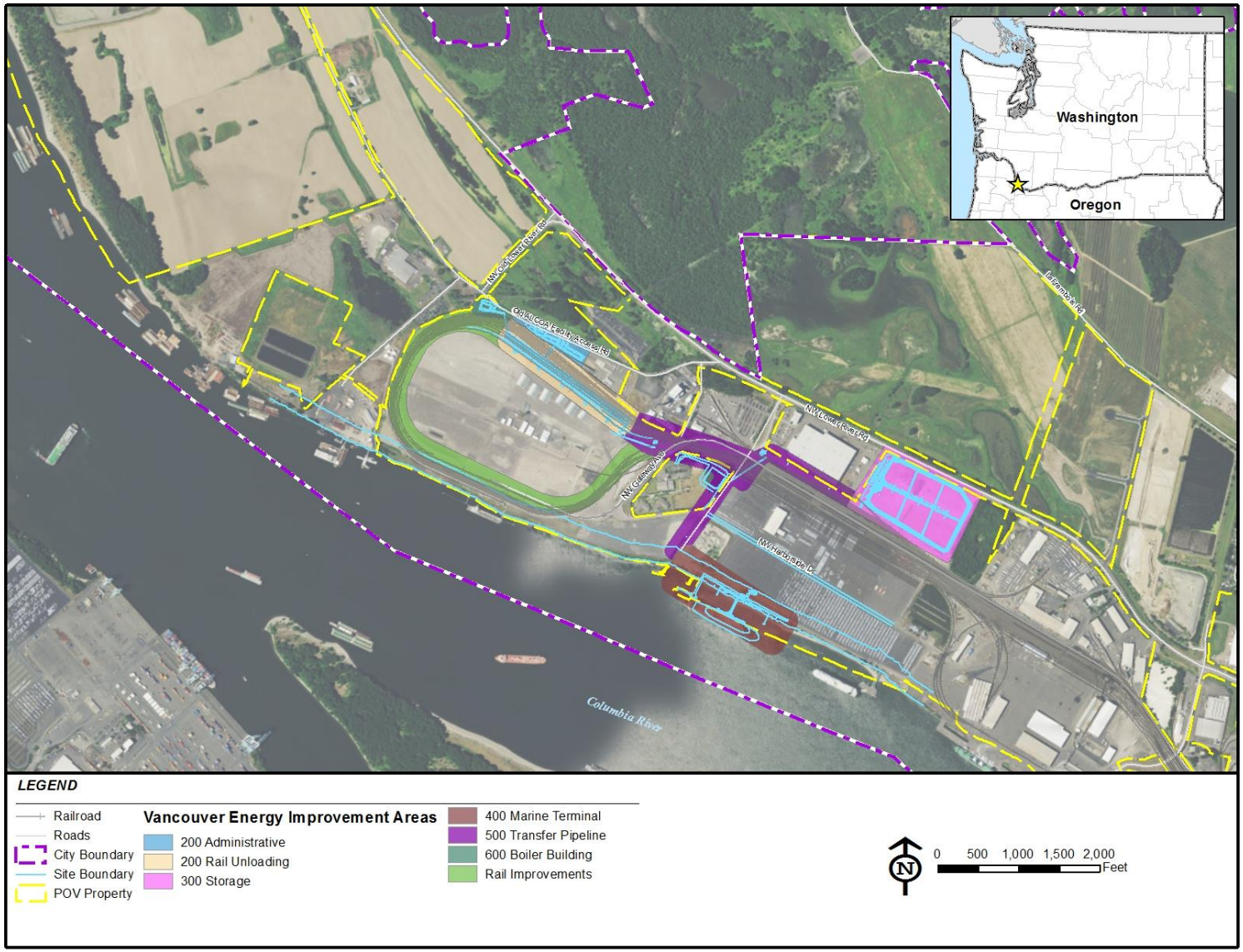

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Figure 2.1-1. General Vicinity Map (Revised)

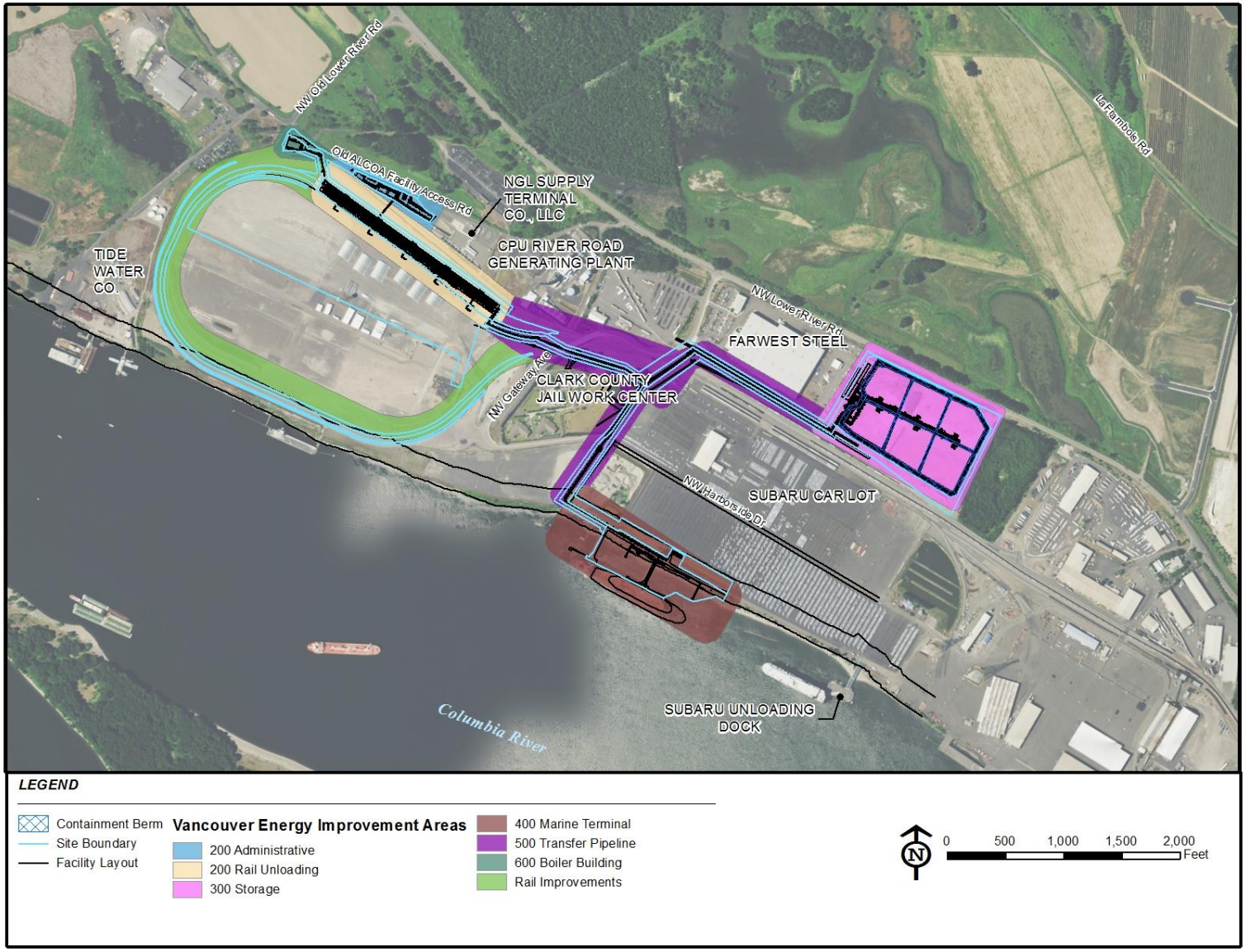

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Figure 2.1-2. Aerial View (Revised)

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 Storage 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 20.8 acres.

This site was developed by the Port for laydown and industrial development and is currently not in use[2]. 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 NW Gateway Avenue and Harborside Drive by a driveway to be constructed with the project. Area 400 will be constructed on approximately 7.7 acres.

Berths 13 and 14 were developed by the port in the early 1990s for a short- and/or long-term moorage of oceangoing governmental and commercial vessels. 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 +2 feet (zero Columbia River datum [CRD]) and the Port is permitted to deepen and maintain the berths to the same depth (USACE Permit No. Nationwide Permit (NWP)-2007-916, City of Vancouver Permit No. SHL2012-0017, Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval Control No. 129626-1). 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),

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[2] In August 2013 at the time of original submittal of the ASC, the site was occupied by a temporary steel scrap yard. Keyera Energy Inc., which was acquired by NGL Supply Terminal Co., LLC, in December 2013 (NGL Energy Partners 2013), then used this site to support rail unloading operations. Use of the site by NGL supply ended in June 2014 (Holtby 2016).

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 4.9 acres.

2.1.1.5 Area 600 –Boiler Building

Area 600 is located at the northwest corner of Terminal 5. The Area 600 Boiler Building, associated parking, and an E-house will be constructed at this location. This area also includes the piping facilities to carry generated steam to Area 200. 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 0.8 acre.

2.1.1.6 Rail Infrastructure

The Facility will take advantage of dual Class 1[3] (BNSF and Union Pacific Railroad) unit train access at the Port's Terminal 5. The Terminal 5 site represents the westernmost extension of the WVFA project and is designed to accommodate unit trains. The Port has permitted, has begun construction, and will continue to construct the WVFA project elements at Terminal 5 (see section 4.2.1.1). The existing rail infrastructure at Terminal 5 is illustrated in Figure 2.3-4.

Vancouver Energy Terminal will use up to two loop tracks constructed as part of the WVFA project, and will construct a third loop at Terminal 5. As explained in section 2.3.2 below, Vancouver Energy and the Port will exchange the use of this new loop for an existing loop at Terminal 5. As part of Facility construction, the Applicant will also relocate approximately 1,500 feet of existing tracks to allow for track tie-ins into the Area 200 unloading structure (see section 2.3.2).

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 is currently unoccupied.

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 is approximately 2,800 feet wide, with a maintained depth of -43 feet CRD. The bank consists of steeply sloping riprap with parking and

[3] Class 1 railroads are defined as those carriers having operating revenues of $433.2 million or more.

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 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. 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 Tualatin Mountains 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 3.2-4. 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 47.4-acre site within portions of the SE 1/4 of Section 18, NW 1/4 of Section 19, and the NW and NE 1/4 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 Appendix E.1.

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.

2.2.2 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. Appendix E.2 presents the main substantive requirements of the lease.

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 primarily for delivery to refineries located on the West Coast of North America. 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 pre-boomed. Crude oil will be pumped from the storage tanks to the loading area, and loaded to the marine vessels. Crude oil may also be pumped directly from the rail unloading area to the vessels at the marine terminal. An overall site plan of the Facility is shown in Figure 2.3-2.

The Facility will receive, handle, store and load pipeline quality light, medium, and heavy crude oils with an American Petroleum Institute (API) gravity ranging from 15 to 45 degrees. 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.

The Applicant will neither own nor source the crude oil shipped through the Facility. The Applicant will receive its customer's crude oil by rail, unload and stage that crude oil in the on-site tanks, and load the crude oil onto vessels provided by those customers.

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 • Storage Building • Pump Basin • E-houses • Fire Pump and Foam Building
400 – Marine Terminal	• Marine Vessel Loading Hoses and Equipment • Control Room/E-house • Dock Safety Unit • MVCUs • Hydrogen Sulfide Treatment System • Vapor Blower Skid • Spill Prevention, Response and Containment Equipment • Dock Improvements • Fire Pumps and Foam Supply • Piping from Vessel Loading to MVCUs
500 – Transfer Pipelines	• Transfer Piping from Area 200 to Area 300 • Transfer Piping to/from Area 300 to Area 400
600 – Boiler Building	• Boiler Building • Piping to carry steam to Area 200

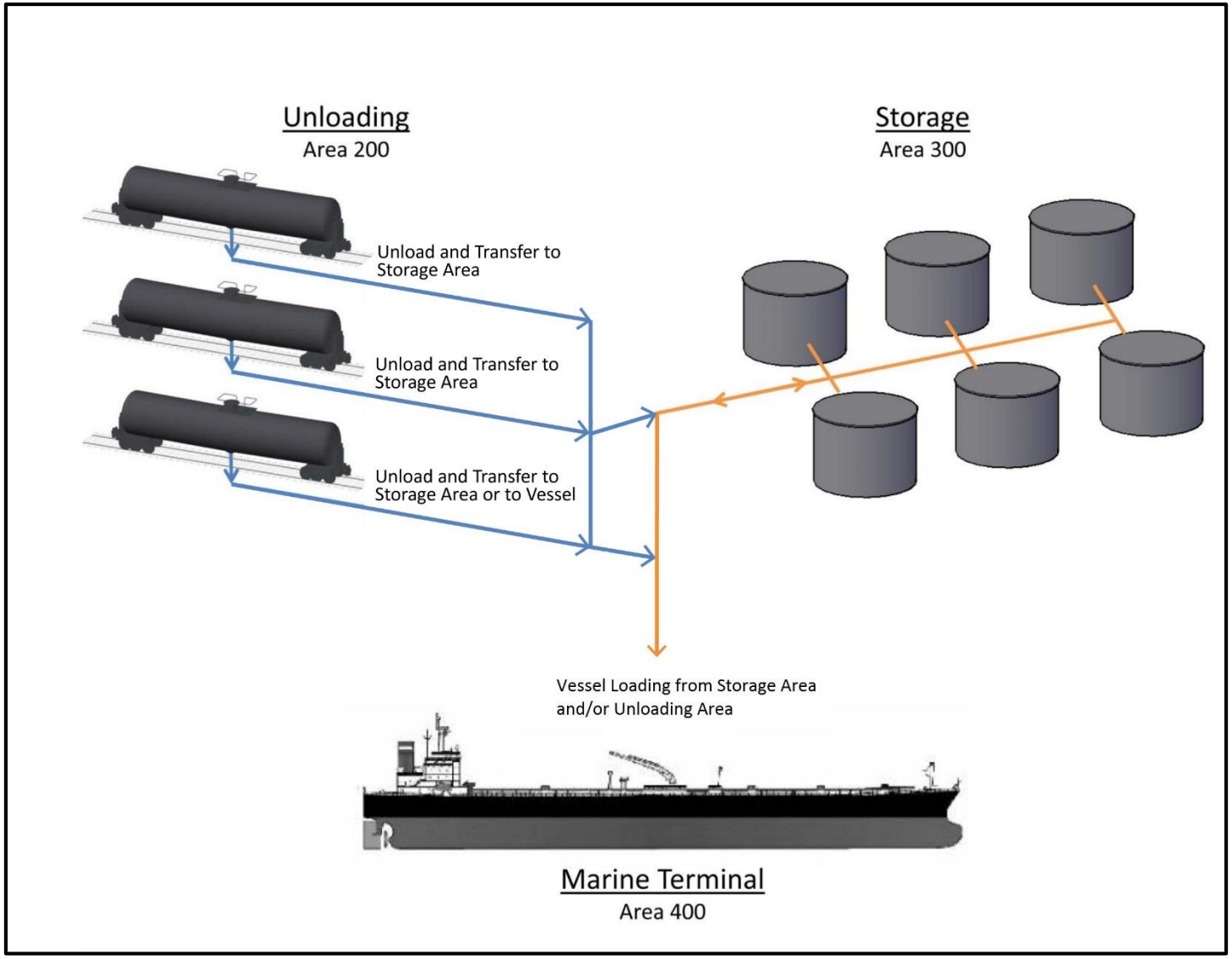

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Figure 2.3-1. Product Flow Diagram (Revised)

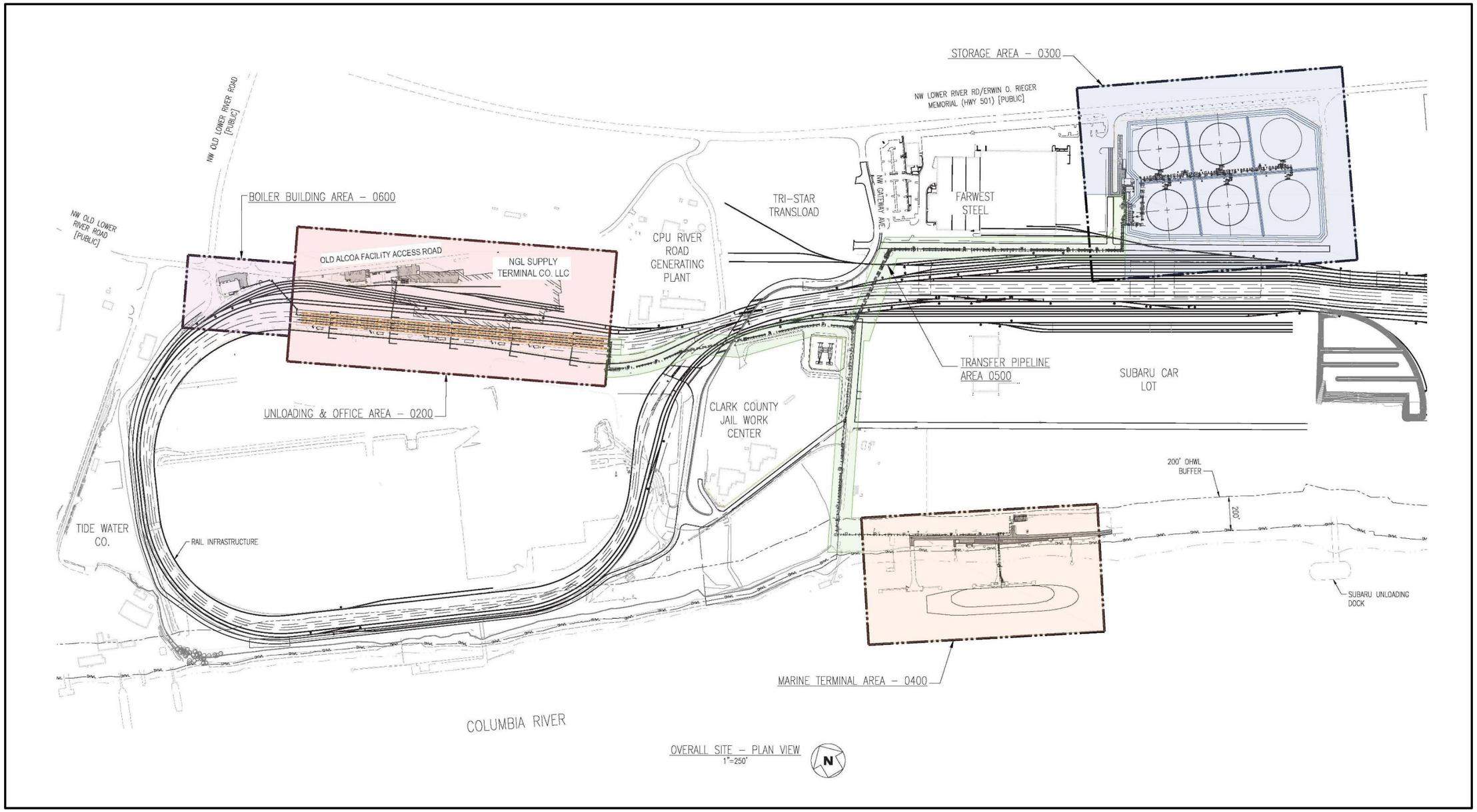

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Figure 2.3-2. Overall Site Plan (Revised)

Primary vehicular access to the proposed project will be to the Administration Building accessible from NW Lower River Road (SR 501) via the public access to Old Lower River Road, and then the Old Alcoa Facility Access Road[4]. Parking will be provided for Facility employees to park their personal vehicles during the workday. 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 NW Gateway Avenue and Harborside Drive via a newly constructed driveway. No modifications are proposed to existing public roads accessing this area of the Port. Parking will be provided for vehicles at the Marine Terminal. A reconstructed asphalt and gravel area at the berths will be used for parking and storage of spill response equipment. Although the Area 600 Boiler Building 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 capacity. Based on market demand for subscriptions by potential clients to use the Facility to deliver crude oil, the Applicant may choose to construct either all elements of the Facility upon receiving site certification, or may choose to defer construction of some of the Facility elements to a later date. From the beginning of operations, regardless of whether the deferred elements are constructed or not, the Facility will have the capability to receive an average of 360,000 barrels per day of crude oil. Construction of the potentially deferred elements will not add receipt capacity on a daily basis; construction of the potentially deferred elements will allow the Facility to receive and handle different crude qualities (i.e., heavier pipeline quality crudes that require heating for transfer operations), and additional capability to segregate crudes for different clients.

Upon receiving site certification from EFSEC and all federal approvals, the Applicant expects to construct the following facilities ("Phase I"), at a minimum:

- All ground improvements necessary for the Facility
- Shifting of a portion of existing Port rail infrastructure to allow arrival, switching and departure of trains (see section 2.3.2)
- The Area 200 unloading building[5]
  - 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

[4] This road is currently unnamed by the Port; for purposes of this ASC it is being referred to as the "Old Alcoa Facility Access Road".

[5] The rail unloading "building" is likely to be considered more properly a "structure/weather enclosure" with minimal siding for fire-protection purposes, and not a "building" under the definition of the National Fire Protection Code. However, in the remainder of this application, it will be referred to as a "building."

- Area 200 administrative and support buildings
  - The administrative building
  - One of the two support buildings
  - The Area 200 containment tanks
- Area 300 storage area, including
  - The entire exterior containment berm sized and designed for 110 percent of the API 650 maximum capacity of the largest storage tank and the rainfall from a 24-hour, 100-year storm event for the entire berm area
  - The four storage tanks designed to handle non-heated pipeline quality crude
  - The intermediate berms sized to contain 10 percent of the contents of a tank
  - Stormwater facilities to capture, treat, and convey stormwater associated with all six tanks
- Area 500 transfer pipelines serving the concurrent unloading of unit trains staged at the two unloading tracks described above, and the conveyance to the storage area
- Area 500 transfer pipelines serving the conveyance of crude oil from the storage area to the marine terminal and the associated return line (described in section 2.3.5)
- Area 400 Marine Terminal facilities designed to handle the conveyance of crude oil to a marine vessel at full vessel loading capacity rates, including
  - All of the berth improvements necessary to support vessel berthing
  - The entire dockside safety unit, and hydrogen sulfide treatment and MVCU systems
  - All dockside and shoreside spill prevention and control equipment
- Fire-suppression facilities sufficient to meet the suppression needs of the facilities installed
- Wastewater collection, treatment, and discharge facilities to meet the needs of the facilities installed
- Stormwater collection, treatment, and discharge facilities to meet the needs of the facilities installed

Contingent on evolving market conditions, the Applicant may choose to defer construction of the following additional elements ("Phase II") (see Figure 2.3-3) to a later date:

- Rail unloading structure in Area 200
  - The catwalks/gangways and all piping necessary to support operations of the third unloading track, which may include the ability to handle heated crude
- Area 200 administrative and support buildings
  - The second of the support buildings
- Area 300 storage including:
  - The two tanks that may have the capability to accept heated crude
- Transfer pipelines serving the concurrent unloading of unit trains staged at the third unloading track in Area 500
- The Boiler Building (Area 600) and the storage building in Area 300
- Fire-suppression facilities sufficient to meet the suppression needs of the additional facilities installed
- Wastewater collection, treatment, and discharge facilities to meet the needs of the facilities installed
- Stormwater collection, treatment, and discharge facilities to meet the needs of the facilities installed

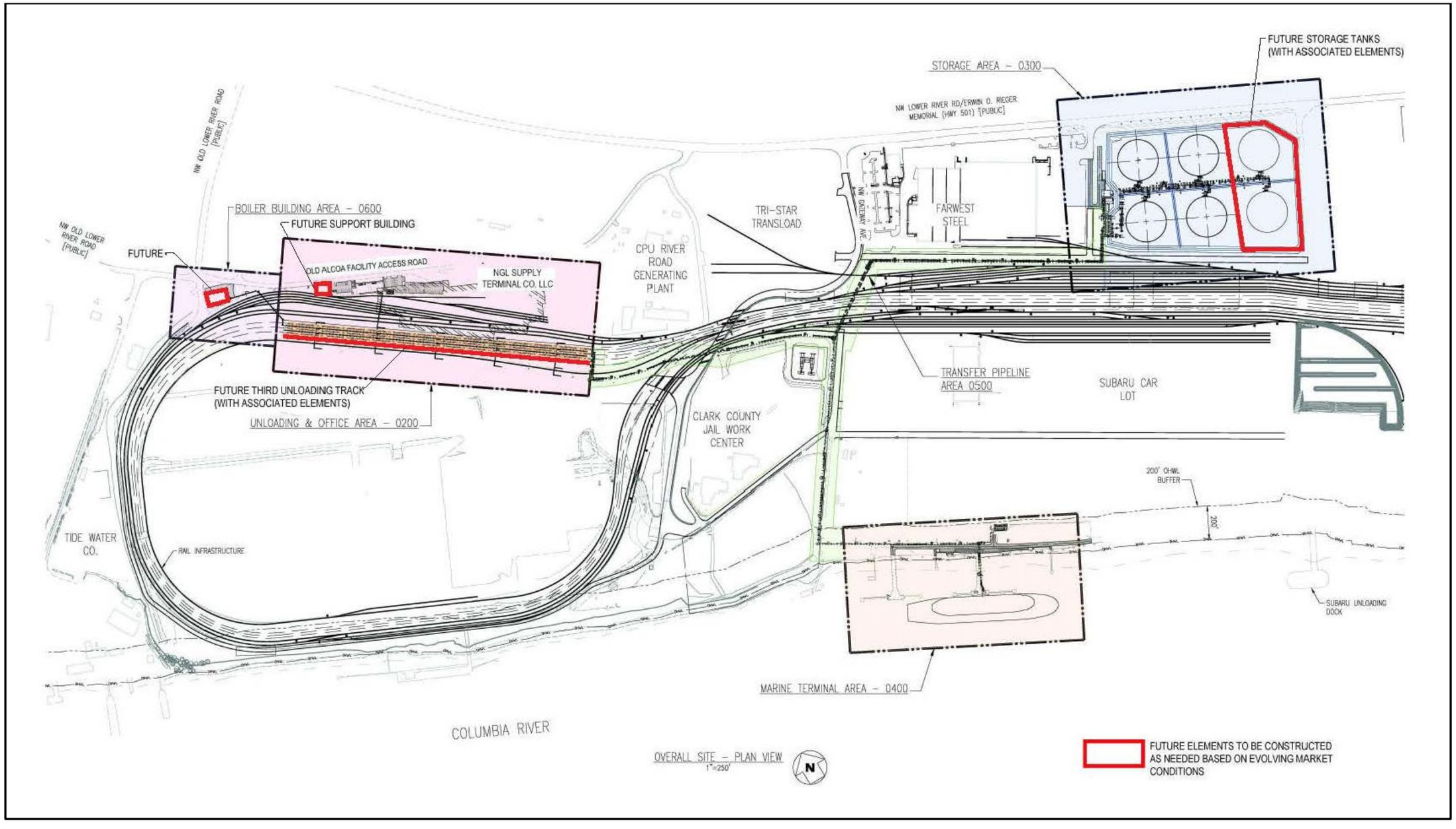

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Figure 2.3-3. Overall Site Plan – Facility Elements Potentially Deferred (Revised)

As described in section 2.3.2, in the future, the Applicant will construct a rail loop. The Applicant will receive in exchange the exclusive use of an existing Port loop.

The Applicant expects a 20-year lifetime for the Facility. The Port lease provides for an initial 10-year term with two 5-year extension options. During the 20-year expected lifetime provided in the lease, the Applicant requests that site certification be granted for operation and maintenance of all of the above facilities. Maintenance dredging at berths 13 and 14 are part of the Marine Terminal (Area 400) but are a separate operation 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. The most recent approvals for dredging within these areas were received in 2013 and include appropriate handling details for dredged materials (USACE Permit No. NWP-2007-916, Water Quality Certification Order #5984). For this reason, Port maintenance dredging is not included in the site certification.

Facilities Not Under EFSEC Jurisdiction

The Applicant discloses that the following elements will be approved and constructed by others in support of the Facility, and they are not part of this request for site certification:

- Utility connections to the Facility site boundaries, e.g., natural gas supply from Northwest Natural Gas, electricity supply line from Clark Public Utilities, water supply from the City of Vancouver.
- Terminal 5 loop tracks constructed by the Port as part of the WVFA project, and operation and maintenance of loop tracks that revert to Port control subsequent to loop track exchanges with Vancouver Energy Terminal (see section 2.3.2).
- As noted above, maintenance dredging of berths 13 and 14 by the Port.

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 2.3-4.

Typically an average of four unit trains per day will be delivered onto the Port's rail network via Class I railroad lines for staging on the rail infrastructure serving the Facility. However, on occasion, a fifth train may arrive within a daily 24-hour period, and begin unloading in the following 24-hour period. On other days (or subsequent days), only three trains may arrive within certain 24-hour periods, thus equating to an overall average of four train arrivals per day. 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 westward to the Terminal 5 rail loop. The trains will travel counterclockwise on Terminal 5 rail loop tracks, and will then be indexed through the rail unloading building located on the north side of the Terminal 5 rail loop. Following unloading, the trains would leave Terminal 5 and travel eastward on the Port's industrial rail network until they re-enter the Class 1 rail system. 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.

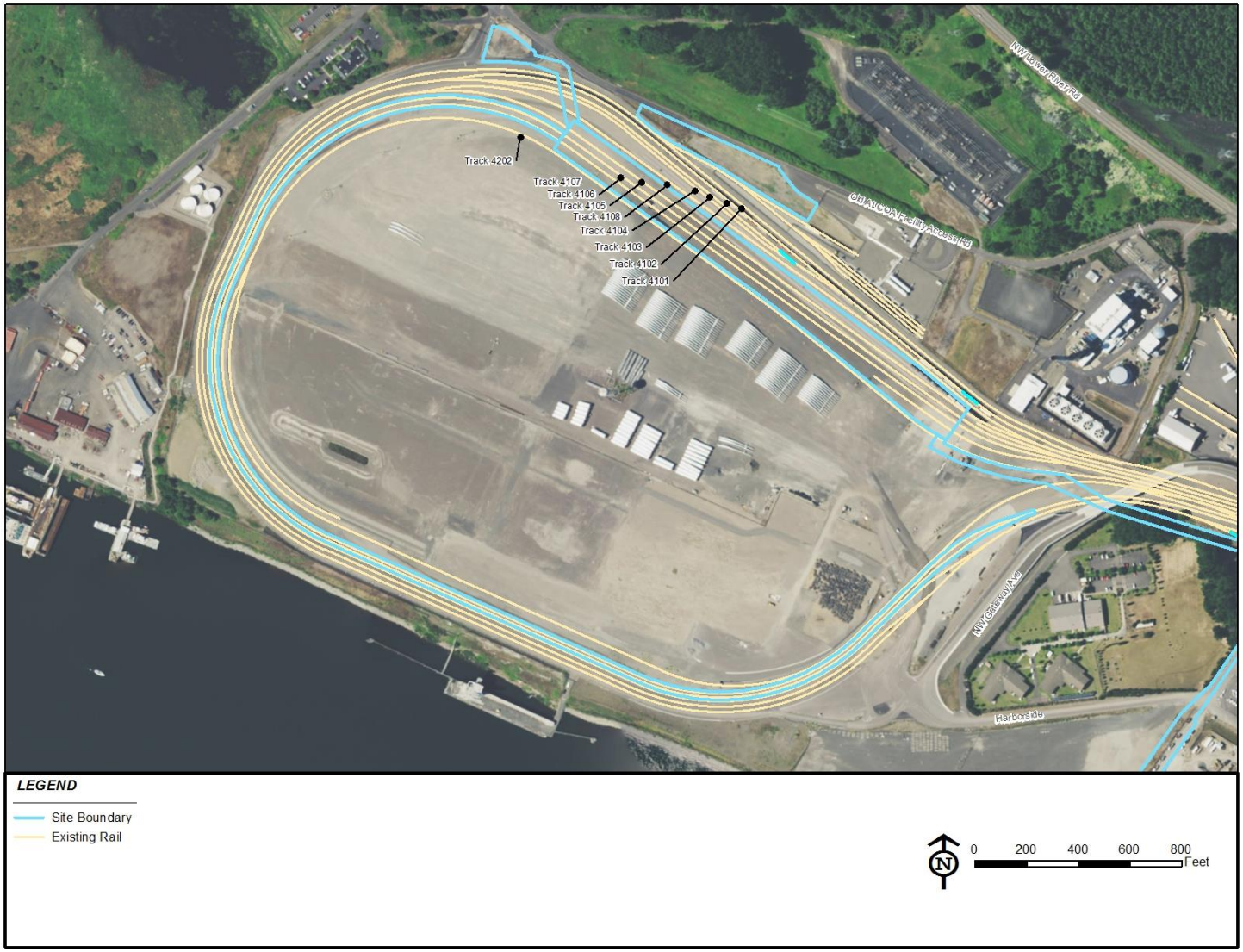

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Figure 2.3-4. Existing Rail Infrastructure (Revised)

The Port has permitted, has begun construction, and will continue to construct the WVFA project elements at Terminal 5. At completion, WVFA project elements at Terminal 5 will consist of five loop tracks. For purposes of the discussion below, these tracks are identified by numbers[6]. Table 2.3-2 summarizes the status of the loop tracks and their relationship to Vancouver Energy Terminal operations[7]. For illustrative purposes, these tracks are identified on Figure 2.3-5.

Table 2.3-2. Summary of Terminal 5 Loop Tracks and Respective Use by Port and Vancouver Energy Terminal

Track Number	Activity	Permitted as Part of WVFA Project	Constructed as Part of Vancouver Energy Terminal	Used by Vancouver Energy Terminal
4102	Shift existing track (WVFA Project 11A)	Yes	No	No
4105	Shift existing track (WVFA Project 11A)	Yes	No	Yes (when triggered[a])
4106	Construct new track (WVFA Project 11A)	Yes	Northern portion relocated[b]	Yes
4107	Existing rail line	Yes	Northern Portion Relocated	Yes
4101	New rail line[c]	No	Yes[d]	No
4202	New rail line	Yes	No	No

Notes:
a When unloading volumes reach and exceed 120,000 bpd, the Port would grant exclusive use of track 4105 to the Applicant.
b The northern portions of tracks 4106 and 4107 will be realigned by the Applicant to allow train entry into the unloading structure.
c Installation of track 4101 also requires reduction of inspection road width from 24 feet to 13 feet and the installation of pullouts to allow passing of vehicles.
d When unloading volumes reach and exceed 120,000 bpd, the Applicant will transfer use of track 4101 to the Port.
WVFA = West Vancouver Freight Access

Three loop tracks have been constructed to-date: tracks 4102, 4105, and 4107. All of these tracks have been permitted and constructed under existing WVFA permits. In June 2015, the Port began completion of WVFA Project 11A, which consists of shifting the two outermost existing Terminal 5 rail loop tracks outward (4105 and 4102) and constructing an additional loop track (4106) between tracks 4105 and 4107. This will result in the presence of four loop tracks (4102, 4105, 4106, and 4107) at the time Vancouver Energy Terminal is expected to begin construction. These four tracks comprise four of five of the WVFA permitted tracks. In the future, the Port will also construct a fifth loop track at Terminal 5 (4202). This track will be located on the inside of the Terminal 5 loop and is not related to Vancouver Energy Terminal. The current numbering on those tracks is (from outermost to innermost) 4102, 4105, 4106, 4107, and 4202.

[6] These numbers are provided for illustrative purposes, and as various WVFA project elements are completed, numbers may be changed or reassigned by the Port.
[7] The status is described as of June 2015 (Harding 2015).

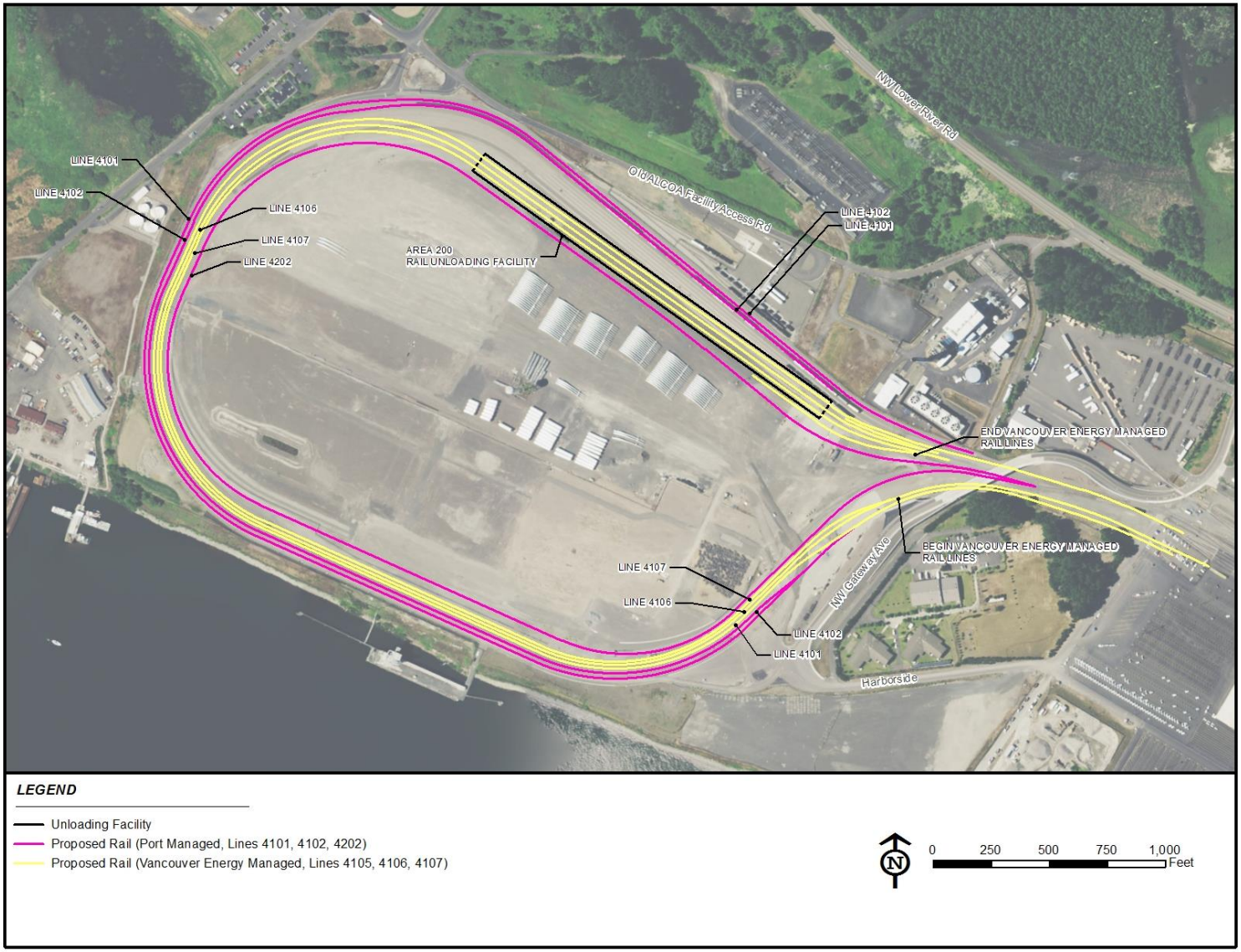

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Figure 2.3-5. Rail Improvements (Revised)

As part of Facility construction, the Applicant will relocate approximately 1,500 feet of tracks 4106 and 4107 to allow for track tie-ins into the Area 200 unloading structure, for release of tank cars back into the main track from the rail car unloading facility, and to separate tank cars in need of repair or further inspection. Upon beginning of operations, Vancouver Energy Terminal will exclusively use these two tracks.

In the future, the Applicant will construct an approximately 4,900-foot-long additional track (Track 4101). This track will be located on the outside of the Terminal 5 loop. The track will consist of railroad ballast (rock), 115-pound hardened steel rails that are continuously welded and mounted on either 8-foot by 6-inch or 8-foot by 3-inch crossties, and other miscellaneous materials. Crossties will be concrete for the most part, except at crossings where timber would be used. The rails will be continuously welded to reduce noise and increase safety. The rail loops will be designed to comply with railroad and federal requirements.

The corridor that will be used for the additional rail loop will overlap with a portion of the footprint of the existing gravel inspection road located on the periphery of the Terminal 5 rail loop infrastructure. As part of installation of Track 4101, the road width will be reduced to 13 feet from 24 feet without modification to the southern extents of the inspection road. Pullouts will be added along the road to allow passing of vehicles along the corridor. The Applicant will make these modifications in association with the construction of Track 4101.

When Facility unloading volumes reach and exceed 120,000 bpd, Vancouver Energy Terminal will take over Track 4105 from the Port for exclusive use. The newly constructed Track 4101 will then be transferred to Port general use and will not be used by the Applicant. Upon this transferal, Vancouver Energy Terminal will have exclusive use of tracks 4105, 4106, and 4107. Shifting of the northern portions of tracks 4106 and 4107 will be under EFSEC jurisdiction. Construction of Track 4101 and the associated narrowing of the inspection road and addition of turnouts will also be under EFSEC jurisdiction. The Applicant's use of tracks 4106 and 4107 will be under EFSEC jurisdiction.

When loops are exchanged between the Applicant and the Port, loops relinquished to the Port will no longer be subject to EFSEC jurisdiction; however, loops under Vancouver Energy Terminal control would fall under EFSEC jurisdiction. The Applicant will maintain the third loop over which it obtains exclusive control for the life of the Facility.

Because rail operations are dynamic, as each of the new loops becomes operational, the Port and Vancouver Energy Terminal may reallocate amongst themselves which loops are for exclusive use by the Applicant, and which are general Port use.

The Applicant will operate two SW1500 switching locomotives in support of Facility operations. These locomotives will be used to remove and temporarily stage tank cars that have been identified as having potential deficiencies that prevent them from being released back to the rail carrier. These tank cars will be emptied of contents using the unloading process described below, disconnected from the unit train, and repositioned for temporary storage until they are

maintained on site, or removed from the site for repair at a separate location[8]. It is anticipated the switching locomotives would be leased or purchased from one of the major locomotive manufacturers, such as Trinity, Unity, Greenbriar, or Utlx.

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 2.3-6 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 (4106 and 4107) will accommodate trains carrying crude oil that can be unloaded and conveyed without being heated; the third unloading track (4105) will accommodate trains carrying crude oil that can be unloaded and conveyed without being heated as well as crude oil that may need to be heated (to approximately 150°F) prior to unloading and conveyance to storage[9].

Each unit train will include approximately 100 to 120 tank cars, 2 buffer[10] cars, and 3 locomotives. Typical unit train length will be approximately 7,800 feet. Tank cars typically hold between 650 and 750 barrels of crude oil.[11] A typical unit train will deliver between 65,000 and 90,000 barrels of crude oil.

Vancouver Energy will only accept tank cars for crude oil shipment into the Facility that meet or exceed the U.S. DOT-117 standards specified in 49 CFR 179.202 (including any related federal agency or congressional modifications to those standards). All Facility customers will be required to ship crude oil using tank cars that meet or exceed these standards. Vancouver Energy is committed to making this requirement for all customers concurrent with startup of the Facility and in advance of the phase-out schedule allowed by the U.S. DOT.

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[8] Maintenance of railcars and locomotives necessary for rail transportation are described in detail in Section 6.1.6.1 of the NPDES Engineering Report attached to section 5.3 of this Application. Such activities will be conducted on the rail spur located at the southeast corner of the rail unloading building. Rail containment pans and a concrete surfacing will be provided around the rail spur. Stormwater from the rail spur will be collected in catch basins and containment pans for treatment and monitoring. Any maintenance activities related to rail cars and locomotives will only be completed for cars already on site being processed by the Facility. The Facility will not be used as a maintenance facility receiving rail cars from other parties and transporters for maintenance activities.

[9] Application of heat reduces the viscosity of crude oil. In the case of more viscous crude oils received at the Facility, application of heat will allow such oils to be gravity unloaded within typical Facility operating timeframes, and more easily pumped through the Facility transfer pipelines.

[10] Buffer cars, which are empty rail cars that serve to separate the locomotives from cars carrying crude oil, are required by federal regulations.

[11] A barrel of crude oil contains 42 gallons.

The unloading of a train would take approximately 12 to 14 hours. Unit trains staged concurrently on each of the unloading tracks can be unloaded at the same time.

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 2.3-8 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 also 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. The foundation for the structure will use pile supports under the trenches and spread footings elsewhere. Piling will be driven to a depth of 75 feet and spread footings will be installed up to 4.5 feet deep.

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 equipped with steam piping allowing rail cars unloaded on this track to be heated with steam, as described in more detail below.

The 30 unloading stations for each track are subdivided into five groups of six unloading stations. Figure 2.3-7 illustrates the typical configuration of rail car unloading. Each unloading station will accommodate one rail car. Each unloading station will include the following:

- Hoses equipped with dry fit connectors used to gravity drain the crude oil from the tank car to a collection header pipe
- 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 stormwater and inadvertent releases to the rail unloading facility containment tanks
- Concrete ground surfaces between the unloading rail tracks
- A vent line to the top of the cars to allow vapor in the manifold to return to the rail car during unloading to prevent vapor from leaving the system during the unloading process
- A vacuum breaker that allows the tank car to maintain negative 0.5 psi to atmospheric pressure while the car is connected and unloading

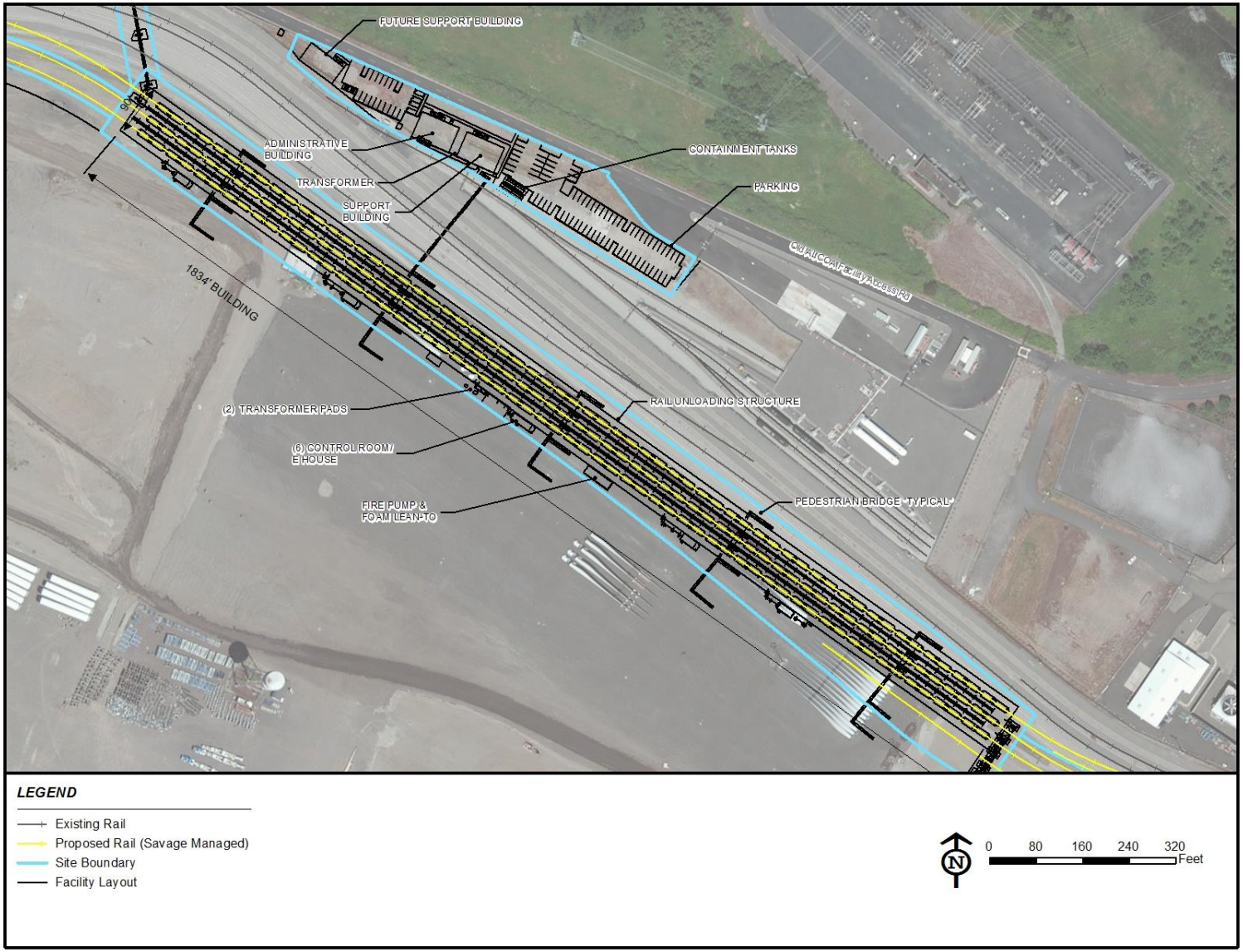

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Figure 2.3-6. Rail Car Unloading Facility (Revised)

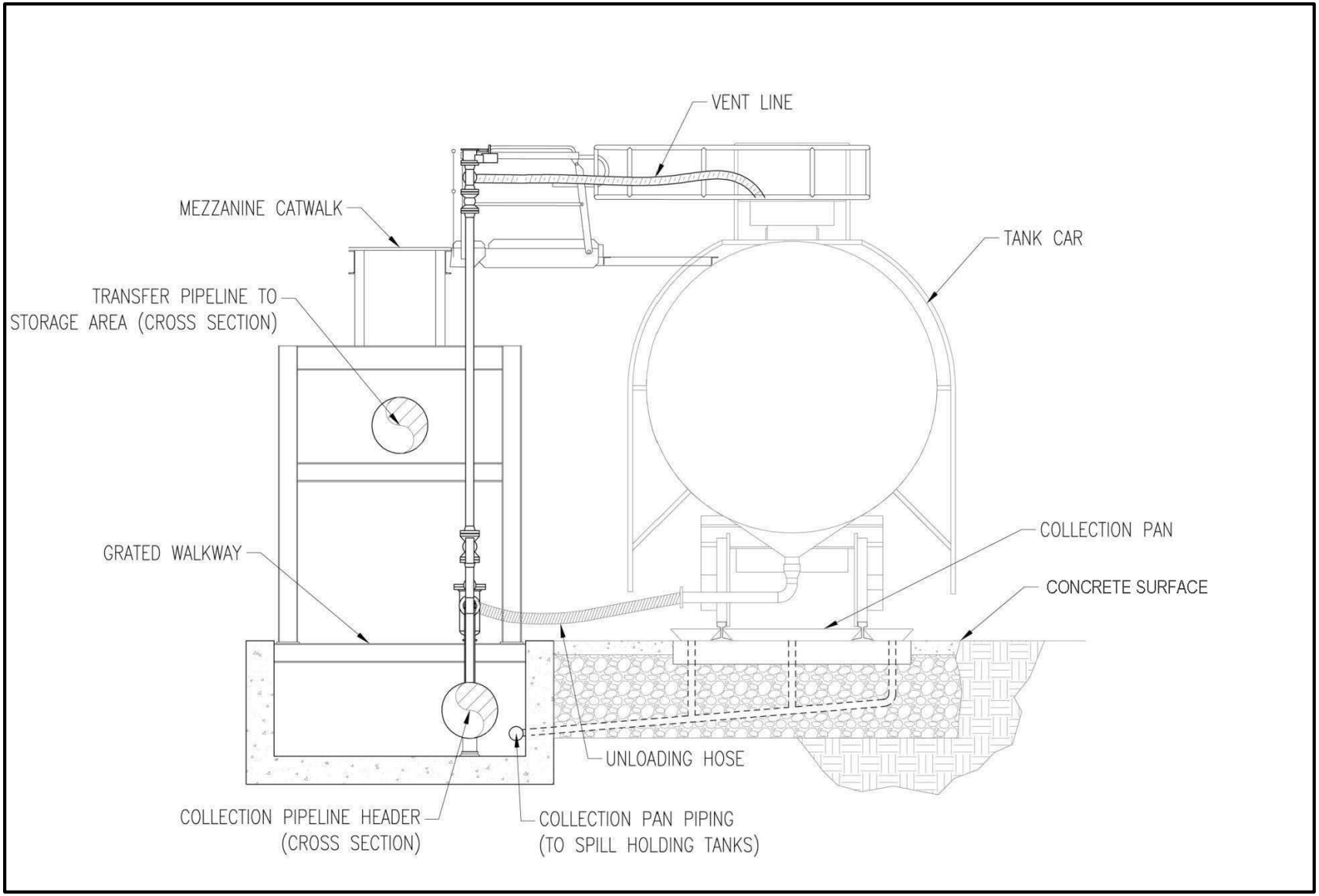

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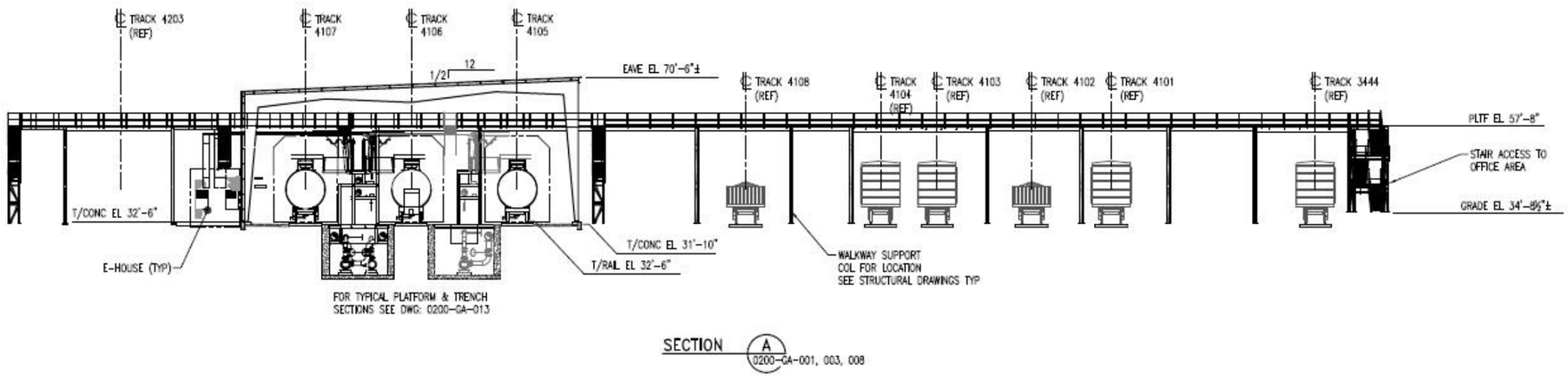
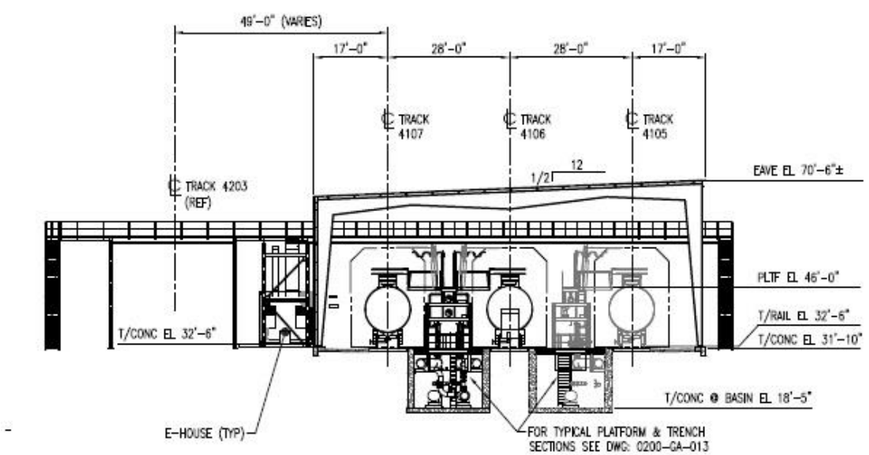
Figure 2.3-7. Rail Car Unloading Facility Cross Section (Revised)





TYPICAL SECTION THRU PUMP BASIN

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Figure 2.3-8. Building Cross Section (Revised)

The 30 unloading stations with the ability to heat crude oil unit trains (Track 4105) 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 2.3.8 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. The cars will be heated to approximately 150°F.

Unloading and conveyance of the crude oil will be conducted so as to prevent exposure of the oil to the ambient atmosphere 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 openly 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 watertight concrete trenches running parallel to the rail tracks. A single 9-foot-wide by 5-foot-deep trench will serve tracks 4106 and 4107; a 7-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, stormwater and inadvertent release collection line, and electrical and data lines, the trench will also act as secondary containment. The combined secondary containment volume of both below-grade trenches, pump basins, and containment collection system is approximately 34,900 bbls.

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 16 feet wide by 55 feet long and 15 feet deep. The five pump basins serving Track 4105 will measure approximately 16 feet wide by 51 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 trenches will be designed with a water stop at the concrete joints; the water stop will prevent groundwater from entering the trench, and will hold water collected within the trench, making the trenches watertight.

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 Containment Tanks

Approximately three double-shelled containment tanks, with a total capacity of approximately 1,500 barrels, will be constructed south of the Area 200 parking lot. These tanks will be connected to a piping system that will receive wastewater and inadvertent releases captured in the collection pans and unloading building floor drains. The combined volume of the containment tanks, secondary containment trenches, pump basins, and containment collection systems is approximately 34,900 bbls. The containment tanks are sized to contain the entire contents of a single tank car plus at least an additional 10 percent and three days of average wastewater production from the rail unloading building. 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 constructed of steel, and anchored in accordance with applicable seismic design requirements. The tank contents will be disposed of or recycled at an off-site facility with the ability to handle the waste.

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 E-houses (some containing control rooms). The integration of the control functions of these E-houses is described in detail in section 2.3.6.1 below. Five of these E-houses will be approximately 325 square feet with a maximum height of 15 feet. One of the E-houses will be approximately 450 square feet with a maximum height of 15 feet.

Electrical equipment for the unloading facilities includes two transformers that will regulate electrical output to the unloading facility, an electrical meter, and electrical switchgear. Electrical equipment will be pad-mounted on concrete surfacing totaling approximately 1,100 square feet.

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 (500-gallon, double-walled) will be located adjacent to the emergency fire pump within the building to hold ultra-low sulfur diesel fuel. A fire foam concentrate tank (1,000-gallon, single wall with bladder) is also located inside the building. 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 4.1.2.2.

Rail Car Receipt

The Applicant will impose standard requirements on crude oil specifications (specs) and quality with all shippers in order to manage the integrity of the crude oil received at the Facility (Wright 2016).

Vancouver Energy will only accept tank cars for crude oil shipment into the Facility that meet or exceed the U.S. DOT-117 standards specified in 49 CFR 179.202 (including any related federal agency or congressional modifications to those standards). All Facility customers will be required to ship crude oil using tank cars that meet or exceed these standards. Vancouver Energy is committed to making this requirement for all customers concurrent with startup of the Facility and in advance of the phase-out schedule allowed by the U.S. DOT.

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. The building foundations will consist of a concrete slab with steel piers. 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. To direct the flow of visitors, signage identifying the Facility will be located in the vicinity of the administrative and support buildings, or the Area 600 Boiler. Additional signage may also be included at existing common Port entrance locations where the Port manages signs for multiple tenants.

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. The transfer pipeline system will also be equipped

with valves allowing the crude oil to be conveyed directly from Area 200 to Area 400[12]. Figure 2.3-9 illustrates the transfer pipeline alignment.

At full capacity, 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 crude oil will be maintained at approximately 150°F 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.
- One 36-inch-diameter, approximately 5,300-foot-long pipeline will connect the storage tanks with the vessel loading system in Area 400. This pipeline will be electrically heat-traced to ensure that the viscosity of the crude oil requiring heating will be maintained from the storage area to the marine vessel loading system.
- One 6- to 12-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.[13]
- One 10-inch-diameter (maximum), 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) A53 or A106 pipe. Aboveground runs of piping will be supported so that the bottom of the piping is a minimum of 1 foot off the ground on vertical supports located every 20 to 25 feet. The vertical supports will be fixed on spread footings (see Figure 2.3-9). Where multiple pipes are placed within the routing pipelines may be either laid side-to-side, or stacked. Figure 2.3-9, 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 2.3-9. Where road or rail crossings occur and in other areas or limited space, the piping will be housed in underground steel casings or raised above ground for standard American

[12] Transfer of crude oil directly from Area 200 for loading to vessels will result in longer vessel loading times than when crude oil is transferred from the Area 300 storage tanks because the transfer rate will be limited by the gravity unloading rate from the tank cars. The rate is anticipated to be slightly less than half of the transfer rate direct from the storage tanks. Assuming that trains are consecutively staged, it is estimated that it would take 22 to 24 hours to unload four trains to fully load a 46 DWT vessel. A separate "direct transfer system" is not being proposed: rather the permanent transfer pipelines will be equipped with valves to direct crude oil flow towards Area 400 instead of Area 300 when this capability is needed. Only crudes that can be unloaded at ambient temperature (i.e. non heated) would be transferred in this manner. Heated crudes unloaded on the third unloading track will not be transferred directly to Area 400.

[13] 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.

Railway Engineering and Maintenance-of-Way Association (AREMA) clearances. Secondary containment with leak detection will be provided for pipe installed underground (as shown in Figure 2.3-9). 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. Transfer pipeline sections below ground will be cathodically protected and coated to prevent corrosion.

Crude oil flow rates between Area 200 – Rail Unloading and Area 300 – Storage will vary as each rail unloading track could have as few as 1 car or as many as 30 cars being gravity drained and crude oil being pumped to storage at any given time. The API of each crude being unloaded will also affect the gravity drainage rate and subsequent pumping rate to the tanks. The transfer rate from storage to Area 400 – Marine Terminal is designed to be variable to adjust to the type of vessel being loaded and the specific loading phase (see section 2.3.7). However, the system will be designed to allow for an approximate maximum transfer rate of 32,000 bbl/hr.

To allow greater flexibility in operations, the transfer piping system will be equipped with valves to allow crude oil being unloaded in Area 200 to be directly conveyed to the Area 400 Marine Terminal for loading onto vessels. This capability will allow occasional topping off of vessel loads, and may allow the Facility to begin limited operation during the construction of the Area 300 storage tanks. Direct transfer rates from train to vessel would vary depending on the vessel being loaded and the vessel loading phase. Pump systems are expected to be designed for an approximate maximum transfer rate from Area 200 to Area 400 of 14,000 bbl/hr for one feed line and 28,000 bbl/hr for two feed lines.

The piping system and associated supports and foundations will be designed to applicable seismic protection standards (as detailed in section 2.18.1), and will be electrically grounded to protect against the buildup of static electricity during crude oil conveyance. Manual and automatic 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 will be conducted to meet applicable regulatory requirements and industry standards. The pipeline system will be inspected on a routine basis.

A skid-mounted, 50- by 100-foot proving station will also be installed on a concrete pad at the exit of Area 200. The proving station consists of a series of flow meters that are used to verify the volumetric flow of crude oil through the transfer pipelines as the crude oil is being conveyed in the transfer pipelines from Area 200 to areas 300 or 400. The proving station consists of piping, meters, and associated connection flanges that fully enclose the crude oil during the proving process.

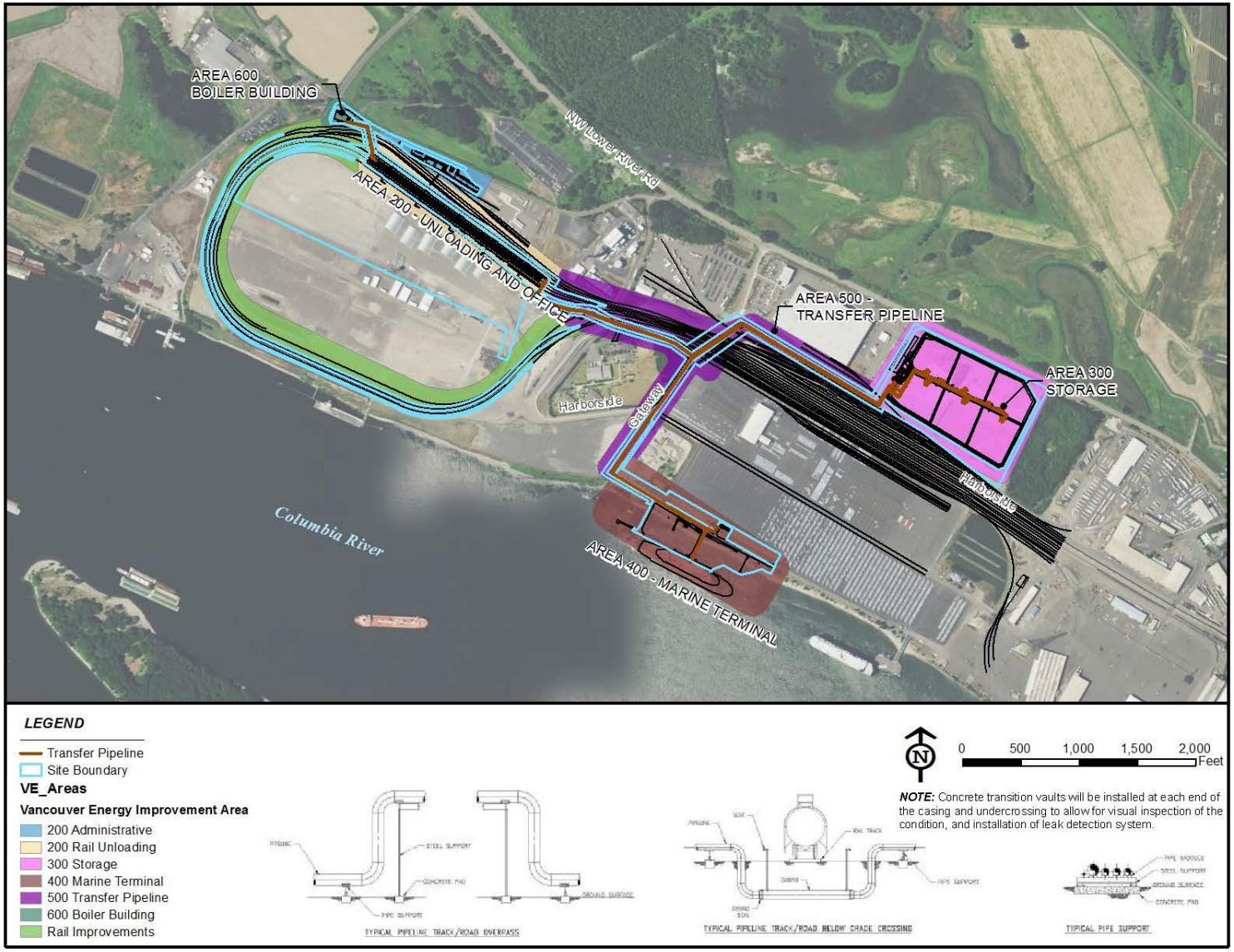

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Figure 2.3-9. Transfer Pipeline (Revised)

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 Figure 2.3-10). These tanks will be approximately 50 feet in height and 240 feet in diameter with a shell capacity of approximately 400,000 barrels each. The normal 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[14]. The tanks will be painted white and positioned so that the distance between each tank is 120 feet in any direction. A typical cross-section of a storage tank is included in Figure 2.3-12.

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 electric tank heaters so that the contents of the tanks can be heated to approximately 150°F to control oil viscosity during loading and unloading. A cross-section of a typical electrical heated tank is shown on Figure 2.3-11. 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[15] to control vapor emissions to the atmosphere. The floating roof will be designed to avoid tipping during operations.

The first tank floor provides primary containment and the second floor acts as secondary containment until actions are taken to abate the source of any discharge. The interstitial space within the double-bottomed tanks will include a leak detection system. The tanks will also be cathodically protected to prevent corrosion.

Containment Berm

The tanks will be surrounded by a containment berm approximately 6 feet in height. The distance from the tank to the berm varies from a minimum distance of approximately 33 feet to a maximum of 150 feet. The containment area will be designed with a capacity at least equal to 110 percent of the volume of the API 650 maximum capacity 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 (Makarow 2015b).

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[14] Although the tanks could hold approximately 380,000 bbl, in actual operation internal floating roof tanks are never completely full. The working capacity of the tanks is slightly lower than the normal fill capacity.

[15] The internal floating roof of the crude oil storage tanks will have primary and secondary rim seals. The typical arrangement of such seals is a mechanical shoe primary seal that presses against the wall of the tank, and a secondary seal wiper mounted above the primary seal to provide additional control of evaporative losses.

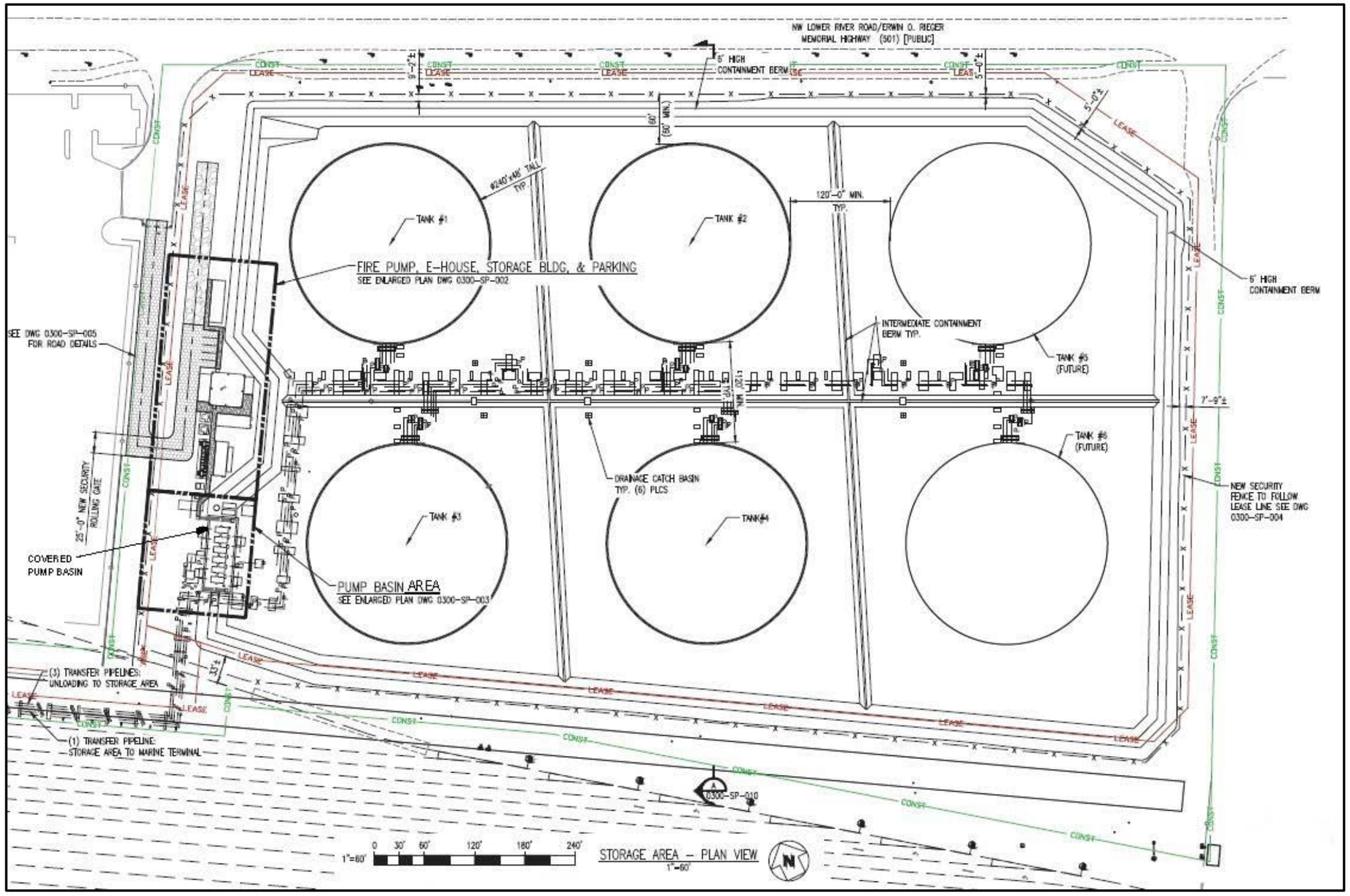

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Figure 2.3-10. Storage Tanks (Revised)

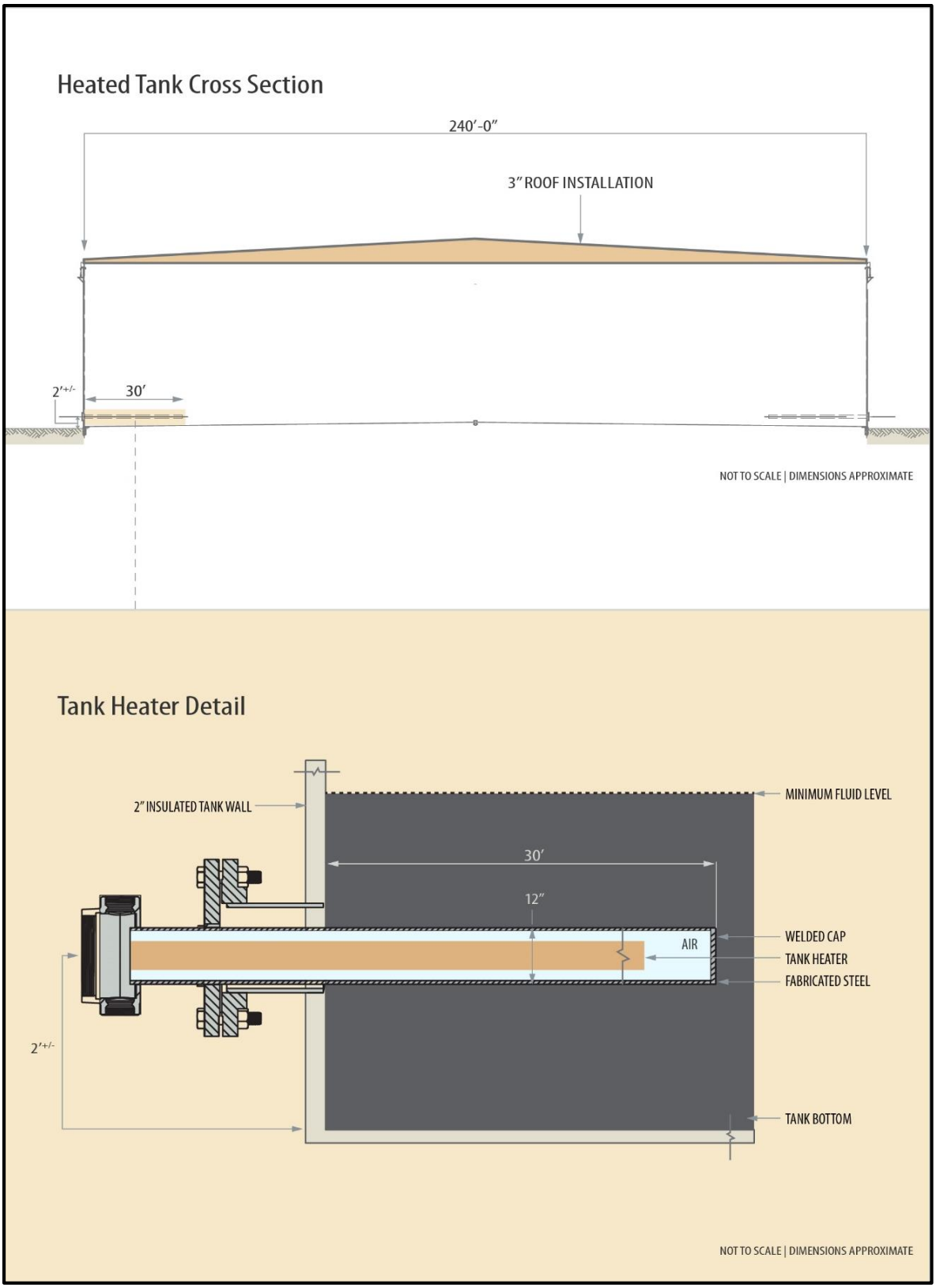

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Figure 2.3-11. Heated Tank Section (New)

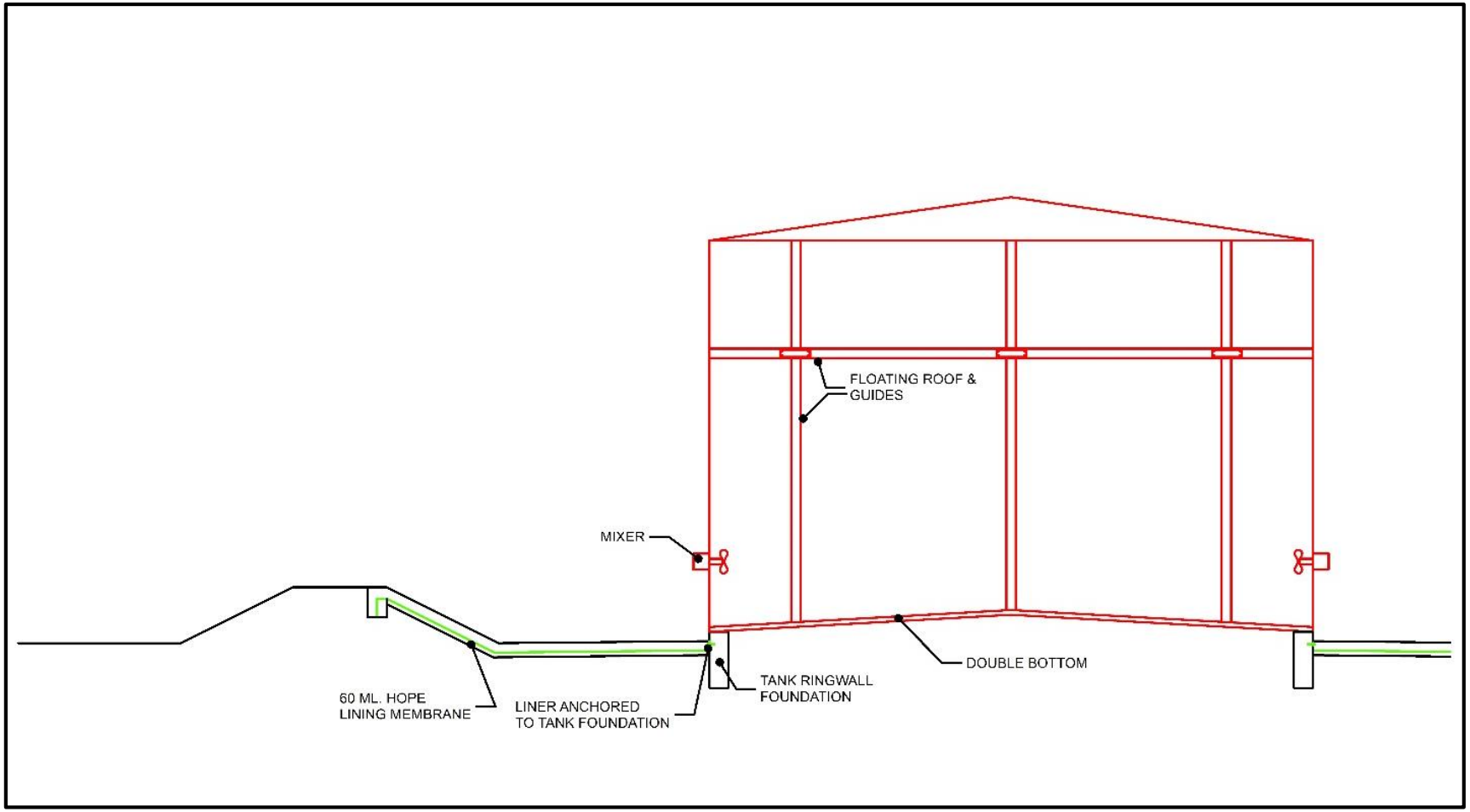

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Figure 2.3-12. Containment Berm Cross Section (Revised)
Note: Intermediate containment berms are not illustrated in this cross section.

As additional protection, 24-inch-high intermediate berms will be installed within the larger area to separate each tank area from the larger containment area (Figure 2.3-10). Each intermediate berm will be designed to contain at least 10 percent of the volume of the tank it encircles.

The tank containment area will be lined with a flexible impervious membrane to prevent any inadvertent releases from leaving the containment area via the ground. The impervious membrane liner would either be tied into the tank foundations or would cover the entire containment area. Figure 2.3-12 illustrates a typical cross section of the berm wall and liner system.

The containment berm will be designed in accordance with the requirements of WAC 173-180-320. WAC 173-180-320 (9)(c) specifically states "Secondary containment systems must be designed to withstand seismic forces," and sub (e) that "Secondary containment systems must be designed and constructed in accordance with sound engineering practice and in conformance with the provisions of this section."

A flexible impermeable liner will be used to mitigate the possibility of oil penetrating through the berm in the event of a seismic event. See section 2.18.1.4 for additional information on Protection from Natural Hazards, Mitigation Measures for Earthquake Hazards.

The containment area and its appurtenances will be designed to collect and treat stormwater so that the full containment volume is available at all times. Stormwater from the containment area will be treated and discharged at a maximum flow rate of 880 gpm. There may be short-term ponding while the stormwater system evacuates stormwater from the containment area. The area will be maintained so that there is no permanent ponding to avoid attracting wildlife.

The stormwater collection and treatment system is described in additional detail in section 5.3.

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. Three to six variable speed pumps will pump the crude, with at least 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 36 by 92 feet square and 12 feet deep. The pump basin will be covered with a steel-framed shed roof to isolate stormwater from the basin. The pump basin will be equipped with a valved sump and attached underground storage tank to collect any windblown stormwater and/or inadvertent releases that collects in it. Collected stormwater or releases will be pumped and hauled off site for treatment, recycling, or disposal.

E-Houses, Transformer, Air Compressor, Fire Pump and Foam Building, and Storage 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. Two E-houses will have a footprint of approximately 560 square feet each and will be single story.

Two transformers will regulate electrical output to the storage area. Both will be pad-mounted on approximately 140-square-foot concrete pads.

Electrical switch gear will also regulate electrical output to the E-houses. This will be pad-mounted on an approximately 630-square-foot concrete pad.

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 used to store ultra-low sulfur diesel fuel (500-gallon, double-walled) will be located adjacent to the emergency fire pump within the building. A fire foam concentrate tank (1,000-gallon, single wall with bladder) is also located inside the building. The combined fire foam skid and fire water pump house will have a footprint of approximately 750 square feet and will be single-story. Fire suppression systems associated with the unloading building are described in detail in section 4.1.2.2.

Finally, a building will be constructed for storage. Sanitary sewer and domestic water will stub to this location for an interior restroom. The storage building will also be located outside the secondary containment berm.

2.3.7 Area 400 – Marine Terminal

2.3.7.1 Marine Terminal Operations

Loading operations will be conducted from the facilities installed at Berth 13. Both berths 13 and 14, as well as intermediate shore-based mooring points and mooring dolphins, will be used for vessel moorage and, therefore, require modifications to provide the necessary structural requirements for vessel mooring and employee access for mooring activities (see section 2.3.7.2). Berth 14 will also house a jib crane and storage cradle for a skiff, and the pre-boom reel to store the floating boom.

Vessels Calling at Vancouver Energy Terminal

The Facility is designed to accommodate ships from 46,000 to 165,000 Deadweight Tonnage[16]. Vessels calling at the Facility will be self-propelled vessels (tankers) and articulated tug barges (ATBs). ATBs consist of a double hull tanker barge that is directly coupled to a tugboat that pushes the barge from a notch in the stern of the barge. Table 2.3-3 summarizes the range of vessels expected to call. ATBs are expected to only be used during the initial start-up of the Facility before sufficient Area 300 tankage is available to stage a full load for a Handymax-size vessel. On a regular basis, once the Facility is fully operational and storage tanks have been constructed as proposed, ATBs will not likely be used, and an estimated 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity will occur, primarily of the Veteran-class (i.e., 45 MDWT [thousand deadweight tons]) size. Figure 2.3-13 illustrates a typical Veteran-class vessel. Vessel sizes could change in the future, and planning standard for the Lower Columbia River could be increased. The presently approved planning standard for the Lower Columbia River limits the maximum volume of crude oil that can be loaded for a single shipment to approximately 300,000 bbl[17]. A vessel with a holding capacity greater than the standard would only be loaded to the planning standard. In the future, a request

[16] Deadweight Tonnage represents the number of metric tons (1 metric ton equaling 2,240 pounds) that a vessel can transport of cargo, stores, and bunker fuel.

[17] The planning standard counts both vessel fuel and cargo towards the 300,000 bbl limit.

may be made by another party to Ecology to increase the planning standard[18], and larger vessels could be loaded to a higher capacity.

Therefore, the Applicant anticipates that approximately 80 percent of the vessels calling at the Facility will be 45 MDWT, 15 percent of the vessels calling being 105 MDWT and 5 percent being 165 MDWT (Makarow 2015a).

The OPA 90 phased in the use of double-hulled vessels for both U.S. and foreign-registered vessels. After January 1, 2015, all tankers and articulated tug barges serving U.S. ports are required to have double hulls.

[18] Because the Applicant is not responsible for transit of the laden vessels once they have departed the Terminal, the Applicant does not have the authority to request an increase to the planning standard. Such a request would come to Ecology from a third party.

Table 2.3-3. Dimensions of Articulated Tug Barges and Tanker Vessels Anticipated to Dock at the Facility

VESSEL CLASS	27.5 MDWT	46 MDWT	75 MDWT	115 MDWT	125 MDWT	142 MDWT	160 MDWT
TYPE	Articulated Tug Barges	Oil Tanker	Oil Tanker	Oil Tanker	Oil Tanker	Oil Tanker	Oil Tanker
Length overall (LOA) [feet]	587.4	601.1	748.0	816.8	869.0	894.7	899.0
Length between perpendiculars (LBP) [feet]	583.1	570.9	718.5	784.1	825.0	847.0	866.1
Beam [feet]	74.0	105.6	105.64	143.7	136	151.6	157.5
Moulded depth [feet]	40.0	61.7	65.0	68.9	71.5	86.3	77.8
Ballast Condition *(for upriver transit)*							
Freeboard [feet]	23.8	42.7	44.5	48.4	50.0	54.3	49.8
Draft [feet]	16.2	19.0	20.5	20.5	21.5	32.0	28.0
Displacement (MT)	17,083	23,900	35,325	50,472	47,850	76,300	78,671
Loaded Condition *(for downriver transit)*							
Freeboard [feet]	9.8	20.7	22.0	25.9	28.5	43.3	34.8
Draft [feet]	30.2	41.0	43.0	43.0	43.0	43.0	43.0
Deadweight [MT]	27,181	46,172	64,100	94,200	86,821	90,700	103,000
Displacement [MT]	32,885	56,368	77,996	112,872	111,299	122,469	125,751
Cargo Capacity at max draft including FWA (BBL)		319,925	449,772	667,777	614,337	642,428	731,513

Source: Capt. Marc Bayer, Tesoro

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Vessel Arrival

Vessels arrive at the entrance to the Columbia River, and about 15 miles from the entrance board a Columbia River Bar Pilot. The Bar Pilot guides the vessel to Astoria where a Columbia River Pilot comes on board and the Bar Pilot disembarks. The Columbia River Pilot guides the vessel to the Vancouver Energy Terminal dock. During the transit to the dock, the pilot will update the terminal and vessel agent so that the terminal will be ready with line handlers to receive the vessel mooring lines on arrival at the dock.

In the vicinity of Kelly Point, two large docking assist tugs will meet the vessel at the approximate location of the confluence of the Columbia and Willamette Rivers. Every vessel coming to load at the terminal will use a minimum of two docking assist tugs for docking and undocking. One tug will be made fast (tied to) on the starboard bow and one tug made fast on the starboard quarter. The docking assist tugs will be supplied by one of the Tesoro-approved tug operators in the Columbia River. The tug will have a minimum HP of approximately 3,500 and be minimum twin screw. The docking assist tugs will join and depart the vessel in the vicinity of Kelly Point at the confluence of the Columbia and Willamette Rivers. The tugs will not be standing by the terminal during loading operations unless there is a severe weather event that requires their presence as outlined in the mooring analysis and documented in the Terminal Operations Manual.

The pilot will then guide the vessel on a slow approach using the docking assist system on the wharf as a guide to measure the speed of approach so that the vessel comes alongside the dock gently. Normally, the pilot will stop the vessel a couple of feet off the berth and use the tugs to push it alongside port side to the dock with the bow pointing upstream. The vessel's crew will then put out the forward and after spring lines to the dock while the pilot with the use of the tugs moves the vessel into position so that the shore loading hoses are lined up with the vessel's manifold. After the spring lines have been put out, tightened, and secured so the vessel cannot move up and down the dock, the breast lines are put out to hold the vessel firmly alongside. Finally, the vessel's headlines and stern lines are run to ensure the vessel is firmly secured alongside. Once the vessel is all fast and secured in place, the tugs are released. The dock shore gangway is then lowered to the deck to permit safe access for people to cross back and forth.

Only a single vessel will be docked at a time.

Booming and Loading

Only one vessel will be loaded at a time.

After the gangway is on and the vessel is "all fast," the full wrap boom is put around the vessel to contain any potential for oil spill (see section 2.10 below). Once the boom is in place, the "Terminal Person In Charge" (TPIC) comes aboard the vessel and conducts a safety inspection with the ship's Chief Officer "Vessel Person in Charge" (VPIC). During the deck inspection, the cargo and vapor hoses are connected under the guidance of the vessel's Bosun, Pumpman, and a deck officer. After completion of cargo and vapor hose connection, the TPIC and VPIC conduct the Pretransfer Meeting (Key Meeting). During this meeting, all aspects of the cargo transfer are discussed, such as starting; coming up to rate; topping off; completion of loading; and any safety security concerns, including signals for shut downs should the primary, secondary, and tertiary means of communication fail.

The vessel loading system will be designed to transfer crude oil from the storage tanks at the terminal to marine vessels at the dock at a rate of up to 32,000 bbl per hour. The daily loading rate is estimated to be 47 percent of the maximum hourly rate, or 360,000 bpd. The loading capacity of Veteran-class tankers is 3,600 cubic meters, or 22,643 bbl per hour. At the maximum rate of 22,643 bbl per hour, these Veteran-class tankers will require approximately 15 hours to load to full capacity.

The Facility will use positive displacement pumps on a variable frequency drive, thus allowing adjustment of loading flow rate by increasing or decreasing the speed/flow rate of the pumps as needed. The pumps will also be staged so they can be turned off and on in multiple configurations to ensure optimal loading feed to the vessels. Different vessels have different loading configurations. For example, a 46 DWT vessel calling to the Facility could have a header sized at 12 to 24 inches with the dimension of the header dictating the rate at which the vessel can be loaded. As a rule of thumb, vessels will start loading at 10 to 25 percent of their maximum rate of fill. The top-off rate will also depend on the vessel size and the amount of cargo it will carry. If a vessel is filling to less than 90 percent total cargo volume (as would be the case with some of the proposed larger vessels), the ship could be filled at full or near full rates to the very end. If the ship is filled to 95 to 98 percent of its rated capacity towards the end of the loading cycle, the fill rate is slowed down to the 10 to 25 percent.

However, the total time that vessels would be expected to be at the Facility would be approximately 24 hours based on the time needed to secure and release the vessels, as well as the lower fill rates used during initial and final loading.

On completion of loading, the vessel is gauged by an independent third-party cargo surveyor, and cargo quantities are reviewed, confirmed, and documented. The loading and vapor hoses are drained, disconnected, and fully blanked before they are retrieved by the shore. The vessel manifolds are fully blanked and secured.

Vessels will require engine power while docked; however, engine power will be minimal. Whole at dock vessels will be fueled by onboard ultra-low sulfur diesel fueled generators. Vessel boilers will be used to maintain the temperature of heated cargo.

Vessel Departure and Transit

The containment boom around the vessel is removed and the second mate tests gear, the engines are tested ahead and astern, and the steering gear is tested as are communications and alarms.

At this time, the pilot comes onboard and the gangway is removed. Two large docking assist tugs are made fast on the starboard bow and starboard quarter. The tugs are then directed to push gently on the vessel, and the mooring lines are released from the shore and retrieved aboard ship starting with the head and stern lines, followed by the breast lines, and lastly the spring lines. Once the lines are all onboard, the second mate on the stern passes the word to the bridge that the propeller is clear and all lines are on board. The pilot uses the tugs to pull the vessel off the berth and then turn the vessel to starboard in the channel until the bow is pointing down river. Once the vessel starts to make headway towards sea, the tug boats are released and the vessel proceeds towards Astoria where the River pilot disembarks and the Bar pilot embarks to take the vessel to sea.

Loaded vessels departing from the Facility will be escorted by a suitably matched tug until the escorted vessel arrives in the vicinity of the river mouth. Once in the vicinity of the river mouth, the tug will be released from the escorted vessel and will standby as a sentinel tug until the vessel crosses the bar and is safely underway in the open ocean.

The Applicant will implement procedures that will only allow vessels calling at the Facility to depart a dock or enter the river when they can make the transit of the entire river with a minimum 2 feet of underkeel clearance and 10 feet across the bar. In addition, planned voyages for outbound Facility vessels will not include anchorage in the river. Only on advice of a River or Bar Pilot would a laden Vancouver Energy Terminal-related vessel anchor in the river to address emergent circumstances. The River and Bar Pilots have to retain this ability to make this professional judgment to effectively implement their charge of ensuring safe vessel transit.

The following elements will also be located in Area 400 (see Figure 2.3-14), 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 2.3.6 above. 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.

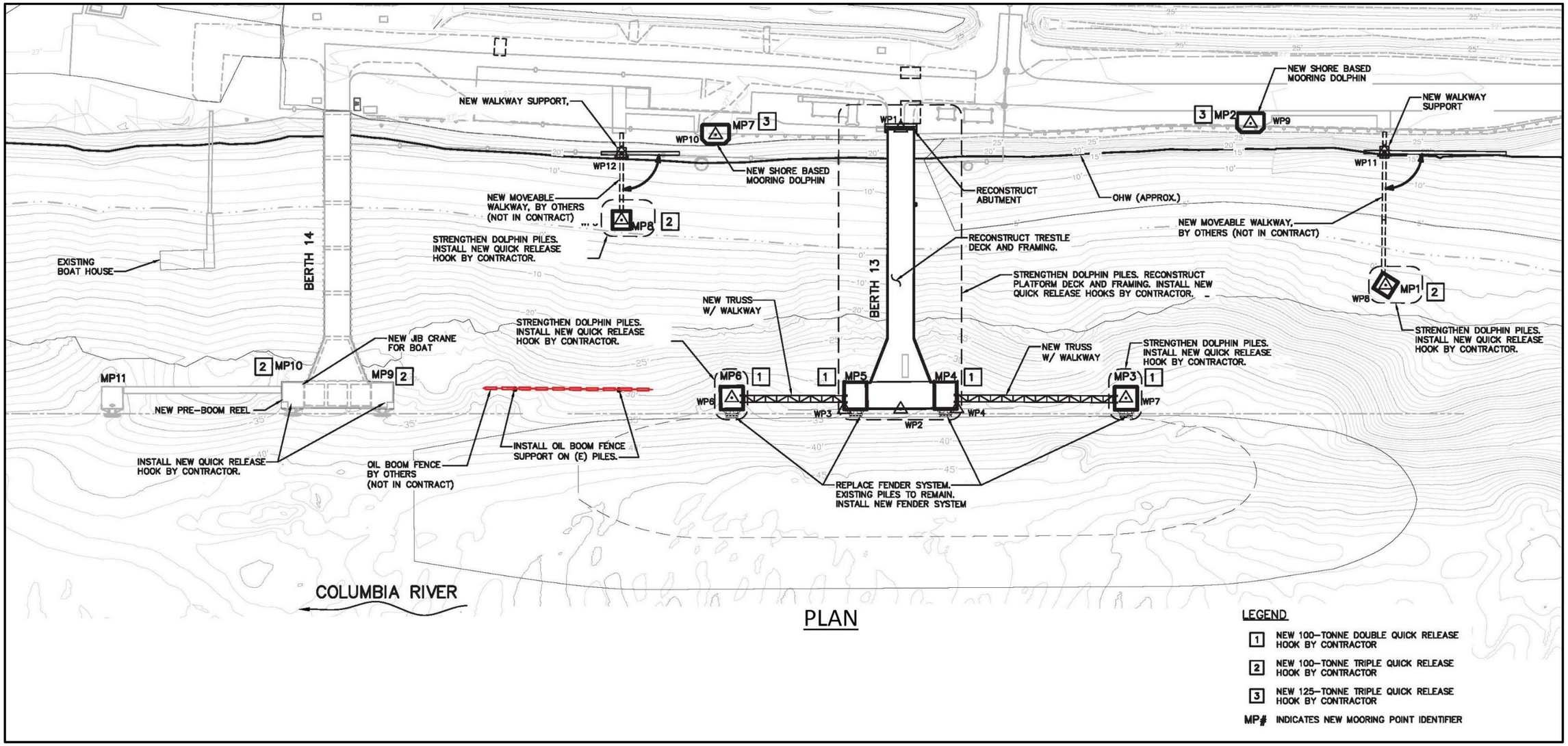

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Figure 2.3-14. Marine Terminal (Revised)

2.3.7.2 Marine Terminal Configuration and Construction

Dock Improvements

Crude oil will be transferred to a vessel at Berth 13. Mooring improvements will be completed on berths 13 and 14, as well as two upland mooring points. 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 which are in good working order. To obtain an optimal mooring configuration and to meet current seismic standards, the following work will be required at the existing Berth 13 to accommodate the Facility.

- Remove a single breasting dolphin, including 11 (of 12) 18-inch steel pipe piles, four 12-3/4-inch steel fender piles and approximately 400 square feet of existing concrete pile cap.
- Remove approximately 1,370 square feet of grated walkway associated with the existing breasting dolphin to be removed.
- Reinforce the existing 18-inch steel pipe piles supporting the Berth 13 T-dock, two breasting dolphins and two mooring dolphins including the removal and replacement of the decking and piles caps to accommodate the reinforcement work.
- Replace the existing steel trusses and grated steel walkways between the Berth 13 platform and the adjacent upstream and downstream breasting dolphins with larger structural steel trusses and new grated steel walkways.
- Add approximately 750 square feet of new retractable/movable-rotable grated walkways between two existing mooring dolphins and the shoreline to provide safe access for line handling.

Mooring and Breasting Dolphins and Walkways

The project will remove an existing breasting dolphin and approximately 650 linear feet of existing 5-foot-wide steel grated walkways on Berth 14, which interferes with the optimal safe mooring configuration. The existing dolphin is supported by twelve 18-inch-diameter steel pipe piles and includes four 12-inch steel fender piles. One section of the walkway is also supported by a single 18-inch-diameter steel pipe pile, which along with one pile from the mooring dolphin will remain in place for attaching the required fence boom.

Two existing mooring dolphins will be connected to the shoreline by 5-foot-wide (exterior dimension) grated walkways to allow safe access during vessel mooring. The pedestrian access width of the walkway is 36 inches per OSHA/WISHA requirements. The walkways will be retractable and will be positioned on the shoreline above the OHWM except during vessel mooring. During vessel mooring, the total area overwater resulting from these modifications will be approximately 750 square feet of grated decking.

To provide an optimal safe mooring configuration, two shore-based mooring points will be installed above the OHWM. Quick release mooring hooks will be installed on a concrete base to handle mooring lines. New quick release mooring hooks will be installed on all mooring points. The mooring system will incorporate a load monitoring system for the physical tensioning of the mooring lines so that they operate within optimum design limits while a vessel is berthed.

Seismic Upgrades

To meet current seismic standards the current dock will be strengthened. To increase pile capacity the existing 18-inch steel piles associated with the Berth 13 T Dock and two associated

breasting dolphins and two mooring dolphins will be improved. Ground anchors will be installed at the base of the existing piles and a smaller diameter steel pile and concrete will be installed in the existing piles. To accommodate this work the existing concrete deck (precast panels) and pile caps will be removed to expose the tops of the piles. Steel braces will also be installed between the piles beneath the deck. Finally, the pile cap and decks will be reconstructed with poured in place concrete and/or structural steel framing depending on the location.

The existing grated walkways and associated support trusses that connect the breasting dolphins east and west of the Berth 13 dock will be replaced with larger steel trusses to physically connect the structures and provide additional strength. The trusses will be constructed of square or tubular pipe in an open web design that will allow for significant light penetration. This framing will add approximately 920 square feet of overwater structure. In-kind replacement 5-foot-wide steel grated walkways will be installed on top of the trusses.

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.

Loading of vessels will only occur from Berth 13. The 36-inch transfer pipeline from and 6- to 12-inch return line to the Storage Area will be located on the trestle where they will connect with a manifold on the dock. 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 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/or sump capable of holding 3 bbls of discharge 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, or will be hauled off site for recycling.

Berth 14 will be used to store equipment and perform operations with spill prevention and response. Equipment includes a mechanically operated crane and workboat cradle for storage of the aluminum skiff. The crane will be approximately 30 feet high. The crane will be designed for the lifting weight of the aluminum skiff and crew and the crane's reach. It is estimated that the total crane capacity will be 15 tons.

A combined fire pump with foam, E-house, and control room building located near the MVCU will house an emergency fire pump and fire protection systems associated with the marine terminal. A small storage tank (500-gallon, double-walled) will be located adjacent to the emergency fire pump within the building to hold ultra-low sulfur diesel fuel. A fire foam concentrate tank (1,000-gallon, single wall with bladder) is also located inside the building. The two-story building will have an approximate footprint of 1,000 square feet and a total internal square footage of 2,000 square feet.

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 fully wrap the vessel, connecting with the fence boom on both the downstream and upstream side of the vessel.

Marine Vapor Combustion Unit

Marine vessels will generally arrive at the berth empty with inert (noncombustible) gases occupying the tank. When the vessel cargo compartments 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 displaced from the tank. These vapors will be sent to the MVCU system, which will combust the hydrocarbons in the vapors[19]. Piping from the dock will convey vapors first through a hydrogen sulfide treatment system located near the MVCUs. The treatment system consists of two 12-foot-diameter tanks with piping and appurtenances. Piping from the treatment system will then 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 44-inch-diameter steel stacks approximately 25 feet in height. The MVCU will be designed and operated in accordance with the applicable requirements of 33 CFR 154 Subpart P. The control of air emissions resulting from MVCU operation is described in more detail in sections 2.12 and 5.1.

2.3.8 Area 600 – Boiler Building

The Area 600 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 steam (two boilers operating) for the heating of tank cars during unloading. Boiler systems will be field-erected or package boilers with a fire- or water-tube design. An existing 6-5/8-inch natural gas main is located within Old Lower River Road. A new pressure regulator and 6-inch-diameter service line to the boiler building will be constructed. Steam from the boilers will be delivered to the point of use via insulated pipelines. The gas-fired boilers may also provide steam to pipes and ancillary equipment and potential space heating. The boilers will be designed, installed and operated in accordance with the applicable provisions of Labor and Industry's Boiler and Unfired Pressure Vessel laws (RCW 70.79) and rules (WAC 296-104).

Boiler System Water Treatment

Potable water from the City will be treated with a reverse osmosis water treatment unit. The raw 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 Plant Discharge Pretreatment

Wastewaters from the boiler plant include boiler blowdown, reverse osmosis wastewater, and miscellaneous drain water. There are three alternatives for discharge that are currently being pursued for discharges from the boiler plant. The three options are briefly described below and detailed descriptions of these alternatives will be included in a revised NPDES engineering report. Options being evaluated for discharge of the boiler plant wastewater are discussed in section 2.9 below.

[19] The MVCU is required to provide safety of transfer operations in accordance with 33 CFR Subpart P, as described in section 2.23.2.13.

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. Separate fire suppression control and gas detection systems will be provided at areas 200, 300, and 400.

2.3.9 Decommissioning

Decommissioning provisions are addressed in both the EFSEC regulations and the lease between the Applicant and the Port (Appendix E.2). The Facility is designed for an anticipated lifetime of 20 years. EFSEC regulations require facility decommissioning at the end of the period permitted in the Site Certificate, unless the Applicant or another party, such as the Port, obtain EFSEC approval to extend the Facility life and, potentially, transfer Facility operations.

The Port lease provides for an initial term of 10 years, with the possibility for two 5-year extensions that are subject to Port approval. At the end of the lease term (as may be extended), the Port has the option to request the removal of all improvements unless they remain economically and operationally viable. If the Port elects not to approve either 5-year extension, then the lease provides that Applicant will have no obligation to pay for removal of the improvements. The Applicant recognizes that these lease provisions regarding Port retention of the Facility improvements need to be addressed to EFSEC's satisfaction in the terms of the Site Certificate, and the Applicant and the Port would need to obtain any required EFSEC approvals if the Port elects to keep all of the improvements after the end of the lease term (as may be extended) and continue the use permitted by the Site Certificate.

In any event, the Applicant and the Port do not anticipate removal of the ground improvements and the seismic upgrades to the dock because removal of those improvements are not practical. The Applicant, therefore, is requesting that the Site Certificate provisions regarding decommissioning acknowledge that the seismic improvements to the dock and the ground improvements will not be removed at the end of the Facility operations, and, alternatively, the site restoration plan required by regulation will address any cap or other requirements deemed necessary to leave the ground improvements in place. If, at the end of the lease term (as may be extended under the terms of the lease), the Port elects to retain the balance of the Facility improvements, including the unloading facilities, the storage tanks and the transfer pipelines, and to continue the use permitted by the Site Certificate, the Port would be required to pursue an amendment to or transfer of the Site Certificate from the Applicant to the Port, and any such request would be subject to future EFSEC review and approval (WAC 463-66-100).

In accordance with WAC 463-72 040, at least 90 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.

If any of the suspension or termination scenarios specified in WAC 463-72 apply, (construction is suspended or ceases, the Applicant seeks early termination, of the approved Facility lifetime has expired), and provided the Port does not seek EFSEC approval to transfer operation of the Facility, as described above, then, the Applicant shall comply with all of the provisions of WAC 463-72, for submittal and EFSEC approval of a detailed site restoration plan within the time frames specified in those regulations. 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 $210 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, because this section does not apply to this type of facility.

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, because this section does not apply to this type of facility.

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 (City of Vancouver 2013). 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 the Engineering Report in section 5.3 of this ASC.

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.

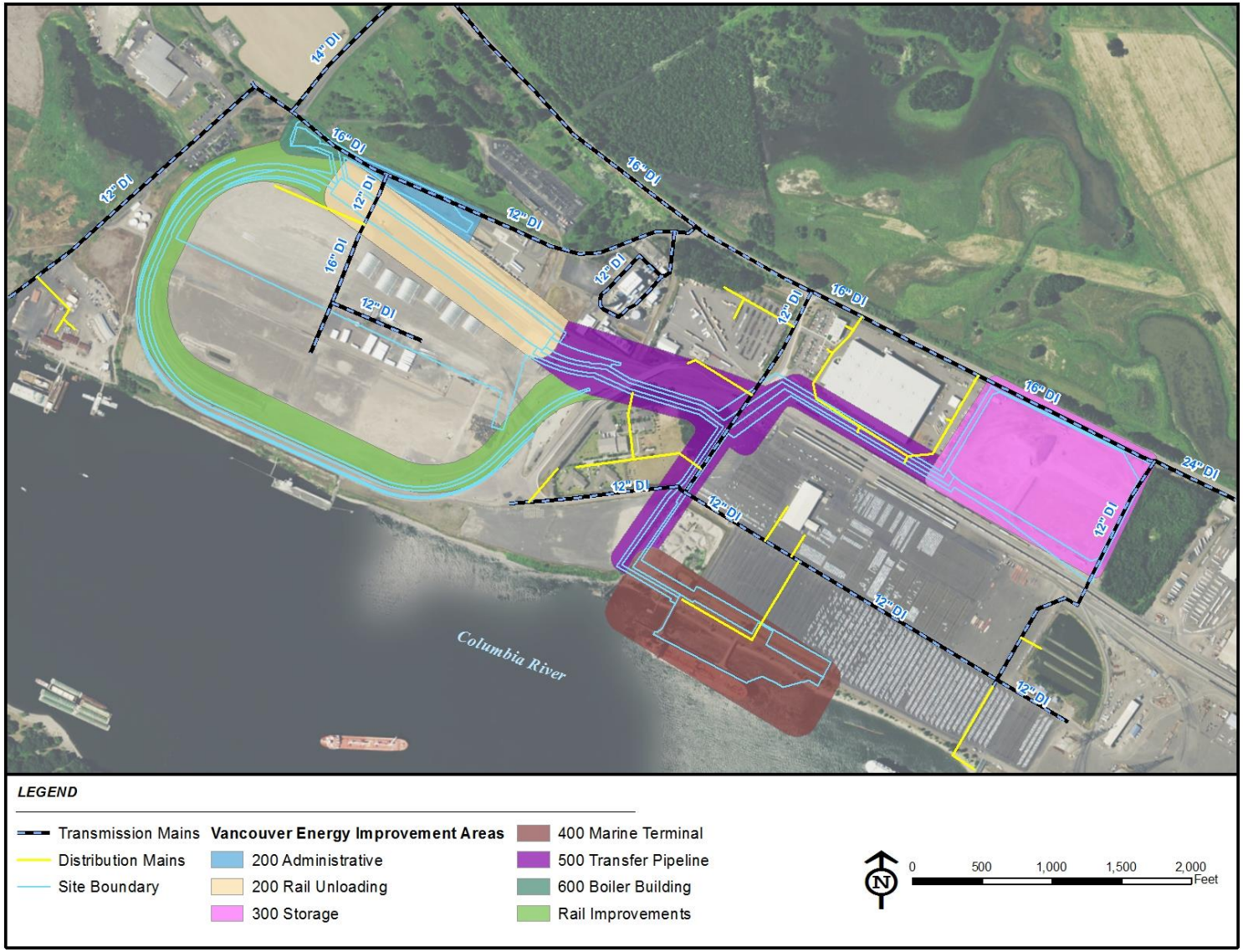

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Figure 2.6-1. Water Transmission Mains (Revised)

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 85,305 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 the Engineering Report in section 5.3 of this ASC 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. Ground improvement installation would require approximately 30,000 to 280,000 gpd depending on the type of improvement chosen. 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

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.

The boiler plant in Area 600, will provide steam to heat crude oil within the rail cars to assist with unloading. The majority of the process water used to make steam 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, reverse osmosis reject water, miscellaneous drains, and water treatment. Some steam is lost during the condensate process as the water is returned to the boiler. Additionally, steam condensate blowdown is generated during the unloading of tank cars in Area 200. Within the rail unloading building as part of operating this system, during the connection and disconnection of the rail car steam coils, the operator opens the steam line valves and discharges steam directly to the containment pans. This procedure is an operational necessity, as it purges the lines of debris. Blowdown water is used for flushing particulates from the boiler system. 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, rail car exterior wash, 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 area 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 30 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		
- Misc Part/Equipment Wash[a]	1,000	2,000
- Fire Pump[b]	107	900
Area 300		
Area 300 – Fire Pump[b]	107	900
Area 400		
- Fire Pump[b]	100	200
- Hose Bibb[c]	10	20
Area 600 – Boiler Building	52,177	69,264
Total Process Water	**53,508**	**73,984**

Note: gpd – gallons per day, gpm – gallons per minute
[a] Pressure washer rated at 5 gpm, with conservative usage assumptions.
[b] Averaged considering weekly 30-minute maintenance cycling at 30 gpm.
[c] Assumed water use for occasional miscellaneous maintenance activates and facility wash down.

The anticipated maximum day process water demand is approximately 51.4 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 crude oil received, 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), future restroom inside the Storage Building (Area 300), and landscape irrigation. The Washington State Department of Health Water System Design Manual estimates that for a "factory" water use can be estimated by using a range of 15 to 35 gallons per day (gpd) per employee. A water use consumption rate of 35 gallons per person per day was used for the maximum, and 25 gpd was used for the average flow. Additional potable water demands for landscape irrigation were calculated and added to the appropriated water system connection location.

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 – Admin and Support Buildings	4,291	6,566
Area 300 – Storage Building	1,148	3,131
Area 400 – Future Domestic	565	845
Area 600 – Landscape Irrigation	266	779
Total Potable Water	6,270	11,321

Note: gpd – gallons per day
[a] The volume of 35 gpd for industrial factory sewer rates is based on Table G2-2, Design Basis for New Sewage Works (Ecology 2008)
[b] Assumption of 157 employees using facilities in Area 200, 6 employees in Area 300 with other sanitary uses, and 19 employees in Area 400 with other sanitary uses.

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 2.3.8, 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 operations. Three boilers, two operating and one on standby, each with a rated capacity of 62 MMBTU/hr will be located in the Area 600 Boiler Building.

The boiler system will be field-erected or package boilers with a fire- or water-tube design. The steam produced in the boilers 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. 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 2.3.8). In order to meet the temperature discharge limits, the blowdown will be cooled through a non-contact tube and shell heat exchanger using the inlet raw water to cool the discharge as discussed in detail in section 2.9.1. The total amount of process water discharged from the boiler building will not exceed 22,464 gallons per day (15.6 gpm).

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 on-site 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 five 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 stormwater treatment swales
- Process wastewater and domestic sewage discharge to City sanitary sewer
- Process wastewater and domestic sewage hauled off site

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 Boiler
- Rail infrastructure

Stormwater is discharged from the Facility to the Terminal 5 stormwater system in three locations just south of the rail unloading building. Stormwater from the Facility will be treated through water quality filter vaults prior to its discharge in accordance with the Terminal 5 Western Washington Phase II Municipal Stormwater Permit WAR045201 and VMC 14.25. The Port owns the stormwater conveyance systems and downstream treatment ponds. Stormwater from the connection points flows through a series of minimum 24-inch-diameter manmade conveyance pipelines to a pump station and is pumped to two water quality treatment lagoons located west of Terminal 5. Each connection location's minimum pipeline diameter and capacity at the point of connection is summarized below.

- T5 West Connection: 24" Corrugated Polyethylene Pipe, 19.2 cubic feet per second capacity
- T5 Mid Connection: 24" Corrugated Polyethylene Pipe, 6.4 cubic feet per second capacity
- T5 East Connection: 24" Corrugated Polyethylene Pipe, 7.6 cubic feet per second capacity

The project site discharges approximately 1.30 cubic feet per second (cfs) during a water quality event and approximately 8.08 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 the Engineering Report in section 5.3 of this ASC. 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 two locations just south of the Storage Area. In accordance with the Port’s Terminal 4 Industrial Stormwater General Permit WAR000424, stormwater from the Facility will be treated through water quality filter vaults 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 36-inch pipeline has a hydraulic capacity of 27.1 cfs at the connection location. The project site discharges approximately 3.11 cfs during a water quality event and 19.25 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 (see the Engineering Report in section 5.3 of this ASC). 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. The Port subsequently completed construction of this stormwater system in accordance with the recommendations of the prior reports. This stormwater system serves Farwest Steel and the future Area 300 Storage Area.

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 transfer 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 and Subaru Treatment and 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 and Subaru treatment and 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 collect and treat the entire 25-acre basin through the pair of northernmost swales that 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 0.19 cfs during a water quality event and 1.16 cfs during a 100-year storm. There is no outfall for this existing stormwater system.

Stormwater from the containment area located on the dock will be collected and conveyed to water quality filters and treatment units located upland. During loading operations, the containment area will be valved closed, and stormwater released only following inspection for any oil sheen. If an oil sheen is present, the oil will be removed prior to release to the stormwater system. The discharge from the stormwater treatment units will be directed to the upland treatment swales.

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 Area 600 Boiler effluent
- Process water from Storage Fire Pump cooling water
- Domestic sewage from Administrative and Support Buildings
- Domestic sewage from Storage Building

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.

Capacity at the connection location for the 18-inch discharge gravity sewers at the Administrative and Support Buildings and Storage Area are 4.84 cubic feet per second and 6.65 cubic feet per second.

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°C (68°F). 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 received (see Engineering Report in section 5.3 of this ASC). The Applicant submitted the City's Industrial Information Form, along with a completed Wastewater Discharge to publicly owned treatment works (POTW) permit application as the basis of review (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.

Disposal to sanitary sewer is the Applicant's preferred option. An industrial waste discharge permit, demonstrating compliance with the City of Vancouver's pretreatment standards, can and should be issued by EFSEC through the integrated process. The Applicant has investigated and confirmed two alternative means by which industrial wastewater can be disposed of without directing discharges to the City's POTW. A description of the discharge options are included in section 2.9.4 below.

2.8.1.5 Haul Off

Wastewater generated from the following Facility locations will be temporarily stored on site and hauled off; these discharge streams are described in further detail in section 2.9.

- Process wastewater from Area 200 Rail Unloading Building
- Fire pump cooling water from Area 400
- Domestic sewage from Area 400

On-site storage for process wastewater streams is provided through double-walled storage tanks.

- As described in section 2.3.3.1, at Area 200, the double-walled steel fabricated containment tanks are located above-grade. The tanks are sized to store a minimum of three days of average annual flow and/or two days of the maximum day flow (whichever is greater) while preserving an additional 825 bbl of spill containment capacity. The containment tanks are connected to a collection and containment system that contains approximately 35,000 bbls of total storage and secondary containment capacity.
- The fire pump cooling water from Area 400 will be discharged to a minimum 1,000-gallon underground storage tank. The wastewaters from the fire pump cooling are estimated at a total of 900 gallons in the worst case produced once per week.

- Domestic sewage in Area 400 will be collected in portable toilets as described in section 2.9.2.

Wastewaters for haul off will be collected on a contracted schedule occurring each day of Facility operations Monday through Friday with likely an additional pump-out on Monday following the weekend operations. Wastewaters will be pumped by a DOT-licensed hauler like Bravo Environmental, LLC and hauled to a licensed industrial wastewater pretreatment facility, such as PPV Inc. The wastewater characterizations contained within the NPDES Engineering Report and the NPDES Engineering Report response letter have been provided to PPV Inc. to confirm suitability for haul off. PPV provided a description of their treatment process detailing the facility's processes. This narrative is included in the NPDES Engineering response letter (see section 5.3). Domestic sewage will be hauled by a licensed sewage contractor for disposal at a wastewater treatment plant.

2.8.2 Process Wastewater Discharge Alternatives

Although sanitary sewer discharge is preferred for discharges from the Area 600 Boiler Plant and for Area 300 Fire Pump cooling water, these discharges could be routed to either the Terminal 5 and Terminal 4 NPDES municipal stormwater outfalls or stored on site and hauled off site. The alternative process wastewater discharge would be routed to either the Terminal 5 NPDES municipal stormwater outfall or stored on site and hauled off site.

2.8.2.1 Area 600 Boiler Building Discharge

Discharge to the NPDES outfall would occur by comingling the Area 600 discharge with the stormwater system proposed to be installed on site. The water quality of the discharge alternative is currently being evaluated under Ecology's water quality criteria WAC 173-201A-320 for compliance with anti-degradation standard for the Columbia River. Additional discharge cooling would be added to the currently proposed raw water and discharge treatment for the Area 600 boiler plant. The discharge cooling would be provided to achieve a maximum of 20°F discharge temperature.

The downstream stormwater system as proposed would not be significantly modified if this alternative was selected. The stormwater would continue south across the rail corridor and east along the south side of the rail unloading building. The stormwater water quality vault would be upsized to treat the water quality storm plus the maximum day wastewater discharges. This upsizing is required to maintain treatment of the full water quality storm.

Downstream of the water quality filter is the proposed NPDES monitoring point for this portion of the facility. The discharges are then comingled with the runoff from Terminal 5 as described in section 2.8.1.1.

For the haul-off alternative, the Area 600 wastewater discharges would be pumped or stored on site to a holding tank. The holding tank would be sized to receive a minimum of two days of the maximum day flows, or three days of the average day flows (whichever is greater). The downstream hauling, discharge, and treatment systems are characterized above in section 2.8.1.5.

2.8.2.2 Area 300 Fire Pump Cooling Water

Discharge to the NPDES outfall was considered during early project development. Discharge to sanitary sewer is considered the preferred discharge alternative; however, if discharge is not authorized to the sanitary sewer, then the volume of weekly maintenance cycling water will be stored on site and hauled off site for disposal.

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 include the boiler plant effluent(including blowdown, reverse osmosis reject water, and miscellaneous drains from the boiler plant), miscellaneous part and equipment wash (including facility wash down, part wash, and occasional rail car exterior wash), fire pump cooling water, and domestic sewage from the Administrative and Support Buildings and the Storage Area building. Most domestic wastewater sources and the boiler effluent discharges 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 and the Application for a city Wastewater Discharge Permit is included in section 5.2.

2.9.1 Process Wastewater Sources

Sources of process wastewater include the following:

- Feed water treatment effluent (reverse osmosis reject water) from the Area 600 Boiler Building
- Blowdown from the Area 600 Boiler Building
- Miscellaneous part and equipment wash water in the rail unloading area (including rail car exterior washing)
- Fire pump cooling water from the Rail Unloading and Office Area, Storage Area, and Marine Terminal

The boiler plant is expected to produce continuous blowdown, with discharge flow rates fluctuating depending on steam demand. Blowdown temperature at the boiler plant will be lowered to 104°F through the use of a non-contact tube and shell heat exchanger. The blowdown water will then be pumped to the Area 200 systems, pass through an oil-water separator, and mixed with domestic waste from the Admin Buildings prior to discharge to sanitary sewer. Average and maximum process wastewater steady state flow rates are summarized in Table 2.9-1.

Miscellaneous part and equipment washing (including rail car exterior wash) 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 for haul off.

Steam condensate blowdown is generated during the unloading of tank cars in Area 200. Within the rail unloading building as part of operating this system, during the connection and disconnection of the rail car steam coils, the operator opens the steam line valves and discharges steam directly to the containment pans. This procedure is an operational necessity, as it purges the lines of debris. This results in the discharge of steam condensate blowdown. The steam condensate blowdown is collected in the Area 200 containment pans, which discharge to the Area 200 containment tanks.

The fire pumps are required to operate for a 30-minute maintenance cycle once a week. Cooling water from the fire pumps will be discharged for the Unloading Facility Containment Tanks,

City's sanitary sewer system, and on-site storage tanks for the Unloading Area, Storage Area and Marine Terminal areas, 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 crude oil vapors within the rail car and/or crude pipelines. Therefore, no discharge of heavily hydrocarbon saturated condensate is necessary.

Table 2.9-1. Process Wastewater Sources

Wastewater Stream	Average Daily Flows (gpd)	Maximum Daily Flows (gpd)
Area 200		
– Miscellaneous Part/Equipment Wash	1,000[a]	2,000[a]
– Fire Pump Cooling Water	107[a]	900[a]
– Steam Condensate Blowdown	6,441 [a]	7,952 [a]
Area 300		
– Fire Pump Cooling Water	107	900
Area 400		
– Fire Pump Cooling Water	107[a]	900[a]
– Miscellaneous Equipment Drains	10[a]	20[a]
Area 600		
– Boiler Building Effluent	16,922	22,464
Sanitary Wastewater Total Process Wastewater	**24,694**	**35,136**

Note: gpd – gallons per day

[a] Process water discharged to stormwater system for treatment or stored on site and hauled off site for disposal.

The approximate constituent concentrations in the process wastewater are shown in Table 2.9-2. Detailed analysis of the boiler plant effluents was completed by DMS-Nalco assuming City water for make-up water and a reverse osmosis treatment unit for processing of boiler feed water. The analysis demonstrated that the combined effluent from the boiler plant will meet the discharge standards in the City's Pretreatment Ordinance VMC 14.10.

Table 2.9-2. Estimated Chemical Makeup of Process Water Discharge

Key Water Constituents	Pre-Treatment Ordinance Local Limits (VMC 14.10)	
All Units in mg/L		**Final Waste Water Discharge**
Ag as Ag	1.130000	ND
As as As	0.220000	ND
Cd as Cd	0.140000	ND
Cr as Cr	7.220000	ND
Cu as Cu	3.670000	ND
Hg as Hg	0.008000	ND
Mo as Mo	0.420000	ND
Ni as Ni	0.900000	ND
Pb as Pb	0.440000	ND
Se as Se	0.310000	ND
Tl as Tl	0.530000	ND
Zn as Zn	1.640000	0.061776
CN as CN	0.470000	NT

Key Water Constituents	Pre-Treatment Ordinance Local Limits (VMC 14.10)	
All Units in mg/L		Final Waste Water Discharge
BOD5	500.000000	6.428280
FOG	50.000000	7.713936
pH	10.000000	8.418850
Temp F	104.000000	75.774029

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 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 biodegradable 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 containment 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.

The Applicant is considering the following feasible alternatives for discharge of the boiler plant wastewater. These options will be pursued as part of the EFSEC permit approval process for the wastewater discharges.

Option 1 – Preferred Discharge to City's sanitary sewer

Discharges from the boiler plant will be cooled to reduce its temperature below 104°F, and then will be pumped to the Area 200 systems, passed through an oil-water separator, and mixed with domestic wastewater from the admin buildings prior to discharge to sanitary sewer. A detailed evaluation of the boiler plant wastewater characterization was completed and confirmed that the discharges from the boiler plant meet the City's Pretreatment Ordinance for discharge to City's sanitary sewer. A sewer availability letter was received from the City indicating that the City has sufficient capacity in the collection system and treatment plant to receive these flows. This discharge would be permitted through EFSEC following conformation by EFSEC and their contract reviewer that the discharges meet the City's pretreatment requirements. The City's Industrial Information Form and application for a State Waste Discharge Permit to Discharge Industrial Wastewater to a Publicly Owned Treatment Works is included in section 5.2 of this ASC.

Option 2 – Discharge to stormwater outfall

Discharges from the boiler plant will be cooled to reduce their temperature below 20°C. Discharges will be comingled at the boiler plant with the stormwater from Area 600 and discharged south under the railroad tracks into Area 200 where the comingled stormwater and process water will be additionally treated through water quality filter vaults. A Tier II anti-degradation water quality review is underway as part of the permitting process that will demonstrate that there is no measureable change in the water quality of the Columbia River in accordance with WAC 173-201A-320. This discharge would be permitted through the NPDES Industrial Individual Permit process by EFSEC.

Option 3 – Haul off

Discharges from the boiler plant will be cooled to reduce its temperature below 104°F. Storage of the boiler plant discharges will be constructed on site in a storage tank of approximately 70,000 gallons. The sizing of the tank would be sufficient to store three days of the maximum day discharge from the Boiler Plant. Haul off would be provided through a contract vendor, such as Bravo Environmental, and hauled to a permitted industrial wastewater pretreatment facility, such as PPV Inc. It is anticipated that the haul-off option would result in an average of additional 2.5 truck trips per day during operation of the 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 Building
- Domestic strength sanitary discharge from the Marine Terminal

Domestic strength sanitary wastewater from the Administrative and Support Buildings in Area 200 will consist primarily of domestic waste from kitchen/break room, restroom facilities, and shower areas. Domestic strength sanitary wastewater from restrooms and other sanitary facilities will also be produced at the Area 300 Storage Building. No pretreatment is proposed at these locations. Discharges from both the Administrative and Support Buildings and Storage Building will be discharged directly to the sanitary sewer. Marine Terminal (Area 400) employees will use portable toilets located at the Marine Terminal. Sanitary waste from the Marine Terminal would 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 – Admin and Support Buildings	3,925	5,495
Area 300 – Storage Building	150	210
Area 400 – Portable toilets	475[a]	665[a]
Total Domestic Wastewater	**4,550**	**6,370**
Domestic Wastewater to Sanitary Sewer	**4,075**	**5,705**

Note: gpd – gallons per day

[a] Domestic wastewater stored on site and hauled off site for disposal.
[b] Wastewater production at Areas 300 and 400 is assumed with employee concentrations of 6 and 19, respectively.

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 pretreatment ordinance. Process wastewater streams requiring pretreatment include Area 600 boiler effluent and Area 300 fire pump cooling water. Pretreatment processes for these waste streams will be designed and furnished to meet wastewater discharge permit requirements.

Treatment technologies used in the boiler plant consist of a reverse osmosis raw water treatment with rechargeable water softener cartridges. Two heat exchangers are installed on the discharge side of the boiler plant to adjust temperature to a maximum of 104°F. A detailed analysis of the

water quality and balance within the boiler plant was completed by DMS-Nalco and demonstrates that the water quality of the discharge meets the discharge requirements of the City's pretreatment ordinance, monitoring for pH, conductivity, and flow.

The fire pump cooling water may require treatment for chlorine residual prior to discharge to the City's sanitary sewer system. After the fire pump maintenance cycling, the discharge water will be temporarily stored in on-site tank to confirm that temperature and chlorine levels are suitable for discharge. The performance specifications for the fire pump indicates that the water temperature leaving the units should be approximately 70°F and, therefore, treatment is not proposed. Chlorine levels could be reduced through the addition of Vitamin C or sodium sulfite tablets.

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. An assessment of all known, available and reasonable methods of prevention control and treatment (AKART) was completed at a high level for the Facility. The wastewater discharges from the site were identified for the appropriate discharge location as a result of proximity to the City's sewer, and risk of potential contaminates with the process. Where the transloading process had the potential to interface with stormwater or wastewater, a haul-off approach was selected to protect water quality. This approach allows for the use of additional testing of effluents by the receiving facility, allows the capture and recycling of any oils within the wastewater, and centralizes the treatment at a facility with advanced forms of treatment.

The on-site wastewaters proposed for discharge to the City's sanitary sewer are all treated through the use of off-the-shelf-treatment technologies, such as package reverse osmosis units, package water softeners, heat exchangers, and dechlorination systems. The design team considered the use of package water softener in lieu of the reverse osmosis unit and found through detailed modeling that the background silica levels in the City's water presented operational concerns for the boiler plant. Therefore, the treatment technology was replaced to a reverse osmosis unit with water softener canisters.

Plate and tube and shell heat exchangers were also evaluated, and the tube and shell variety was selected as the preferred alternative due to ease of maintenance.

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 28.4 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 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. A letter stating that the City has sufficient capacity has been received and is attached in the Engineering Report in section 5.3 of this ASC.

The City commented on page 76 of the "City of Vancouver Comments Regarding Consistency of Proposal with Land Use Plans and Zoning Regulations" that the facility, with regard to non-domestic discharges, has sufficient capacity to receive the wastewaters from the Facility. Additionally, the City commented, "The applicant has provided sufficient information to grant preliminary approval related to this standard. Final civil engineering review and approval is required." A detailed analysis of the wastewater discharges demonstrates full compliance with the City's pretreatment ordinance in VMC 14.10.

Discharges to the City's sanitary sewer system will comply with VMC Title 14.10 Pretreatment Ordinance. The following discharge limits are specified in VMC 14.10.

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 14.10.050 Prohibited Discharge Standards, VMC 14.10.060 National Categorical Pretreatment Standards, and VMC 14.10.070 State Pretreatment Standards.

An application for a wastewater discharge permit has been submitted to the EFSEC to approve discharges to the City of Vancouver's POTW.

The Facility is not subject to categorical standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N, and does not meet the definition in VMC 14.10.040 WW as a significant industrial user. A detailed wastewater characterization was completed for the proposed industrial wastewater discharge streams. Detailed modeling of the boiler plant was completed by DMS-Nalco and is based upon DMS-Nalco's expertise modeling, maintaining, and servicing local boiler facilities. The full wastewater characterization report was submitted to EFSEC in the NPDES response letter dated May 17, 2016 (Makarow 2016). The industrial wastewater discharges from the Facility will meet the requirements of the City's pretreatment ordinance in VMC 14.10.

The Applicant believes that disposal to sanitary sewer is the preferred option for the Facility and that a pretreatment permit can and should be issued by EFSEC. The Applicant is concerned that a City permit would be subject to a separate review and appeal process, rather than the integrated process envisioned by Ch. 80.50 RCW. For that reason, the Applicant has investigated and confirmed two alternative means by which industrial wastewater can be disposed of without directing discharges to the City's POTW. These are summarized as follows (Makarow 2016).

Alternative 1: Boiler Wastewater Discharge to NPDES Outfall

Discharges from the boiler plant as compared to the state water quality standards in WAC 173-201A by DMS-Nalco are suitable for discharge to the Columbia River through the existing stormwater system. Additional treatment for temperature may be required following detailed engineering design of the systems to meet the anti-degradation water quality standard within the Columbia River.

If this alternative is selected as the preferred alternative, a Tier II anti-degradation water quality standards review (WAC 173-201A-320) will be completed for the Facility to demonstrate that Facility discharges from the Boiler Building will not result in a detectable change in water quality.

Under this alternative, the fire pump cooling water discharge from Area 300 will be converted from a discharge to the City's sanitary sewer system to a collection tank and hauled off. PPV Inc. reviewed the anticipated characterization for the fire pump cooling water and provided a description of treatment methods they would use at the treatment facility.

Alternative 2: Boiler Wastewater Haul Off

The wastewater constituents of the discharge was provided to PPV Inc. and reviewed by their in-house staff who prepared a summary of the proposed treatment process to be used for the Terminal's wastewater. This summary is provided as an attachment to the NPDES Engineering Report response letter attached in section 5.3 of this ASC.

Under this alternative, the fire pump cooling water discharge from Area 300 will be converted from a discharge to the City's sanitary sewer system to a collection tank and hauled off. PPV Inc. reviewed the anticipated characterization for the fire pump cooling water and provided a description of treatment methods they would use at the treatment facility.

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 relate 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.

The Facility proposes to only receive, handle, store, and load Groups 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 15 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 15.0, which are heavier than water.

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

The 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.

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 15 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 15.0, which are heavier than water.

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.

WAC 173-184 establishes requirements for advance notice of oil transfer. An advance notice of oil transfer is required for the project during operations any time oil is transferred to a ship.

Table 2.10-1 summarizes the regulations promulgated under these statutes that apply to this Facility.

WAC 463-60-205 requires the ASC to describe in general detail the content of a construction and operations phase spill prevention, control and countermeasure plan that will be prepared prior to commencement of construction. Spill prevention and control activities are described in section 2.10.3 below. The Applicant has prepared preliminary construction and operation SPCC plans and has submitted these plans to EFSEC for review (see Appendix B.2 and Appendix B.3, respectively).

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 bu k." • 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,	**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
88.46.080, 88.46.090, 88.46.100, 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.
WAC 173-184 **Vessel Oil Transfer Advance Notice and Containment Requirements** Regulatory Authority: RCW 88.46.160, 88.46.165, and 90.56	WAC 173-184-010 through 130	The Applicant will provide prior notice of oil transfer, pre-boom oil transfers, and submit a Safe and Effective Threshold Determination report.

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

Note: BMP – best management practice

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. See section 2.10.1 above.

Numerous industry standards and codes also control the design, operation, maintenance, and testing of equipment to be installed. The Facility would be designed to meet such industry standards. Table 2.10-3 summarizes the primary design standards that will be implemented and the general areas in which they would provide mitigation.

Table 2.10-3. USEPA-Recommended Industry Standards Applicable to the Facility

Organization Name	Standard No.	Standard Name	Area of Mitigation
API	none	Manual of Petroleum Measurement Standards	Good engineering practice – alarm systems, discharge prevention systems and inventory control systems
API	570	Piping Inspection Code - Inspection, Repair, Alteration, & Re-rating of In-service Piping systems	Contingency planning Inspection of aboveground valves and piping
API	574	Inspection Practices for Piping System Components	Inspection of aboveground valves and piping
API	575	Inspection of Atmospheric and Low Pressure Tanks	Contingency planning Integrity testing
API	620	Design and Construction of Large, Welded, Low-Pressure Storage Tanks	Construction & materials used for containers

Organization Name	Standard No.	Standard Name	Area of Mitigation
API	650	Welded Steel Tanks for Oil Storage	Construction & materials used for containers
API	653	Tank Inspection, Repair, Alteration, Reconstruction	Contingency planning Brittle fracture Integrity testing
API	1110	Pressure Testing of Petroleum Liquid Pipelines	Testing of transfer pipelines for integrity
API	1169	Managing System Integrity for Hazardous Liquid Pipelines	Transfer pipeline integrity management system
API	2015	Safe Entry and Cleaning of Petroleum Storage Tanks	Storage tank maintenance and inspection
API	2350	Overfill Protection for Storage Tanks in Petroleum Facilities	Good engineering practice - alarm systems, discharge prevention systems and inventory control systems
API	2610	Construction, Operations, Maintenance, & Inspection of Terminal & Tank Facilities	Security Loading/unloading Diked storage area drainage Secondary containment of bulk storage containers
ASME	B31.3	Process Piping	Contingency planning Inspection of aboveground valves and piping
ASME	B31.4	Liquid Transportation systems for Hydrocarbons	Contingency planning Inspection of aboveground valves and piping
BOCA	N/A	Safe Entry and Cleaning of Petroleum Storage Tanks	Secondary Containment Mobile Containers
BOCA	None	National Fire Prevention Code	Secondary containment of bulk storage containers
NFPA	30	Flammable & Combustible Liquids Code	Secondary containment Loading/unloading (excluding offshore) Diked storage area drainage Mobile containers Good engineering practice -alarm systems, discharge prevention systems and inventory control systems
NACE	0169	Control of external corrosion on Underground or submerged metallic piping systems	Corrosion protection for buried piping
PEI	200	Installation of Aboveground Storage Tank for Motor Vehicle Fueling	Construction & materials used for containers Secondary containment of bulk storage containers
STI	F911	Standard for Diked Aboveground Steel Tanks	Construction & materials used for containers
STI	R931	Double Wall Aboveground Storage Tank Installation	Construction & materials used for containers

Organization Name	Standard No.	Standard Name	Area of Mitigation
STI	SP001-00	Inspection of In-Service Shop Fabricated Aboveground Tanks for Storage of Combustible & Flammable Liquids	Contingency planning
UL	142	Steel Aboveground Tanks for Flammable and Combustible Liquid	Construction & materials used for containers Contingency planning
STI	892	Corrosion Protection of underground piping networks associated with liquid storage and dispersing systems	Corrosion protection for buried piping
STI	SP001	Inspection of In-Service Shop Fabricated Aboveground Tanks for Storage of Combustible & Flammable Liquids	Integrity testing

Source: BergerABAM (2014)

Preventive design elements that will be incorporated into Facility design are further discussed in this section below.

2.10.2.1 Materials to Be Stored at the Facility

Table 2.10-4 summarizes oils, fuels, and hazardous materials to be stored at the Facility during construction and operation.

In addition, if any material has not been identified in the Tenant Environmental Questionnaire, or any increase in quantities stored is anticipated, the Applicant will also notify the Port in advance in compliance with the Port lease.

Table 2.10-4. Hazardous Materials On site during Operation and Maintenance

Products[a]	Use	Storage Location	Total Amount Stored at Facility
CTI-220	Cleaning Compound	Area 200, Area 300, Area 400[b]	110 gallons
Ultra-Low Sulfur Diesel	Emergency Fire Pump Fuel	Area 200, 300, 400[c]	1500 gallons
Mobil Actrel 1138L Cleaner	Equipment cleaning	Area 200, Area 300, Area 400[b]	20 gallons
15W-40 motor oil	Mobile equipment maintenance	Area 200[b]	220 gallons
Antifreeze	Mobile equipment maintenance	Area 200[b]	275 gallons
Hydraulic fluid	Mobile equipment maintenance	Area 200[b]	275 gallons
Mobil CM-P grease	Equipment maintenance	Area 200[b]	400 pounds
Mobil XHP 462 grease	Equipment maintenance	Area 200[b]	120 pounds

Products[a]	Use	Storage Location	Total Amount Stored at Facility
Mobil Polyrex Eem grease	Equipment maintenance	Area 200[b]	120 pounds
Nalco NexGuard 22310	Boiler water treatment	Area 300, Area 600[d]	310 gallons
Nalco Tri-Act 1820	Boiler water treatment	Area 300, Area 600[d]	310 gallons
Nalco 1720	Boiler water treatment	Area 300, Area 600[d]	310 gallons
Nalco 8735	Boiler water treatment	Area 300, Area 600[d]	140 gallons
Railroad/Marine engine oil	Mobile equipment maintenance	Area 200, Area 400[b]	275 gallons
Crude Oil	Commodity handled at Facility	Area 300	2.16 million bbl (90.72 million gallons)

Source: BergerABAM (2014)

[a] A fire pump is located in each of these areas; each fire pump has an associated 500-gallon tank of low sulfur diesel.

[b] Stored at the boiler building in double wall totes.

[c] Stored in appropriate containers within buildings located in each of these areas.

[d] This is a representative list of the types of materials to be stored and handled. The Applicant would finalize this list when the specific elements of the construction and operations SPCC Plans are developed.

2.10.2.2 Rail Unloading Facilities

As described in detail in section 2.3 above, crude oil unloading will be conducted 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 piping and pumps such that crude oil exposure to the ambient atmosphere is minimized.

The unloading area incorporates the following containment systems:

- Containment pans between rails that will be piped to a separate line that conveys stormwater and inadvertent releases to the rail unloading facility containment tanks.
- Materials captured in the containment pans will drain to a dedicated piping system that will convey the liquids to secondary containment tanks located in Area 200. The secondary containment tanks will have a total capacity of 1,500 barrels, enough to contain 110 percent of the contents of a single rail tank car. Should a discharge to these tanks occur, the contents of the tanks will 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 will 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 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.
- Prior to commissioning the Facility, the storage tanks will be hydrostatically tested to confirm they will meet operational stresses and loads prior to their receiving any crude oil and are free of leaks, in accordance with industry standards.
- Vegetation growth will be controlled within the bermed storage area to prevent vegetation roots from piercing the berm liner. Vegetation control will be accomplished using commercially available herbicides applied in accordance with local, state, and federal regulations.

Design elements related to containing unanticipated discharges will include:

- As described in section 2.3.6, the tanks will be constructed on a concrete foundation/ringwall with a double tank bottom, with interstitial monitoring to detect leaks should they occur
- As described in section 2.3.6, constructing the tanks in a fully lined bermed area with the capacity to contain 110 percent of the API 650 maximum capacity of the largest tank and precipitation from a 24-hour, 100-year storm event.
- As described in section 2.3.6, 24-inch-high intermediate berms will be installed within the larger area to separate each tank area from the larger containment area. Each intermediate berm will be designed to contain at least 10 percent of the volume of the tank it encircles.

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 within piping and pumps such that crude oil exposure to the ambient atmosphere is minimized.
- 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. Pressure relief valves are included on the pipeline and pump to avoid over-pressure situations.
- Transfer pipelines will be equipped with valves and ultrasonic flow meters to monitor volumetric flow during crude oil conveyance between areas 200, 300, and 400. Ultrasonic flow meters will be installed on each of the transfer pipelines from Area 200 to Area 300. These meters would be checked against a second set of flow meters located at Area 300,

which would monitor receipt. Flow meter readings will be monitored during transfer operations; if a discrepancy in the flow and receipt totals is identified transfer pumps will be immediately shut down and automated valves closed. Similar valving and meterage would be installed on the transfer pipelines from Area 300 to Area 400, and used to monitor and shut down transfers from Area 300 to 400. The valves and flow meters would also serve for similar monitoring and shutdown for transfers from Area 200 to 400. 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. It is anticipated that it would take an employee 30 to 60 seconds from detection of release until an ESD button or other shutoff device would be actuated.

- 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, or road crossing will be designed and installed to adequately withstand the dynamic forces exerted by anticipated traffic or rail loads.
- Secondary containment with leak detection would be provided for pipe installed underground. Runs of aboveground pipeline would be standard-walled to ensure ease of inspection and maintenance in accordance with the applicable requirements of WAC 173-180-340 and 49 CFR 195.246 through 49 CFR 195.254. Piping would be cathodically protected at all underground locations and coated to prevent corrosion.
- All ESD valves throughout the Facility will be provided with a 30-second shut off to isolate Facility elements where the release has occurred.
- 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 if stray currents are present and protective measures will be taken.
- Transfer pipelines will be equipped with leak detection systems meeting regulatory standards.
- All pumps will have internal pressure relief systems to avoid overpressure.

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 will 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 will 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 capable of holding 3 bbl of discharge 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 33 CFR 156.
- All piping located over water will be welded and will not contain any mechanical joints.
- Vessel mooring systems will meet the applicable requirements of 33 CFR 156.

The Applicant conducted an assessment of the oil spill risk from vessel loading operations and equipment at the Facility (see section 8 and Appendix B of Appendix P.1 to this ASC). In general, the study did not take into account any of the required containment systems that would be in place at the terminal, nor does it account for catchments or surface elevation changes on the facility (with only one exception in one scenario). Also, because the majority of the equipment analyzed in the study is proposed to be located on land, not all spills would reach the river. The use of the phrase "release" for purposes of the study refers to oil, which is no longer in its intended equipment (i.e., within piping, hoses, connecting equipment), but has not necessarily reached the water. The cargo loading oil spill risk assessment derived the types of equipment failures most likely to occur. The study used two different methodologies. The first used standard safety QRA practices and global failure frequencies. The second used Tesoro-specific historical spill experience and a spill study prepared for Ecology to estimate the potential for spills of various quantities. The study identified release scenarios based on the equipment where the failure occurred, whether the release resulted from a small, medium, large or full bore opening, and whether isolation of the transfer piping was successful or not. Released oil spill volumes were estimated for these scenarios, taking into consideration static and dynamic equipment inventories, and representative isolation times. The study concluded that small releases (less than 100 bbl) were the most likely, with an estimated frequency of one every seven to nine years. This conclusion was supported by the historical record, which demonstrates that the majority of spills are less than 1 bbl. Loading hoses contribute to the majority of this risk. The replacement of these hoses every five years (as mandated by state and federal regulations) is expected to further reduce the likelihood of these small releases. Spills of tens of thousands of bbl resulting from full bore rupture of the largest transfer pipeline were estimated to be very significantly less frequent, occurring once every 39,000 years or more.

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 to deploy booms in advance of each oil transfer to ensure that any materials accidentally discharge to surface water can be contained.

The Facility will be classified as a "Class I" facility under WAC 173-180-025 (8), that meets "Rate A" oil transfer conditions (i.e., transfers greater than 500 gallons per minute, per WAC 173-180-220 (2)(a). The Facility will, therefore, be required to meet the pre-booming requirements and Rate A alternative measure requirements of WAC 173-180-221. In accordance

with these requirements, the Applicant has developed and submitted to EFSEC for review a preliminary "safe and effective threshold determination report" (included as Appendix K of the Operations Facility Oil Handling Manual, Appendix B.5 of this ASC). This report will identify a Facility-specific booming strategy taking into account ambient conditions (e.g., currents, wind speeds, vessel traffic, etc.) to ensure that transfers are conducted to meet the standards for safe oil transfer operations and meet the zero spill goal (WAC 173-180-010). The Applicant will develop a final safe and effective determination report based on final terminal design, and will submit the report for state review and approval 120 calendar days prior to the first oil transfer operation at the Facility as required by WAC 173-180-224 (4).

Based on the preliminary design of the Facility as presented in this ASC, and experience with oil transfers at other facilities, the Applicant has performed a preliminary review of booming requirements and anticipates the pre-booming system will consist of a fence boom placed between the vessel location and the shoreline, and a floating boom deployed after a vessel is at the berth. The floating boom would be connected with the fence boom on the downstream and upstream to ensure the vessel is fully encircled by boom.

Figure 2.10-1 illustrates this conceptual pre-booming configuration. As noted above, the final configuration will be submitted for review to EFSEC.

The fence boom would be secured with tide slides and fixed down wires hung from the berth structure. The floating boom would be stored on the berth, and would be deployed using a boom boat. Once in place, the floating boom would be anchored at the upriver and downriver ends to hold the boom position during the transfer operation.

Booming activities will meet and effective booming threshold of 1.5 knots (in excess of the typical 1.0 knot effective threshold) so that effective pre-booming would not be precluded a substantial portion of the year. Furthermore, Vancouver Energy has purchased two NOFI Harbour Busters©[20]. The Harbour Busters© are mobile containment booms that can withstand current speeds up to 3 knots, and include an integrated oil/water separator and storage tank (15 cubic meters gross, approximately 5 cubic meters of net oil). These containment booms can be rapidly deployed and will be on standby during all marine transfer operations.

[20] These mobile containment booms will also be added to Table 4 of the Operations Oil Handling Manual, and Figure 7.2 of the Operations Oil Spill Contingency Plan in future revisions.

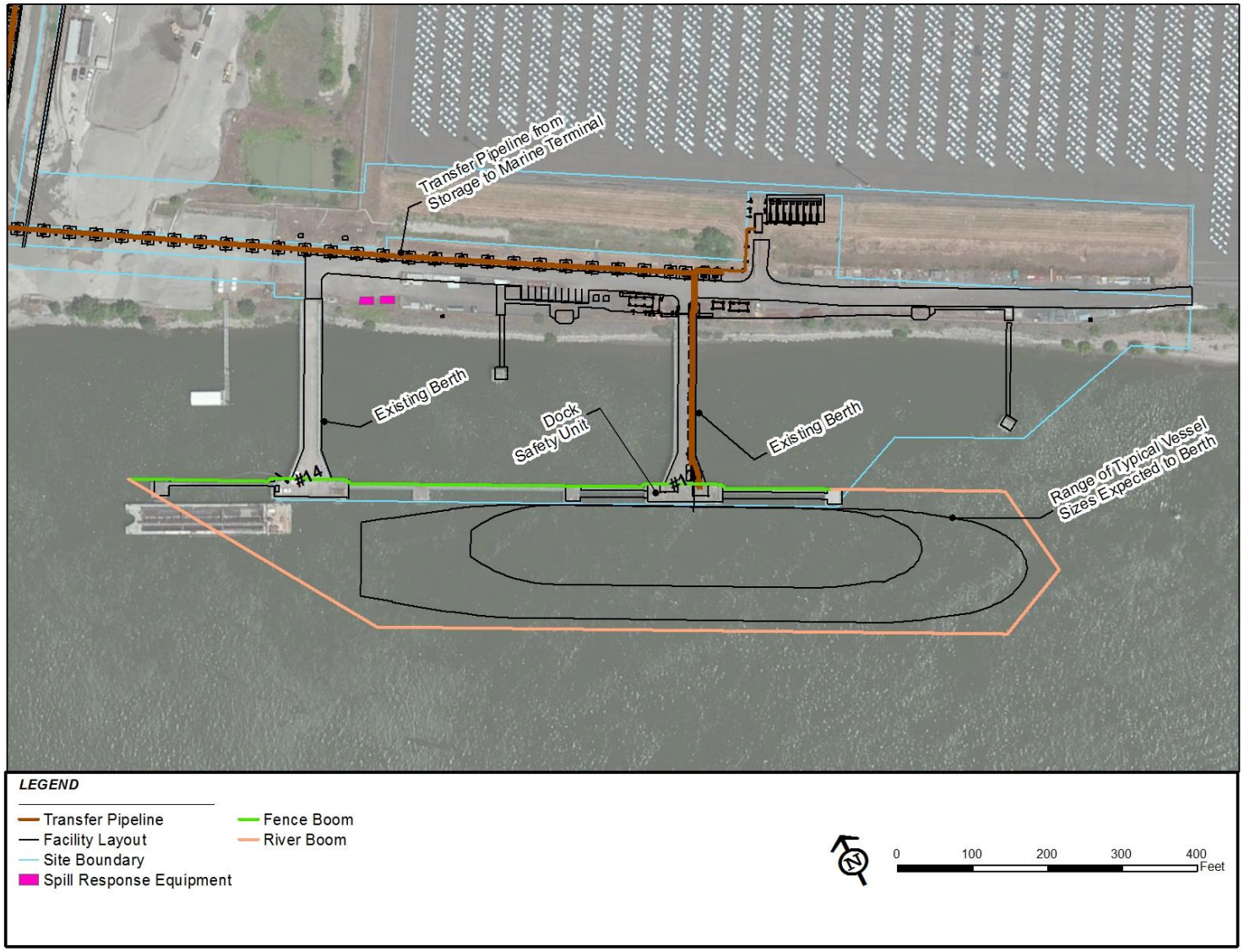

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Figure 2.10-1. Preliminary Pre-Booming Diagram (Revised)

The booming system would be designed with connections for a rapid oil skimmer (also known as a "Harbor Buster") designed for use in current speeds expected at the facility. The Harbor-Buster would be stowed on the berth, for example on a small aluminum flat-barge with wheels. When needed, it would be launched. The barge would be designed for compatibility with the boat that is used for deploying the floating boom. The boat would maneuver the Harbor Buster-barge into position where the fence- and floating- boom pigtails would be attached to the Harbor Buster and it is then deployed into the water from the barge or would be a stand-alone recovery boom just downstream from the dock.

The Applicant proposes to implement the following state of the art equipment during vessel loading operations in support of the pre-booming requirements:

1. Fence Boom – 1,600-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 conex box on shore. The end connectors will be made of aluminum and be the ASTM Universal Slide connecter.
4. Twenty foot Conex – This conex 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 console 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 2.10-2(a) is an example of a container housing a reel and diesel power pack to deploy and retrieve the boom.

BergerABAM	**Figure 2.10-2. Rapid Response Boom Skimmer and Reel**

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 2.10-2(b) is a photograph of this type of skimmer.

9. Two NOFI Harbour Busters©.

Finally, Vancouver Energy will have access to the following Tesoro equipment (Haugstad 2013):

- In Pasco, 5,000 feet of river boom and associated anchor systems, and one Current Buster number 2 on reel in a conex with blower and HPU system installed
- In Vancouver, 5,000 feet of river boom and associated anchor systems, and one Current Buster number 2 on reel in a conex with blower and HPU system installed

2.10.3 Spill Prevention, Control, and Contingency Planning

2.10.3.1 Facility Construction

Hazardous materials present and used during construction will be typical of a large, industrial construction site (Table 2.10-5). Fuels, such as gasoline and diesel, will be used to power mobile construction equipment; maintenance of such equipment could require the use of lubricants, oils, and antifreeze. Solvents and paints will be used during assembly and surface finishing of Facility components. Small amounts of welding gases will also be stored and used on site to assemble metal structures and transfer pipelines. In accordance with the Port lease, the Facility would not use, store, or handle chlorinated solvents on site.

Table 2.10-5. Summary of Oils, Fuels, and Hazardous Materials to Be Stored during construction of the Facility

• Construction vehicle fuel (e.g., gasoline, diesel, kerosene) • Welding gases • Oil (e.g., transformer, lubricating) • Non-chlorinated solvents and thinners • Paints • Antifreeze • Coatings and sealants • Batteries

The Applicant has prepared and submitted to EFSEC for review a preliminary construction spill prevention, control and countermeasures plan (cSPCCP) (Appendix B.2). The Applicant will prepare and implement a final cSPCCP prior to the beginning of Facility construction. The final cSPCCP would be submitted to EFSEC for review and approval prior to beginning construction. The construction contractor(s) employed by the Applicant (see section 2.16 below) will develop and implement a cSPCCP implementing at a minimum the provisions in the Applicant's final cSPCCP, and in accordance with applicable state and federal regulations.

As described in Appendix B.2, the cSPCCP will address the petroleum products and hazardous substances handled on site, relationship of activities to past site remediation, spill prevention BMPs (including appropriate handling and storage of hazardous materials), spill response and notification procedures, and training of construction employees.

These measures include, but are not limited to, that chemicals, fuels, and industrial gases used during construction be stored in containers specifically designed for their individual

characteristics; small quantity chemicals be stored in their original containers to minimize risk of upset; and construction personnel working with chemicals be trained in proper handling technique and in emergency response procedures for chemical spills or accidental releases. Personal protective equipment will be provided in compliance with WISHA requirements; material safety data sheets will be provided and maintained onsite as required by WISHA regulations.

2.10.3.2 Facility Operations

Prior to the beginning of oil handling and operations, the Applicant will prepare and implement the following plans to comply with state and federal requirements.

- An operations spill prevention control and countermeasures plan (oSPCCP), prepared under 40 CFR 112 and WAC 173-180, Part F; the Applicant prepared a preliminary oSPCCP and has submitted this plan to EFSEC for review (see Appendix B.3).
- A safe and effective threshold determination report, prepared under WAC 173-180-224; the Applicant prepared a preliminary effective threshold determination report, and has submitted this report to EFSEC for review (see Appendix K of the Operations Facility Oil Handling Manual, Appendix B.5).
- A pre-loading transfer plan will be filed pursuant to WAC 173-180-230; the Applicant has prepared an example pre-loading transfer plan (see Appendix I of the Operations Facility Oil Handling Manual, Appendix B.5).
- A facility operations manual in compliance with WAC 173-180-400 to -435; the Applicant has prepared a preliminary Operations Facility Oil Handling Manual and has submitted this report to EFSEC for review (see Appendix B.5).
- An oil transfer training and certification program in compliance with WAC 173-180, Part E; the Applicant has prepared a preliminary oil transfer training and certification program as part of the Operations Facility Oil Handling Manual (Section 21 of Appendix B.5) and has submitted the program to EFSEC for review.
- A spill contingency plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F; the Applicant has prepared a preliminary Operations Facility Oil Spill Contingency Plan and has submitted the plan to EFSEC for review (see Appendix B.4).

To comply with this complex regulatory context, the Applicant will prepare coordinated plans to meet all applicable local, state, and federal requirements. The Applicant will prepare final versions of the above-listed plans and documents based on final Facility design. The final plans will be submitted to EFSEC for review and approval prior to the beginning of oil handling operations at the Facility.

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.

A preliminary construction stormwater pollution prevention plan (cSWPPP) is attached as Appendix C.1. The plan includes a preliminary site-specific erosion and sediment control plan, construction best management practices (BMPs), and construction phase enforcement procedures.

A final cSWPPP, which will be submitted to EFSEC prior to construction, will meet the requirements of the NPDES Industrial Permit and State NPDES Individual 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 cSWPPP 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 six-month, 24-hour design storm. All construction practices will emphasize erosion control over sediment control to eliminate the source of stormwater contamination. 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 Boiler	Rail Infrastructure
Silt Fencing	X	X	X	X	X	X
High Visibility Fencing	X	X	X	X	X	X

BMP Devices	Area 200 Unloading & Office	Area 300 Storage	Dock Area 400 Marine Terminal	Pipeline Alignment Area 500 Transfer Pipelines	Area 600 Boiler	Rail Infrastructure
Stabilized Construction Entrance/Exit	X	X	X		X	X
Wheel Wash	X	X	X			
Construction Road/Parking Area Stabilization	X	X	X		X	
Check Dams	X	X				
Outlet Protection			X			
Compost Sock	X		X	X	X	X
Storage/Surge Tanks	X	X	X			
Weir Tanks	X	X				
Chemical Treatment	X	X	X			
Filtration	X	X	X			
Wick Drains		X	X	X		
Temporary and Permanent Seeding	X	X	X		X	
Mulching			X	X		
Plastic Covering	X	X	X			X
Surface Roughening		X				
Dust Control	X	X	X	X	X	X
Storm Drain Inlet Protection	X	X	X	X	X	X
Channel Lining	X	X				
Concrete Handling	X	X	X	X	X	X
Sawcutting & Surface Pollution Protection	X	X	X		X	X
Concrete Washout Area		X			X	X
pH Neutralization		X				
Maintain BMPs	X	X	X	X	X	X
Manage the Project	X	X	X	X	X	X

Water for hydrostatic testing will be obtained from the City or Port systems and will be discharged through the on-site stormwater treatment systems for disposal through the existing Port stormwater systems. Water used for flushing and hydrostatic testing will be tested and treated to removal chlorination or other constituents, which may be present as a result of

construction, such as residual chlorine or settleable solids if necessary prior to its discharge to ensure compliance with discharge limits. Testing water will be released at a controlled rate from on-site storage facilities and monitored to ensure safe conveyance through downstream system. Hydrostatic testing water is identified as an authorized non-stormwater discharge according to Section S1.C.3 of the Construction Stormwater General Permit for the State of Washington as issued by Ecology.

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 47.4 acres, and the developed impervious area is estimated to be 44.4 acres.

The Port receives approximately 39.6 inches of rain per year measured at the "Vancouver 4 NNE" agricultural meteorological station. 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 Ecology's water quality regulations in WAC 173-201A. The following table summarizes changes to land coverage resulting from this project.

Table 2.11-2. Drainage Basin Areas

Drainage Basins	Total Area (acres)	Contributing Area (acres)	25-Year Storm Flow Rate (cfs)	100-Year Storm Flow Rate (cfs)
Area 200 Admin/Support Buildings	1.6	0.8	0.66	0.80
Area 200 Rail Unloading Area	6.2	5.3	3.39	4.22
Area 300 Secondary Containment Berm	18.2	18.2	2.0	2.0
Area 300 Support Buildings and Parking	2.9	1.6	1.1	1.36
Area 400 Marine Terminal	7.7	2.2	N/A	N/A
Area 500 Transfer Pipelines	4.9	N/A	N/A	N/A
Area 600 Boiler Building	0.9	0.5	0.31	0.38
Rail Infrastructure	5.4	N/A	N/A	N/A
Total	47.77			

As required by WAC 173-240-110, before constructing or modifying industrial stormwater facilities, engineering reports, plans, and specifications for the project must be submitted to EFSEC. A comprehensive NPDES Engineering Report addressing stormwater and wastewater

discharges from the facility is included in section 5.3. An operational final SWPPP, which will be submitted to EFSEC prior to construction, will meet the requirements of the NPDES Industrial Permit and reflect final design plans.

The project, therefore, will require compliance with the following standards and regulations.

- Ecology's Stormwater Management Manual for Western Washington
- Water Quality Standards WAC 173-201A
- 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. On-site 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. Segregation of stormwater is the preferred source control BMP eliminating risk of contact between industrial activity, crude product, and stormwater. Transfer of crude oil at the dock is completed with a closed piping system where oil transfer will not be exposed to stormwater. Stormwater would be protected from exposure to industrial activity.

Secondary structural containment measures are in place; they consist of containment pans along the unloading building, 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 API 650 maximum capacity of the largest tank plus a 24-hour, 100-year storm event. Secondary containment systems at the rail unloading building are conveyed to double-walled storage tanks located near the office building where the contents will be hauled off site to a permitted disposal or recycling facility. A stormwater control structure and oil-water separators located within the containment area of the storage area complete initial treatment of stormwater. The oil-water separators discharge to manually controlled pumps that discharge to water quality filter vaults for treatment of turbidity, heavy metals, and volatile organics. The pumps are manual on, automatic off, to require that each time the pumps are turned on supervising personnel conduct a visual inspection for oil sheen.

Parking and access areas are designed with a combination of catch basin filters and filter vaults to treat stormwater runoff.

Equipment and parts wash (including rail car exterior washing) will be conducted in a covered portion of the rail unloading building. All wastewater produced will be pumped to the secondary containment tanks located at the Administration and Support Buildings to be hauled off site and disposed of at an approved location.

No industrial activity takes place within the rail corridor, which is used only for rail transportation. Maintenance activities necessary for rail transportation will be conducted on the

rail spur located at the southeast corner of the rail unloading building. Rail containment pans and a concrete working surface will be provided around the rail spur. Stormwater from the rail spur will be collected in catch basins and containment pans for treatment and monitoring. A containment valve, oil-water separator, and monitoring manhole will be provided for this facility. This stormwater will continue to flow through the stormwater collection system on the south side of the rail building and will eventually contribute flows to water quality vault 0200-WQV-002 for additional water quality treatment. A downstream monitoring manhole is provided to confirm that discharges meet the NPDES stormwater permit conditions.

Any maintenance activities related to rail cars and locomotives will only be completed for cars already on site being processed by the facility. The facility will not be used as a maintenance facility receiving rail cars from other parties and transporters for maintenance activities. A detailed listing of activities conducted on site and off site are included in the NPDES Engineering Report attached in section 5.3.

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. Federal regulations require that containment measures be designed for the most likely quantity of oil that will be discharged during the typical failure mode (40 CFR 112.7 (5)(c)). 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. Containment measures and response protocols for larger non-typical events will be addressed in the SPCCP, as well as the contingency plan that will be prepared prior to beginning operation of the Facility.

2.11.2.2 Operational Source Control BMPs

In addition, containment pans and other containment measures will supplement the structural source control BMPs. A comprehensive site-specific oSPCCP will be developed in accordance with 40 CFR 112. The Applicant prepared and submitted to EFSEC for review a preliminary oSPCCP, attached as Appendix B.3 to this ASC.

Table 2.11-3. Applicable Structural Source Control & Operational BMPs

BMP Devices	Area 200 Unloading & Office	Area 300 Storage	Dock Area 400 Marine Terminal	Area 500 Transfer Pipelines	Area 600 Boiler Building	Rail Infrastructure
Landscaping and lawn/vegetation management	X	X	X		X	
Loading and unloading areas	X					
Parking and storage of vehicles and equipment	X	X	X		X	
Soil erosion and Sediment control at industrial sites	X	X	X	X	X	

BMP Devices	Area 200 Unloading & Office	Area 300 Storage	Dock Area 400 Marine Terminal	Area 500 Transfer Pipelines	Area 600 Boiler Building	Rail Infrastructure
Storage of liquids in permanent aboveground tanks	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 six-month, 24-hour event, as estimated using the WWHM. A comprehensive NPDES Engineering Report has been submitted to EFSEC for review and approval, as attached in section 5.3 of this ASC. A Tier II anti-degradation analysis is being completed in accordance with WAC 173-201A-320 to demonstrate water quality compliance. The results of the Tier II study will be provided to EFSEC upon completion for review.

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.

Stormwater 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. Stormwater 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 two-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. The conveyances are described in detail in the Stormwater NPDES Engineering Report provided in section 5.3 of this ASC. 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 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. Stormwater discharges will be conveyed through existing pipelines to an existing outfall to the Columbia River.

Stormwater discharges from Area 200, Area 600, rail improvements, and portions of Area 500 will be treated with water quality filter vaults and discharged to the existing Terminal 5 stormwater system. The Terminal 5 conveyance system flows through manmade conveyance to

water quality lagoons located west of Terminal 5 for final treatment prior to discharge through an existing outfall to the Columbia River.

Stormwater 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 bioswales 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. A temporary grout batch plant will be installed near ground improvement activities to provide a source of cementitious grout.

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;
- 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 in Section 112 of the Clean Air Act (CAA) 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.

As part of ongoing operations analysis, the Applicant has determined that in the event of a power failure, it would be desirable to have leased, portable power generators (i.e., emergency engines) available to operate critical safety, security, and environmental equipment. Any emergency engines would be operated in accordance with the required air emissions permit(s) from Ecology or local air authority in compliance with WAC 173-400-930. Maintenance of the emergency engines would be performed by the leasing company at an off-site location. The emergency engines would be fueled by ultra-low sulfur diesel or biodiesel, and would be subject to horsepower limitations, operational hour limitations, and other permit conditions to ensure operations do not cause an exceedance of applicable air quality standards.

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. EFSEC regulations are 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 are met (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. However, the region was designated non-attainment for carbon monoxide (CO) and ozone in the past and is therefore regulated under regional air quality "maintenance" plans whose purpose is to ensure continued compliance with ambient air quality standards. New stationary sources may, therefore, be subject to additional requirements set forth in the regional maintenance plans.

Vancouver is designated as a CO maintenance area. The Southwest Clean Air Agency (SWCAA) Section 400-111 rules contain measures for new major stationary sources as part of the maintenance area plans applicable to Vancouver. The proposed Facility will not exceed the threshold of 100 tons-per-year of CO designated in the plan for major stationary sources and, therefore, no additional measures are required to comply with the CO 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 remains subject to an ozone maintenance plan. Under the SWCAA Section 400-111 rules, new major stationary sources must offset VOC and NO_x emissions or may apply to SWCAA for an allocation of the available growth allowance. The proposed Facility will not exceed the plan's 100 tons per year major source threshold of VOC or NO_x 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.

Because the Facility would be a new source of air pollutants, under the 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 federal 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 a notice of construction (NOC) preconstruction permit, as required under WAC 173-400-110. The NOC permit application 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 HAP and TAP criteria.

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 (NOx) 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 oxides (NO_X) includes nitrogen dioxide (NO_2) and nitric oxide (NO).

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 pollutants and TAPs. Diesel engine emissions are regulated by federal rules.

A temporary batch plant will be brought on site. Dry grout materials will be brought and stored at the construction site, and then mixed to order for the grouting. The batch plant will consist of a cement silo, batch plant mixer, and high-pressure pumps to convey the grout to the location of use. Water for mixing the grout will be sourced from the City.

Operation of a temporary batch plant for mixing of grout used for the improvements will result in air emissions. The batch plant will most likely be brought on site and operated by a third-party contractor.

Typically, such batch plants are permitted in accordance with portable source regulations and are permitted to be used temporally at a location provided they comply with the provisions of such permit. Any temporary batch plant will be operated in accordance with the required air emissions permit(s) from Washington State Department of Ecology (Ecology) or local air authority in compliance with WAC 173-400-036. Batch plant emissions will be monitored and controlled in accordance with the batch plant's permit conditions to ensure operations do not cause an exceedance of applicable air quality standards.

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 fugitive 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 may include natural gas-fired boilers to generate steam for heating rail cars during the unloading process to facilitate crude oil unloading and transfer to Area 300. For purposes of air emissions, permitting this ASC conservatively assumes three boilers, each with a nameplate heat input capacity of 62 MMBtu/hr, will be installed in the Area 600 Boiler Building to generate steam which will be used to heat rail cars. The boilers are expected to operate throughout the year, but at varying loads dictated by rail car arrival schedules and the viscosity of the crude oil contained in the rail cars. Typically, no more than two boilers will operate at any given time, with the third boiler maintained as a redundant unit. However, to allow for uninterrupted steam supply, the third boiler may operate for limited periods until 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 will operate at full capacity every hour of the year (see section 5.1.2.1.1). This assumption is sufficient to address emissions attributable to the occasional startup of the third unit.

Two of the crude oil storage tanks may use electrical heating elements to control the viscosity of crude oils as necessary during filling, storage and emptying of the tanks. For purposes of air emissions, permitting this ASC conservatively assumes that two storage tanks will be so equipped.

The three steam boilers are stationary equipment units associated with the Facility that 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 Subparts A and 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 342,000 bbl[21]. 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 the onboard tank compartments filled with inert gas with oxygen levels below eight percent. The inert gas consists of cleaned exhaust from dedicated onboard inert gas generators (engines burning ultra-low sulfur distillate). Note that the inert gas is added to the tank compartments as the cargo is unloaded at another destination – not at the Facility, which is a loading facility.

When the vessel cargo compartments are filled with crude oil, the vapors from the cargo compartments, made up of hydrocarbon and inert gases, may be displaced through a hydrogen sulfide treatment system and then will be routed to a MVCU, that combusts the hydrocarbons in the vapors[22]. 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 prior to combustion 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 if 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.

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[21] Although the tanks could hold approximately 380,000 bbl, in actual operation internal floating roof tanks are never completely full, and the tanks are expected to operate at a normal fill capacity of 360,000 bbl. The working capacity of the tanks is slightly lower than the normal fill capacity. For purposes of emissions estimation a more accurate working capacity of 342,000 bbl is assumed, based on preliminary tank design drawings. Elsewhere in the ASC, the working capacity is referred to as "approximately 340,000 bbl".

[22] The MVCU is required to provide safety of transfer operations in accordance with 33 CFR Subpart P, as described in section 2.23.2.13.

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. These sources of emissions are specifically exempted by federal and state regulations from pre-construction permitting.[23]

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 MVCU 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[24]. Conservative air quality modeling of MVCU operations, 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.

The crude oil storage tanks will have an internal floating roof design with dual rim seals, which will minimize the formation of fugitive hydrocarbon vapor emissions that are a potential source of odors.

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 concrete or asphalted.

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[23] *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."); *See also in re* Cardinal FG Company, 12 E.A.D. 153, 171-172 (EAB 2005) (Ecology correctly concluded that emissions from a permanently situated non-road vehicle powered by a "nonroad engine" were not attributable to the stationary source); Letter from EPA AQMD Director 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 that "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.")
[24] U.S. EPA Sulfur Dioxide Final Acute Exposure Guideline Levels, May, 2008

Summary

The projected annual emissions of criteria pollutants from the project units identified in this section are summarized in Table 2.12-1. Annual emissions of pollutants relevant to PSD would be emitted at rates less than the PSD thresholds, so they are all addressed in a minor source permit process. Annual facility-wide GHG emissions are less than 100,000 tons per year on a carbon dioxide equivalent (CO_2e) basis.

Table 2.12-1. Projected Annual Emissions (tons per year)

	NO_x	CO	SO_2	PM	VOC	GHG (CO_2e)
Area 600 boilers	4.15	13.6	1.39	2.83	1.89	44,170
MVCU	8.04	3.49	6.59	2.62	8.64	50,530
Components	--	--	--	--	0.822	236
Tanks	--	--	--	--	21.7	261
Firewater pumps	0.00632	0.0302	0.000130	0.00321	0.00698	13.5
Total:	12.2	17.1	7.97	5.45	33.1	95,200
PSD threshold[1]	100	100	100	100	100	N/A
PSD SER[2]	40	100	40	10	40	N/A
NOC exemption[3]	2.0	5.0	2.0	0.5	2.0	N/A

[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. The SER shown for PM is that of $PM_{2.5}$. The SER for PM_{10} is 15 tons per year.

[3]Notice-Of-Construction (NOC) Exemption levels for new or modified stationary sources (WAC 173-400-110 Table 110(5)). The NOC Exemption level shown for PM is that of $PM_{2.5}$. The Exemption level for PM_{10} is 0.75 ton per year.

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, the Applicant developed an inventory of TAPs associated with project emission units. 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 ASIL 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 required controls and work practices 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) standards[25] that must be applied for a given industry category.

MACT standards can require facility owners/operators of new (and old) sources on a case-by-case basis to meet emission limits, install emission control technologies, monitor emissions and/or operating parameters, and use specified work practices necessary to meet the standard. 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 Area 600 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	3.20E-01	0.0581	Yes
Benzene	71-43-2	Yes	Annual	1.35E+02	6.62	Yes
Benzo(a)anthracene	56-55-3	No	Annual	2.97E-03	1.74	No
Benzo(a)pyrene	50-32-8	No	Annual	1.93E-03	0.174	No
Benzo(b)fluoranthene	205-99-2	No	Annual	2.88E-03	1.74	No

[25] The standards that were developed through this MACT approach became known as the National Emission Standards for Hazardous Air Pollutants (NESHAPs). The purpose of these NESHAPs is to protect the public health by reducing discharges of HAPs from major air emission sources.

Compound	CAS	HAP?[1]	WA TAP Averaging Period	Emission Rate	SQER[2]	Model?[3]
				lb/avg per	lb/avg per	
Benzo(k)fluoranthene	207-08-9	No	Annual	2.89E-03	1.74	No
Beryllium	7440-41-7	Yes	Annual	1.92E-02	0.08	No
1,3-Butadiene	106-99-0	Yes	Annual	2.16E-03	1.13	No
Cadmium	7440-43-9	Yes	Annual	1.76E+00	0.0457	Yes
Carbon monoxide	630-08-0	No	1-Hour	1.02E+01	50.4	No
Chromium, (hexavalent)	18540-29-9	No	Annual	8.96E-02	0.00128	Yes
Chrysene	218-01-9	No	Annual	2.90E-03	17.4	No
Cobalt	7440-48-4	Yes	24-Hour	7.60E-04	0.013	No
Copper	7440-50-8	No	1-Hour	3.36E-04	0.219	No
Cyclohexane	110-82-7	No	24-Hour	9.54E-01	789	No
Dibenzo(a,h)anthracene	53-70-3	No	Annual	1.95E-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	2.56E-02	0.00271	Yes
Ethylbenzene	100-41-4	Yes	Annual	3.08E+01	76.8	No
Fluorene	86-73-7	No	24-Hour	4.73E-05	1.71	No
Formaldehyde	50-00-0	Yes	Annual	1.20E+02	32	Yes
Hexane	110-54-3	Yes	24-Hour	1.79E+01	92	No
Hydrogen Sulfide	7783-06-4	No	24-Hour	4.90E-01	0.263	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	No	Annual	2.90E-03	1.74	No
Isopropyl benzene	98-82-8	Yes	24-Hour	3.93E-02	52.6	No
Manganese	7439-96-5	Yes	24-Hour	3.44E-03	0.00526	No
Mercury	7439-97-6	Yes	24-Hour	2.35E-03	0.0118	No
3-Methylchloranthrene	56-49-5	No	Annual	2.88E-03	0.0305	No
Naphthalene	91-20-3	Yes	Annual	9.80E-01	5.64	No
Nitrogen dioxide	10102-44-0	No	1-Hour	6.43E+00	1.03	Yes
Propylene	115-07-1	No	24-Hour	4.18E-04	394	No
Selenium	7782-49-2	Yes	24-Hour	2.17E-04	2.63	No
Sulfur dioxide	7446-09-5	No	1-Hour	4.59E+00	1.45	Yes
Toluene	108-88-3	Yes	24-Hour	4.29E-01	657	No
Vanadium	7440-62-2	No	24-Hour	2.08E-02	0.0263	No
Xylene (-m)	108-38-3	Yes	24-Hour	2.89E-01	29	No
Xylene (-o)	95-47-6	Yes	24-Hour	1.08E-01	29	No
Xylene (-p)	106-42-3	Yes	24-Hour	1.20E-01	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, 10 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 10 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.

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

Washington State law requires that new fossil-fueled thermal electric generating facilities provide mitigation of CO_2 emissions under WAC 463-80, requiring mitigation of 12 percent of the project's total CO_2 emissions over 30 years of operation. WAC 463-80-060 specifies mitigation plan options, including a payment to a third party option. A mitigation payment rate is established by rule at $1.60 per metric ton of CO_2.

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.

While the legal requirement to comply with the mitigation obligation applicable to new fossil-fueled thermal electric generating facilities does not apply to the Facility, the Applicant proposes to voluntarily implement these mitigation requirements. Note that the mitigation program in WAC 463-80 applies exclusively to stationary sources based on CO_2 emissions (i.e., not to all GHGs as CO_2e). The Applicant has, however, agreed to implement the mitigation requirements of WAC 463-80 based on CO_2e emissions from stationary source operations at the Facility. With total annual operational GHG emissions of about 86,184 metric tons (Table 2.13-1), over a 30-year life of the Facility at 12 percent of the total CO_2e emissions (i.e., based on the WAC 463-80 mitigation formula that assumes 60 percent capacity operations and 20 percent of total emissions), this amounts to mitigation of 310,270 metric tons of GHGs. This obligation would be met by payment of $496,440 to the Climate Trust for the implementation of projects to reduce GHG emissions. This commitment fully meets the Applicant's voluntarily assumed obligation to mitigate Facility operations GHG emissions.

Table 2.13-1. Facility Stationary Source Annual GHG Emissions (metric tons of carbon dioxide equivalents)

Area 200 Boilers	Area 200 MVCUs	Components	Area 300 Tanks	Firewater Pumps	Total
40,071	45,841	11	237	12	86,172

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 liner
- 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, reinforcement of existing piling and construction of new walkways
- 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 intended as the Applicant estimate only and is subject to change. The construction schedule will be revised to reflect the actual date of approval of the Site Certification Agreement and other permit approvals, and provided to EFSEC at least 60 days prior to the beginning of construction.

As indicated in section 2.3.1.1, the Applicant may choose to defer construction of some of the Facility elements to a later date.

2.15.2 Construction Workforce

During the construction period, approximately 298 construction workers would be employed at the site. Levels would vary over the construction period with a maximum daily workforce of 149 construction workers. Table 2.15-1 summarizes the anticipated 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. The 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 for Phase I

Trade	Number of Construction Staff
Steel erecting	32
Laborers	53
Mechanical and piping	50
Equipment operators	25
Tank erectors	40
Electrical	25
Concrete	25
Ground improvements/piling	22
Dock seismic upgrades	20
Fire system installation	6
Total	298

As discussed in section 2.3.1.1, construction of some elements may be deferred. If the Applicant choses to construct these elements at a later date, it is anticipated that additional construction would occur over a period of 6 months and would be expected to employ a construction workforce of 81 persons.

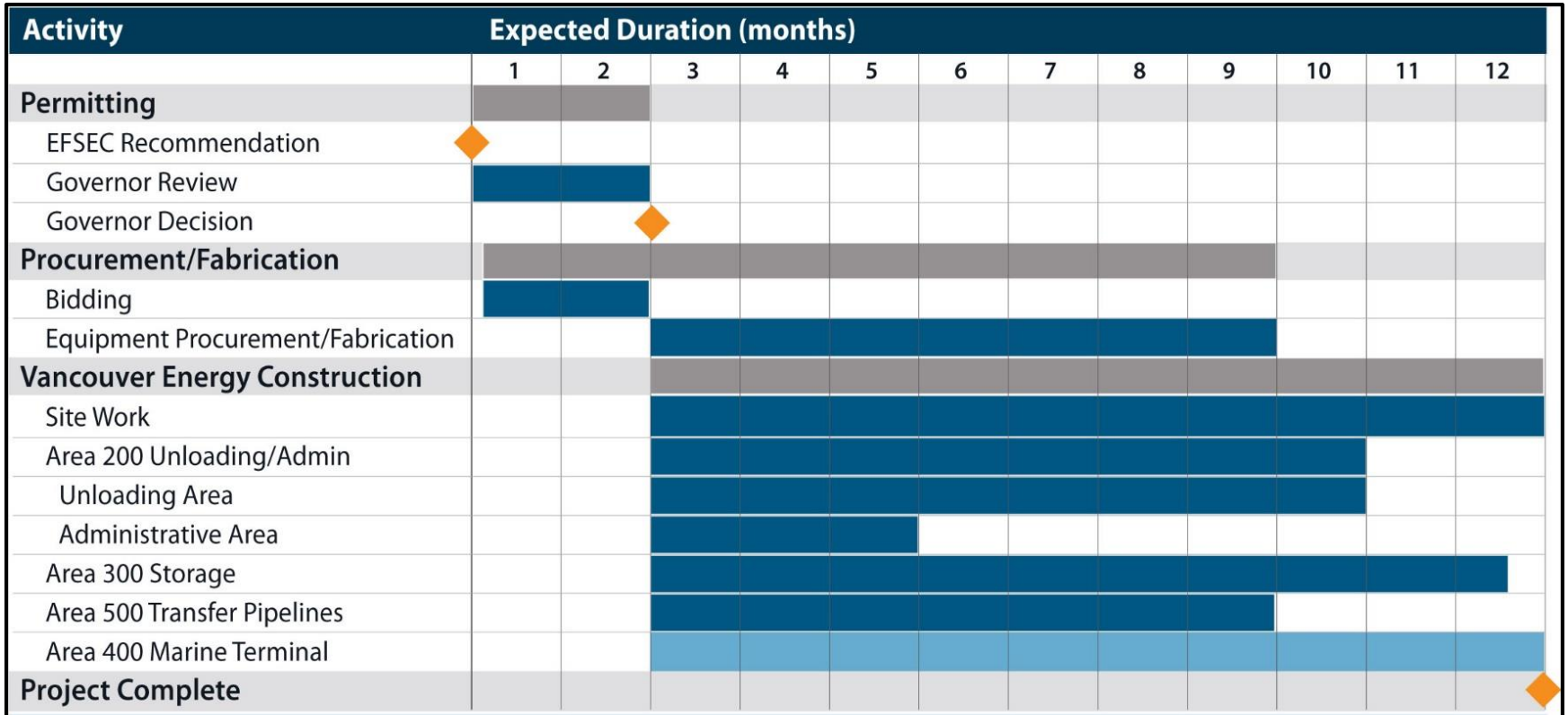
2.15.3 Operation

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 176 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.

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	
	Start-up	Full Build-out
Marine (dock, vessel securement, etc.)	16	19
Rail (engineers, switchmen, inspectors, etc.)	20	40
Trans-load (trans-loaders, tanks farm, trainers, etc.)	30	79
Safety, health, environment & maintenance (mechanics, maintenance, EHS, etc.)	9	13
Office/management (managers, coordinators, supervisors, etc.)	16	25
Total	91	176



Notes:

1)The schedule is represented as an expected duration in months.

2) The Applicant acknowledges that construction of in-water Marine Terminal components will be conducted outside the fish exclusion window. Therefore, the schedule shows a block of time held for this work. Specific timing and duration of work in Area 400 will depend on timing for start of construction in relation to the approved fish exclusion window.

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Figure 2.15-1. Construction Milestones (Revised)

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

As part of the ASC review process, the Applicant has developed a preliminary Construction Safety and Health Manual (CSHM) (Appendix D.2). Prior to beginning of construction, the Applicant will submit a final CSHM to EFSEC for review and approval. As part of its Construction Execution Plan, 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, which integrates the requirements of the Applicant's final CSHM at a minimum and complies 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
- Management of Construction Health, Safety, Security, and Environmental (HSSE) Activities
- Incident Investigation
- Accident Reporting and Documentation
- Asbestos Removal
- Blasting and Use of Explosives
- Bloodborne Pathogens
- Code of Safe Practices
- Cold Environment
- Communication
- Confined Space Entry
- Crane Operations
- Critical Lift Procedure
- Discipline
- Education and Training
- Environmental Protection
- Equipment

- Fire Protection
- Drug Testing
- Flammable and Combustible Liquids
- Fugitive and Dust Control
- Hazard Communication
- Hearing Conservation
- Hot Environments
- Housekeeping Practices
- Impalement Protection
- Job Hazard Analysis
- Ladders – Use, Handling and Storage
- Lead Abatement
- Lock and Tag Program
- Microbial Remediation Program
- Inspections by the Washington Department of Labor and Industries
- Outdoor Heat Exposure
- Personnel Hoisting
- Personal Protective Equipment (PPE)
- Portable Electrical Equipment
- Respiratory protection
- Safety and Health Audit
- Safety Orientation
- Scaffold Use, Assembly, and Dismantling
- Severe Weather
- Emergency Procedures
- Trenching and Excavation
- Trucking Compliance
- Work at Elevated Locations (Fall Protection)
- Proximity to Active Rail Lines
- Work Near or Over Water
- Off-Site Activities (Fieldwork)

In addition, the final CSHM and EPC construction safety plan(s) will incorporate the following revisions to address EFSEC's review of the preliminary plan (see Appendix M).

- Reference WISHA and OSHA standards.
- Identify that safety teams will be staffed based on crew size.
- Each construction contractor and/or subcontractor will implement behavior based safety programs for activities at the Facility construction site, based at a minimum on the elements described in the Applicant's CHSM.
- Delete section 5.4(d), because it is redundant with the overall contents of the CHSM.
- Correct the definition of ACM at Section 6.4(b) to >1% asbestos.
- Section 16 will be updated to reflect that all workers will receive safety orientation prior to working on the site. Attachment 12 is preliminary and will be updated to reflect training that

will be required for specific construction occupations at the site. Emergency Procedures training will be added to the list.

- Section 23 will be updated to conform to the latest updates to Hazard Communication published by OSHA and effective May 25, 2012.
- Section 34, Attachment 19 will be updated to reflect WISHA standards.
- Section 45.5 and Attachment 31 will be updated to reflect the correct depth of 4 feet for excavation protection.
- Subsection 47.4 will be updated to consistently reflect fall protection at four feet, and 10 feet for roofing, scaffold or steel erection work.
- A Hot Work program will be added to the CHSM.
- The table of contents will be reviewed and edited as appropriate to reduce the potential for confusion.
- The Applicant will also implement a safety program for Facility Operations. See section 4.1.4.

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:

- Implementation of safety and environmental practices consistent with the Applicant's final pre-construction plans
- 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
- Site-specific safety concerns
- Unusual conditions

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 2.3.1 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 cSWPPP. 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 (CMMP) that will be developed for the project (see section 4.1.3).

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 areas adjacent to the project site and would occupy approximately 57.2 acres. Final configuration will be determined based on construction needs. Construction staging and laydown activities would only occur in areas that have been previously disturbed and developed. Although in some locations light surface levelling might be required to provide safe access to construction employees and equipment, surface disturbance in these areas is not anticipated. 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 for upland construction activities, including, but not limited to:

- Earth-moving equipment: Compactors, loaders, backhoes, tractors, graders, pavers
- Materials-handling equipment: Concrete mixers and pumps, cranes, derricks
- Stationary equipment: Pumps, compressors, generators
- Mobile equipment: Cranes, hauling equipment, trucks
- Impact equipment: Pile drivers, ballast tampers
- Impact tools: Jackhammers, rock drills, pneumatic wrenches
- Steel assembly equipment: Welding and cutting tools
- Ground improvement equipment: See section 3.1.3.6
- Equipment to be used for water-oriented construction: See section 2.17.7

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 containment 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.

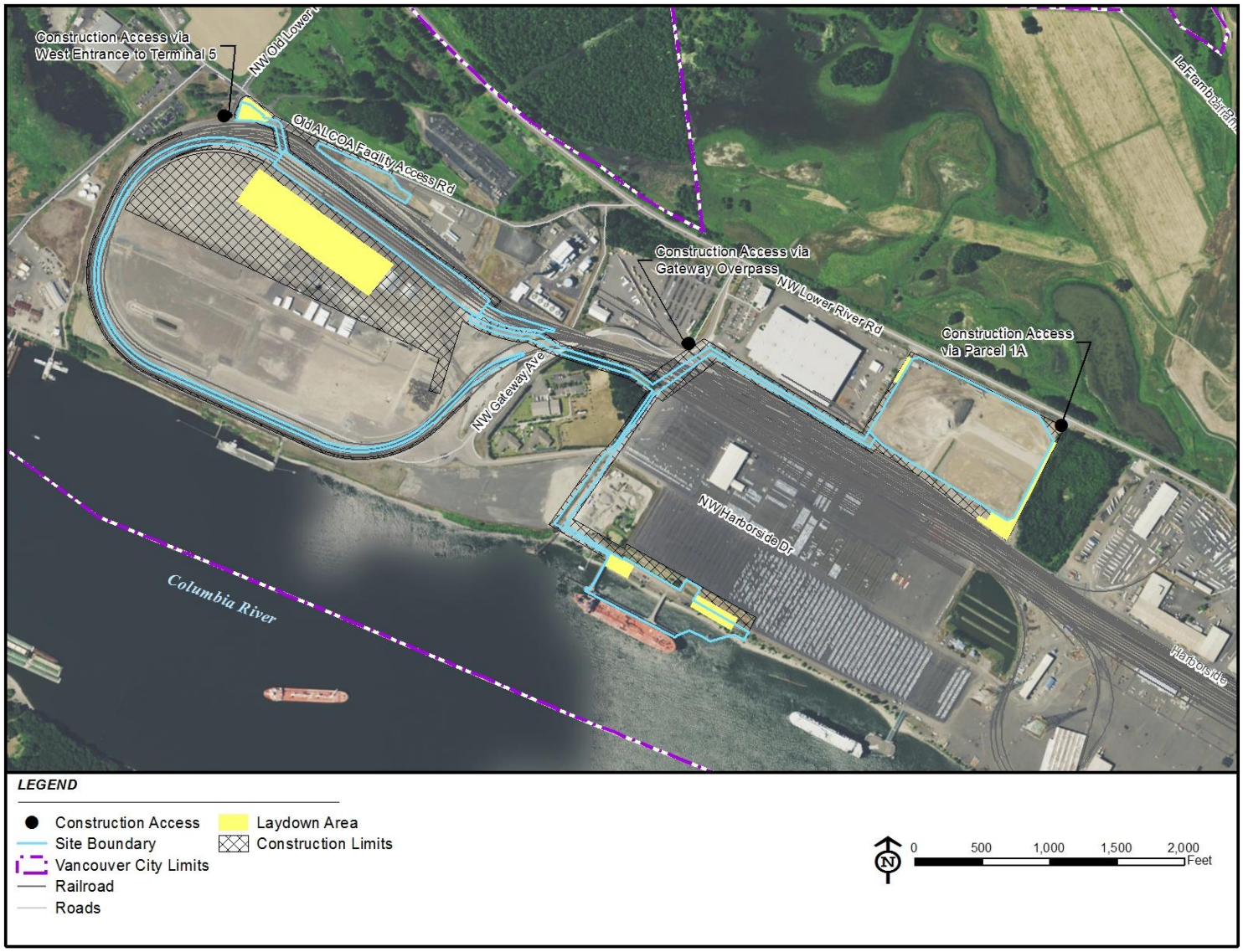

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Figure 2.17-1. Temporary Construction Boundary and Laydown Areas (Revised)

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 cSWPPP, Appendix C.1 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 cSWPPP and selected in accordance with the Stormwater Manual.

2.17.3 Foundations

Foundations, ground improvements, 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. Foundation types and ground improvements are described in section 2.18.1.4 below.

2.17.4 Area 300 - Storage Area

Ground improvements in Area 300 will first be constructed below each tank and below the transfer pipelines. 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, general grading of the storage tank area, and imported from off-site sources. Materials excavated from areas with potential contamination would be tested; if they are deemed contaminated, they would be disposed of in accordance with Port management procedures and replaced with clean fill for berm construction. Soils excavated from the construction of storage tank foundations could also be used. Soil types used for berm construction would be identified and selected in accordance with sound engineering practice. 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 2.3.6.

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 2.3.2, an approximate 4,900-foot-long rail loop will be constructed and 1,500 feet of existing track relocated to accommodate unit trains. Construction of the rail loop and track relocation will follow typical industry standards. The track alignment and construction limits will 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), 115-pound hardened steel continuously welded rails, mounted on either 8-foot-6-inch or 8-foot-3-inch crossties, and other miscellaneous materials. Crossties will be concrete for the most part, except at crossings where timber will be used. 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 or clipped 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 typical uniform ballast section.

2.17.6 Utilities

Natural Gas

Natural gas service will be obtained from Northwest Natural Gas. A service regulator and 4-inch-diameter service line will be required for the Area 600 Boiler Building. The existing 4-inch natural gas main in Gateway Avenue, which serves the Jail Work Center and other Port tenants, will be extended further south towards berths 13 and 14 to provide assist gas for the MVCU. A 4-inch main will be extended south in Gateway Avenue and then east in Harborside Drive. A meter will be placed on the Facility side of each of these connections.

Northwest Pipeline (Williams) has a 10-inch-diameter gas service running along the south side of Old Lower River Road within the site limits of the Area 600 Boiler Building and the Area 200 Administration and Support Buildings that supplies natural gas to the Clark Public Utilities River Road Generating Plant. A portion of this line will be relocated around the Area 600 Boiler Building. Relocation of the gas line will be completed by Northwest Pipeline (Williams) through a contract with the Applicant.

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-water and overwater construction. Additional details regarding dock improvement construction techniques are provided in section 2.3.7.2.

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
  - Underwater chainsaw
- Dump truck or wheeled excavator (for material removal on dock)
- Emergency response and safety equipment

Mobilization

The contractor will mobilize labor and equipment to the site. Laydown areas for materials and equipment will be located landward of the OHWM.

Demolition

In-water and overwater demolition will consist of removal of the existing breasting dolphin and associated walkways and removal of the existing deck and pile caps from those areas of the structure requiring seismic work. Demolition will generally proceed by removing existing concrete caps, and then removing the associated piles for each structure. Piles will be removed by vibratory extraction or by pulling them directly with a crane mounted on a barge. If a pile is unable to be extracted with the above methods 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 a recycling center. All pile removal activities below the OHWM will be conducted within the published in-water work window. Demolition may be conducted using land- and/or barge-based equipment.

Pile Strengthening

Prior to strengthening, the inside of the piles will be inspected for substrate that must be removed, if necessary. The piles were installed with partially closed ends and significant substrate is not anticipated to be present. The end of the pile will be opened with a drill to allow installation of the ground anchor. The ground anchor will likely consist of a steel threaded rod that will be inserted into a hole drilled into the substrate and secured with grout. A new steel pile

will then be placed inside the existing pile and concrete grout pumped into the piles to complete the pile work. This may be conducted using land- and/or barge-based equipment.

Overwater Construction

New concrete pile caps will be formed using water-tight forms. The superstructure will be constructed with steel framing with a steel grid deck and a poured in place concrete topping slab. Walkways and trusses will be manufactured off site and brought to the site for installation. Temporary piles (up to 40) may be used for the concrete formwork. Temporary piles will be 18- to 24-inch-diameter open-ended steel pipe or H-piles and will be installed with a vibratory hammer.

Other overwater portions of the project will include installation of associated on deck infrastructure, such as the hanging fendering system, bollards, handrails, etc.

Overwater construction may be conducted using land- and/or barge-based equipment.

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.

Upland Access Trestle Improvements

The project will install ground improvements at the upland end of the access trestle and along the shoreline. A series of drilled shafts will be installed at the Berth 13 Trestle abutment. Ground improvements, if required, will consist of vibro-compaction, stone columns or other similar method that results in the establishment of an area of denser soils through compaction and the placement of additional materials. Six 24-inch steel pipe piles will also support the access trestle. Pipe pile installation will require use on an impact pile driver. This work would not be limited to the in-water work window.

2.17.8 Commissioning

During commissioning, 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 Facility, the storage tanks will be hydrostatically tested to ensure they will meet operational stresses and loads prior to their receiving any crude oil and 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.

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 from natural hazards that could occur on or surrounding the Facility. Existing conditions, potential impacts, and mitigation measures, where appropriate, are discussed below. Additional information is also presented in section 3.1.3.

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

A preliminary ground improvement design was submitted to EFSEC for review (Appendix L.3). The design proposes the use of deep soil mixing (DSM) columns, jet grout columns, and wick drains to mitigate the liquefiable soils at the Facility site. Combinations of these methods have been selected as appropriate to the subsurface soils present within each area of the Facility. These methods are described below. 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.

The upland Facility elements will be designed assuming a Facility importance factor of 1 combined with the site classification recommendations from the geotechnical investigation report. The upland facilities will meet the design criteria of IBC 2012 as supplemented by city and state amendments and ASCE 7. Based on the site classifications of D and E and the site specific hazards analysis conducted, API 650, Appendix B, requires that mitigation measures be constructed to address seismic, and in particular, liquefaction. The API standards are designed for the protection of life and to prevent catastrophic collapse of the storage tanks. To meet the mitigation requirements of the API standard, a combination of ground improvements as described above will be constructed for the essential facilities to meet or exceed the standards. Foundations for upland aboveground structures are described in section 2.17.3. Ground improvements are described in section 2.18.1.4. Design of the dock modifications will conform to IBC 2012, as amended and adopted by the state of Washington and the City with the exception of mooring and berthing design, seismic design, and structural load combinations, which are not adequately addressed by IBC; these will be supplemented with applicable industry standards.

Seismic design will be a performance-based design approach using multi-level earthquake performance objectives. The dock design considers ground motion from the three levels of seismic hazards:

- Operational Level Earthquake—5.8 magnitude
- Contingency Level Earthquake—8.4 magnitude
- Design Earthquake—9.0 magnitude

During the Operational Level Earthquake, the structure will reach the operational limit on utilities with minor repairs necessary to regain dock operations. During the Contingency Level Earthquake, damage will occur to the structure but repairs could be accomplished. During the Design Earthquake, the structure will not collapse but significant damage could occur, likely beyond reasonable levels of repair. The dock improvements are described in section 2.17.7.

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 and ground improvement designs will be completed to address seismic conditions found at the site prior to construction. It is anticipated that EFSEC will contract with the City for the review of final project design for compliance with the required code provisions, as well as for providing the required inspections and issuance of occupancy permits. The Applicant will submit the required plans, which will be designed in compliance with the codes and requirements referred to above.

As confirmed by a series of three geotechnical site-specific field explorations of subsurface materials and conditions, presented in Appendices L.1, L.2, and L.3, mitigation solutions for the risk of liquefaction during a design level earthquake, 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.

Final ground improvement methods will be determined during design refinements and documented in construction plans submitted to EFSEC for review. The following section provides the type of ground improvements considered for each area of the Facility. Ongoing design and analysis will determine the final configuration of the ground improvements that will be installed; ground improvements may be refined as the design progresses. The final ground improvement selection and design will be documented in the Facility construction plans and submitted to EFSEC for review prior to beginning construction.

Area 300 (Storage)

Ground improvements will be constructed below each tank and the transfer pipeline. The ground improvements will consist of stone columns 3 feet in diameter and spaced approximately 8 feet on center (square grid spacing). The columns will be installed along the alignment of the pipeline to depths ranging from 25 to 47 feet below ground surface based on soil properties. At Tank 1, the base design is supplemented with two additional rings of more shallow stone columns (installed to 30-foot depth) to address potential differential settlement concerns in unusually poor soil conditions.

The tanks will be surrounded by a containment berm approximately 6 feet in height. A flexible impermeable liner will be used to mitigate the possibility of oil penetrating through the berm in the event of a seismic event. The berm will be designed in accordance with the requirements of WAC 173-180-320. WAC 173-180-320 (9)(c) specifically states "Secondary containment systems must be designed to withstand seismic forces," and sub (e) that "Secondary containment systems must be designed and constructed in accordance with sound engineering practice and in conformance with the provisions of this section."

As stated in the geotechnical report (GRI Dec. 2013, Appendix L.1), Area 300 is estimated to potentially experience between 6 to 10 inches of liquefaction-induced settlement during a seismic event. The containment berm design will have a capacity at least equal to 110 percent of the API 650 maximum capacity of the largest tank volume, plus precipitation from a 24-hour, 100-year storm event. This design results in a freeboard of 8 inches. In a worst-case scenario of a maximum liquefaction-induced settlement, at the same time as a 24-hour, 100-year, storm event, not only would the berm settle up to 10 inches but so would the other non-ground improved surface area inside of the berm. The settlement of the non-ground improved area inside the containment berm would be sufficient to contain the difference between the 10-inch liquefaction-induced settlement and the provided 8 inches of freeboard.

The geotechnical report addresses the seismic stability of the berm in terms of bearing capacity failure or breaching. Based on an assumed groundwater Elevation +12 feet, and the thickness of well-compacted structural fill at the storage site, the site will be mantled with 15 to 20 feet of non-liquefiable soils, which are not susceptible to reduction of seismic strength. Preliminary evaluation of the berm seismic stability indicates that the risk of seismic bearing capacity failure impacting the berm is low. The geotechnical report states there is a low risk of the design level earthquake damaging the berm and causing breaches.

Area 400 (Marine Storage)

A combination of jet grout columns, DSM panels, and stone columns to mitigate lateral spreading and liquefaction-induced settlement will be used. There are two zones of ground improvements in Area 400, the pipeline and the Marine Terminal abutment.

Ground improvements associated with pipeline includes stone columns, DSM, and jet grout. DSM panels will limit the potential liquefaction below the pipeline alignment, jet grout will provide vertical support of the pipe-rack foundation, and a series of stone columns will form a nonliquefiable buttress that stabilizes the shoreline area. The DSM panels are spaced approximately 35 feet apart and are planned to be 55 feet long, 6 feet wide, and extend to a depth of approximately 45 feet. A jet grout column will be situated below the DSM panels, which will be 8 feet in diameter and extend about another 32 feet below the DSM panels. The stone columns are located between the DSM panels and the top of the bank and are 3 feet in diameter and

spaced at 8 feet on center. The stone columns extend to the non-liquefiable soils at about 78 feet below ground surface.

Ground improvements in the vicinity of the Marine Terminal abutment will be located where the pipeline support transitions from foundations bearing on improved soils to pipe-racks supported by the dock structure. The area for improvement is approximately 160 feet long (parallel to the river) and 72 feet wide (perpendicular to the river). All ground improvements will begin landward of OHWM and will use jet grout to a depth of approximately 78 feet. Jet grout columns are approximately 6 feet in diameter and spaced to achieve replacement ratios between 40 and 100 percent. Landward of the jet grout block, a combination DSM/jet grout, as described above for Area 400 pipeline, would be constructed to support Area 400 facilities.

Within Area 400, the pipeline, pipeline supports, and the ground improvement are designed to function as a system. When subjected to design earthquake loading, the system will result in actual movements less than the movement that would be expected to cause pipeline rupture or other damage. Following a seismic event, the Applicant will undertake system inspection and repair.

The system is designed in accordance with all applicable building codes using widely accepted design methods. Analysis of the ground improvements indicates that if isolated and discontinuous zones of liquefaction may occur, and should these discontinuous zones of liquefaction develop, very little movement at the pipe supports is expected. Analysis indicates that, at the pipe supports, vertical movement less than 2 inches plus an additional 2 inches of horizontal movement is expected. The transfer pipes have been designed to accommodate this movement. The calculated movement includes the effects of lateral spreading associated with the portion of the riverbank between the pipe rack foundation and the top of the riverbank's slope.

Potential sliding of portions of the shoreline embankment south of and downslope from the system of proposed ground improvements is not mitigated by these improvements and, if this sliding occurs, it could deform the dock or displace a moored vessel. The dock structure has been analyzed for the potential impacts from failure of the slope on the piles. The improvements proposed by the Applicant have been designed to address these potential loads.

Deformation criteria for the pipeline supports near the abutment are indicated in the ground improvement basis of design. Additionally, universal tied expansion joints will be installed at the transition from the ground support to the support on the dock to mitigate differential movement between components.

Area 500 (Transfer Pipelines)

In Area 500, spread footing foundations will be constructed at anchor points along the length of the pipeline to ensure transfer pipelines are supported. The footings would have depths of 5 or 10 feet. The shallower depths would be used for non-anchor footings, and the deeper depths for anchor footings. The spread footings will be constructed by excavating the footing footprint, layering base materials, concrete forming and pouring, and backfilling. They are a common foundation construction technique for providing stability in weak soils. The design and size of the footings accounts for both the bearing capacity and resistance, but also settlement that may occur.

Area 600 (Boiler)
Ground improvements will not be necessary; the building will be constructed on a 1-foot-deep spread footing. The E-house will be constructed on a 2-foot slab-on-grade foundation.

Rail Infrastructure
Ground improvements will not be necessary; the rail loops will be constructed on concrete or wooden ties.

Ground Improvement Verification and Testing
Within Areas 300 and 400, following installation of stone columns, verification and testing will be performed using a series of cone penetration test (CPT) soundings. If required, geotechnical drilled borings and seismic penetration testing may be used with the CPT soundings. The CPT soundings will extend at least 3 feet below the bottom of the immediately adjacent stone columns and will be performed at least seven days after the column installation The CPT data will be analyzed by the ground improvement design engineer to evaluate achievement of the settlement design criteria. If the required settlement is not met, additional exploration, laboratory testing, and analysis will be conducted as necessary. See Appendix L.3, Section 7.0, for additional details.

Due to the sensitive fine grained soils in Area 300, the Applicant will hydro test each tank by slowly filling each tank with water over the period of one month. The plan is to fill each tank to the 25 percent level and maintain that loading for one week, followed by another 25 percent and maintaining for one week until the tanks are full and the full load has been maintained for a week. By doing so, the ground improvement system will accelerate drainage of the fine grained soils. One of the benefits of hydro testing each tank with water and holding the largest load for more than seven days is the over-consolidation of the fine-grained soils and a reduction of the anticipated secondary compression. See Appendix L.3, Section 7.0, for additional details.

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 4 inches or more of ash would be deposited at the site from eruptions throughout the Cascade Range, with the highest probability resulting 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 and the Construction/Operations Emergency Plan will be implemented to address ash fall.

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.

The project is located within the inundation area of the 500-year flood event. Floodwaters are anticipated to inundate the facilities with approximately 1-foot of water during the 500-year event. Facility design has taken this potential flooding into consideration. The containment berm around the product storage tanks provides protection against inundation. The below grade trenches will be water-tight eliminating inundation concerns during the 100-year flood, or from seasonal shallow groundwater. The unloading facility is located within the inundation area of the 500-year flood plain. Flood waters inundating the unloading facility would fill the below grade trenches and containment pans.

It is not anticipated that any fill will be placed in the 100-year 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.

In order to prevent the contamination of flood water, operating procedures will require that any crude oil spill including minor leaks and drips be contained and affected surfaces cleaned promptly limiting the amount of any residue that could comingle with flood waters inundating the containment pans, containment piping, and below grade trenches. In the event of flood events exceeding the 100-year or 500-year flood stages, the Applicant will monitor the rate of flood water rise and suspend threatened Facility operations prior to the flooding occurring.

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.

The Port has a professional full-time proprietary security force. This security force monitors Port property via roving random vehicle patrols, staffed gates, and monitored closed-circuit television (CCTV). The security force maintains a strong liaison with Vancouver Police Department (VPD) for security-related response.

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 prepared and submitted to EFSEC for review a preliminary construction security plan (Appendix D.4). The plan addresses regulatory requirements, threat assessment, and site security measures likely to be implemented (including access control, screening, traffic control, and incident procedures and emergency response). Area 400 – Marine Terminal lies within the Maritime Transportation Security Act (MTSA)-regulated area of the Port and is subject to the Port Facility Security Plan on file with the U.S. Coast Guard (USCG) in accordance with 33 CFR 105. As construction progresses, other locations of the site will also become subject to 33 CFR 105; such areas will be secured in accordance with the Applicant's facility security plan (see section 2.19.3 below). Because of the sensitive nature of the security plan prepared under 33 CFR 105[26], a detailed security plan cannot be disclosed publicly; the following provides a summary of the likely security provisions to be implemented.

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.

[26] Security plans for facilities subject to these regulations are considered Security Sensitive Information (SSI) under 49 CFR 1520 and subject to protection from general release.

The construction security plan will be drafted to comply with federal statutory and regulatory requirements under the MTSA of 2002, 46 U.S.C. § 70101, et seq. This federal statute and implementing federal regulations preempt any conflicting state and local regulations or requirements.

2.19.2.1 Site Security

The perimeter of the Port is fenced and gated to prevent unauthorized access to the Port. The overpass from Terminal 4 to Terminal 5 provides access to the rail loop at Terminal 5. Gates and traffic schemes are in effect to restrict access to the rail loop at the east base of the overpass. Facility specific security enhancements to physical security include increased fencing, gates, and possible staffed gate house with powered gates.

Construction will be secured via a combination of temporary fencing, portable lighting, and 24/7 security officers. Security officers will be hired from the Port or an outside vendor. Security officers will have redundant communications with the Port to report suspicious activity and to contact VPD for response. Security officers will work with Port security to provide mobile coverage of active construction sites.

Area 200 - Unloading

This construction site is located in the Terminal 5 rail loop. The rail loop may be in use by the Port and other tenants during construction. Potential threats include property crimes related to equipment and materials. Mitigations will include existing perimeter fencing, existing Port lighting, and existing random Port security patrols. Additional mitigations may include temporary fencing, portable lighting to enhance existing Port lighting, and 24/7 staffing by a contract security officer. Day/construction security officer duties will include access control in addition to monitoring. Afterhours duties will include patrols and monitoring of the site, construction equipment, and materials.

Area 300 - Storage

This construction site is located in Parcel 1A East. Potential threats include property crimes related to equipment and materials. Mitigations will include existing perimeter fencing, existing Port lighting, and existing random Port security patrols. Additional mitigations may include temporary fencing, portable lighting to enhance existing Port lighting, and 24/7 staffing by a contract security officer. Day/construction security officer duties will include access control in addition to monitoring. Afterhours duties will include patrols and monitoring of the site, construction equipment, and materials.

Area 400 – Marine Terminal

This construction site is located in Terminal 4, berths 13 and 14. Potential threats include property crimes related to equipment and materials. Mitigations will include the berths 13 and 14 that lie within the MTSA-regulated footprint of the Port. The Port controls access to the MTSA area via perimeter fencing, staffed entrance gates, Port lighting, random Port security patrols, and monitoring via security staff and CCTV. Additional mitigations may be considered to include portable lighting to enhance existing Port lighting, and 24/7 staffing by a contract security officer. Day/construction duties will include access control in addition to monitoring. Afterhours duties will include patrols and monitoring of the site, construction equipment, and materials.

2.19.2.2 Access Control

Access control to the construction sites will be the primary function of security during day/construction hours. Access control measures serve to mitigate unauthorized access to the sites for safety, security, and loss control risks. Access lists are coordinated with construction supervision to accommodate dynamic scheduling of construction. A Facility-specific decal will be provided to individuals who have completed the Facility-specific orientation. This decal will be required for unescorted access within the defined Facility boundaries.

Visitors and guests will be admitted to the site only after preapproval or coordination with construction supervision. All entrants will be required to initially provide a government-issued photo identification to match with access lists or to record visitor guest information. Visitor guest access and escort requirements will be determined by construction supervision weighing active construction and security risks.

TWIC escorts will be required for non-TWIC visitors and guests at Area 400 – Marine Terminal in accordance with Port procedures. A TWIC will be required for individuals working the marine loading construction area because this area is within the Port MTSA-regulated footprint. Although not required at the rail unloading construction site, nor for the storage tanks construction site, consideration will be given to requiring TWIC for other construction areas for construction crew flexibility.

2.19.2.3 Screening

Random entry screening of personnel and vehicles will be conducted by contract security to prevent the introduction of unauthorized individuals, substances, and devices to the construction sites. Screening rates will be coordinated with the Port to be in alignment with current Port security posture. Random exit screening will be conducted by contract security to mitigate potential loss of materials and tools. Any tools, materials, or equipment being brought out of the Facility will require an authorized Material Gate Pass. These passes will be obtained from the Facility HSSE lead. All items are subject to inspection prior to release.

Coordination with construction supervision will be conducted to manage deliveries and demobilizations.

2.19.2.4 Traffic Control/Blockage of Roadways

If a roadway managed by a public or private entity must be blocked or access restricted as a result of Facility work, advanced planning and notification to stakeholders will be conducted. All road closures and traffic control activities will be coordinated through the Facility HSSE lead or his delegate, and taking into consideration the construction traffic management plan.

2.19.2.5 Monitoring

Monitoring and random patrols of the construction sites will be the primary function after hours. Monitoring and random patrols serve to mitigate loss control and general crime risks. Monitoring and random patrols will encompass active construction sites, materials staging areas, equipment and tool storage areas, and any flammable or hazardous materials storage areas. Locked storage, trailers, Conex, cabinets, etc. will be used for storage when tools and materials are not in use.

2.19.2.6 Incident Procedures and Emergency Response

Site familiarization visits will be coordinated with construction supervision, contract security, Port security, Vancouver Police Department, and Vancouver Fire Department. These visits will

be conducted preconstruction and at major construction milestones to ensure safe and timely response to any emergent situation. Safe and timely access and egress routes will be clearly established. Standard clear nomenclature will be established to describe the construction site and site hazards. These visits will include a review of current threat status of the construction site, high value items and their storage strategies, and site hazards.

Emphasis will be given to potential risks to responders, including construction and flammable and/or hazardous materials on site. General site plot plans will be used to illustrate these visits. This plot plan will be updated with each major construction milestone or significant hazard change. A laminated portable copy will be provided to contract security.

A security incident reporting call list will be established to ensure timely and comprehensive notification of any security incident. Current 24-hour contact numbers with name and title will be included in the reporting procedure.

On-duty security will initiate incident reporting and will prepare a laminated plot plan with location of the incident clearly marked for emergency responders.

Telephonic threats or bomb threats will be reported to law enforcement. A bomb threat record sheet will be kept near the public or main listed telephone for the construction site.

Post incident procedures will include a root cause review of the incident to determine lessons learned and any possible modification to the security plan.

2.19.3 Operations Site Security Plan

The Applicant prepared and submitted to EFSEC for review a preliminary operations security plan (Appendix D.3, Section 3.2). The operations site security plan will be developed pursuant to 33 CFR 105 and will be approved by the Port and USCG.

Regulatory determination assumptions have been made based on terminal facilities with similar attributes but are subject to final determination of the federal regulators. It is assumed the entire Facility is subject to the MTSA of 2002, 33 CFRs 101 and 105 (MTSA).

Security plans for facilities subject to these regulations are considered Security Sensitive Information. (SSI) under 49 CFR 1520 and subject to protection from general release. The following provides a general description of how the Facility will meet these requirements without disclosure of SSI.

The Marine Terminal (Area 400) lies within the MTSA-regulated area of the Port and is also subject to the Port Facility Security Plan on file with the U.S. Coast Guard (USCG) in accordance with 33 CFR 105. The Port Facility Security Plan is SSI and not subject to release. General reference to the requirements are made without disclosure of Port SSI.

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. It is assumed that Area 200, Rail Unloading, is subject to the Transportation Security Administration (TSA) rail security regulations as detailed in 49 CFR 1520 and 1580.

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

As a result of the Facility's capacity to store and 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 MTSA of 2002, as implemented through 33 CFR 105, establishes federally mandated security requirements for facilities regulated under 33 CFR 154. 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(1)
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 (1)
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

(1) MARSEC directives and levels are established by the USCG under 33 CFR 101, Maritime Security: General.

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. 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 a TWIC
- 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

As identified in Appendix D.3, Section 3.2, the FSP will also address:

- Roles and responsibilities of Operators, Management, and Corporate Security in security activities
- The security administration and organization of the Facility
- Personnel training
- Drills and exercises
- Records and documentation
- Responses to change in MARSEC level
- Declaration of security with arriving vessels
- Communications
- Security systems and equipment maintenance
- Security measures for access control, including designated public access areas
- Security measures for restricted access
- Security measures for handling cargo
- Security measures for delivery of vessel stores and bunkers[27]
- Security measures for monitoring
- Security incident procedures
- Audits and security plan amendments
- FSA report
- Facility vulnerability and security measures summary

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.

[27] As noted elsewhere in this ASC, bunkering will not be permitted at the Facility; however federal regulations mandate that it be addressed in the FSP.

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

Since submittal of the original ASC in August 2013, and the ASC Supplement in January 2015, the Applicant has conducted additional studies and prepared reports and plans in support of preparation of EFSEC's DEIS, to supplement EFSEC's review of applications for air and water discharges, and to respond to concerns raised in EFSEC's DEIS. These additional analyses and plans have been appended to this revised ASC as follows:

- Appendix A
  - Cultural Resources Geoarcheological Investigation Report (April 2015)
  - Cultural Resources Inadvertent Discovery Plan (April 2015)
- Appendix B
  - Construction SPCCP (April 2015)
  - Operations SPCCP (June 2015)
  - Oil Spill Contingency Plan (June 2015, and revisions January 2016)
  - Operations Facility Oil Handling Manual (June 2015)
  - Spill Response Exercise (January 2016)
- Appendix C
  - Construction SWPPP (February 2015, revised August 2015)
  - Operation SWPPP (February 2015, revised October 2015)
- Appendix D
  - Construction Safety Manual (April 2015)
  - Operations Safety Program (April 2015)
  - Construction Security Plan (April 2015)
- Appendix F
  - Contaminated Media Management Plan (February 2015, revised August 2015)
  - Water Quality Protection and Monitoring Plan (February 2015, revised August 2015)
- Appendix H
  - Marine Mammal Monitoring Plan (April 2015)
  - Construction Wildlife Monitoring Plan (June 2015)
  - Wake Stranding in the Lower Columbia River Technical Report (January 2016)
  - Lower Columbia River Morphology and Fish Stranding Technical Report (January 2016)
- Appendix J
  - Transportation Impact Analysis (August 2013, revised July 2014)
  - Construction Traffic Management Plan (April 2015)
- Appendix K
  - Assessment of Vancouver Energy Socioeconomic Impacts: Primary Economic Impacts (July 2014)
- Appendix L
  - Geotechnical Investigation Vancouver Energy Upland Facility (December 2013, revised April 2015)

  - Geotechnical Investigation Tesoro Savage Vancouver Energy Distribution Terminal – Dock Facility (September 2014)
  - Vancouver Energy Terminal Ground Improvement Design – Areas 300 & 400 (April 2015)
- Appendix N
  - Fire Protection Design (July 2014)
  - Life Safety Design (July 2014)
- Appendix O
  - Facility Structural Design (April 2015)
  - Storage Tank Design (March 2015)
- Appendix P
  - Quantitative Vessel Traffic Risk Assessment (January 2016)
  - 2014 AIS Traffic Analysis (January 2016)
  - Facility Siting Study and Quantitative Risk Assessment (May 2016)

The Applicant is aware of the following studies and analyses, which are currently underway, or expected to be undertaken.

- The Applicant is coordinating with EFSEC and its consultant to conduct geotechnical modelling to respond to concerns raised in EFSEC's November 2015 Draft Environmental Impact Statement (Derr 2016).
- The Applicant is conducting a Tier II anti-degradation analysis being completed in accordance with WAC 173-201A-320 to demonstrate water quality compliance (May 2016).

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 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 primarily for delivery to refineries located on the West Coast of North America. 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 Applicant 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.

In order to meet the Applicant's purpose and need for the Facility, the following elements were deemed necessary to develop a facility of this type: (1) a deep-draft marine terminal ideally owned by a public port, with existing land use zoning to allow the Facility and with existing marine infrastructure; (2) a project site that has existing, or can accommodate, rail infrastructure capable of handling multiple unit trains to accommodate the proposed project capacity; (3) a site that is in close proximity to Class I rail access, and as close as possible to the source of the product to minimize the cost of rail transportation with a relatively central location to serve West Coast refineries; and (4) a site large enough to accommodate the remaining Facility elements, especially sufficient area for storage that allows product segregation to service multiple clients. In addition, a specific site has to be available for control by a potential applicant, and overall development of the project must be timely to meet current market needs.

Port locations in California do not meet the Applicant's purpose and need because they would be located furthest by rail from the crude production areas in the Midwest.

Of the eleven deep-draft ports in Washington State, three are located along the Washington side of the Columbia River system (Longview, Kalama, and Vancouver), seven are located in Puget Sound (Olympia, Tacoma, Seattle, Everett, Anacortes, Bellingham, and Anacortes), and one in Grays Harbor on the coast.

At the time of original ASC submittal (August 2013), the Port of Kalama was advertising the "Northport" 70-acre Marine Heavy industrial site, located in the northern area of the port (Port of Kalama, 2014). This site is accessible from a BNSF spur, but is not currently developed to accommodate unit trains. A previous development proposal for this site investigated the potential to add rail infrastructure to accommodate unit trains (URS, 2006); however the proposal was dependent on the filling of wetlands to accommodate the rail infrastructure (as of January 2014, these wetlands had not yet been filled (Carrico, 2014)). In addition, rail capacity for use of this location has been identified as constrained due to trains leaving/entering the main BNSF lines at Kalama (BST Associates, et al., 2011). Use of this site for any type of cargo would also require the development of a new vessel berth and dock (Port of Kalama 2016). Due to the lack of rail

infrastructure, existing rail capacity constraints, and need for a new berth and dock, this location would not meet the Applicant's criteria for development of the Facility. Since 2013, this site has been chosen by the Port of Kalama and Northwest Innovation Works for a methanol production facility and is, therefore, no longer available (Port of Kalama and Cowlitz County 2016).

The former Reynolds Metal aluminum smelter site in Longview is already proposed for the location of a coal export facility (Millennium Bulk Terminal). The Port of Longview is currently advertising a heavy industrial zoned 49-acre site at its east industrial park (Port of Longview 2014); an existing marine dock at the site services an existing grain terminal, and would not be available for use by another tenant. Due to the lack of marine infrastructure, this site does not meet the Applicant's criteria for development of the Facility. Public port locations in northwestern Washington (Anacortes, Bellingham, Everett), though accessible directly by mainline rail, or spur to mainline rail, are also situated furthest from the crude production areas with respect to rail transportation, and for the most part lack the area necessary to implement unit train handling. The Port of Port Angeles is not served by rail. Potential sites that could accommodate unit train infrastructure at the Port of Tacoma were under the control of others. The Port of Seattle is specialized in containerized intermodal activities, and does not have the necessary infrastructure to accommodate unit trains. The Port of Olympia is accessible by rail spur from the BNSF mainline, but does not have any real estate currently available to accommodate a 45-acre development (Port of Olympia 2014). Suitable project sites may exist at the Port of Grays Harbor. However these locations themselves are currently under development, and are not available for control by the Applicant.

In Oregon, reasonable rail access is available at the following deep-draft ports: Astoria, Newport, Portland and St. Helens (Parsons Brinckerhoff 2010). The Port of Portland is the only port served directly by a mainline railroad. The Port of Portland is in close proximity to the Port of Vancouver, and potential environmental issues would likely not be materially distinguishable from the Port of Vancouver site. In May 2014, the Port of Portland issued a statement to the effect that it will wait for "sufficient answers to the important questions regarding environmental and physical safety to proceed with any type of [crude-by-rail] development at this time" (Port of Portland 2014); in November 2015, the City of Portland passed a resolution wherein it actively opposes expansion of infrastructure whose primary purpose is storing or transporting fossil fuels in or through Portland (City of Portland 2015). Further, the Port of Vancouver, not the Port of Portland, solicited bids for this development. The remaining three Oregon ports are served by short line rail spurs. The Port of St. Helens is already the location of a smaller crude-by-rail facility.

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. The Port of Vancouver is one of the closest available port to the source of domestic crude oil, and is reasonably central in location to the West Coast refineries.

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. Therefore, the use of Terminal 5 and the existing WVFA infrastructure by unit trains and their impact on rail volumes and frequency has been fully anticipated; the cargo proposed to be handled (crude oil) is

but one of the cargoes that could take advantage of infrastructure fully anticipated as a matter of land use planning and development.

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.
- In addition, a covered unloading facility would minimize the exposure of workers to the elements and provide safer work conditions.

2.22.3 Water Supply and Usage Alternatives

As described in section 2.6.2 above, the Applicant investigated alternative water supply sources, and the potential for reusing treated wastewater from the City's WWTP.

2.22.4 Wastewater Discharge

As noted in section 2.9.5, 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 pretreatment systems are standard equipment. The Applicant completed a detailed wastewater characterization for the proposed industrial wastewater discharge streams. Detailed modeling of the boiler plant was completed by DMS-Nalco and is based upon DMS-Nalco's expertise modeling, maintaining, and servicing local boiler facilities. The full wastewater characterization report is included in section 5.3. The industrial wastewater discharges from the Facility will meet the requirements of the City's Pre-Treatment Ordinance in VMC 14.10 (Makarow 2016). The Applicant is considering discharge alternatives and a summary of those are presented in section 2.9.3.

2.22.5 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.

2.22.6 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 piles, creating all new over-water surface, and possible bank modifications. Selection of the existing berths over a greenfield location significantly minimized new impacts, and all additional new impacts will be fully mitigated.

Since submittal of the ASC in August 2013, the Applicant continued to refine berth modifications to achieve the minimum number of additional, permanent impacts to the aquatic environment and are reflected in the revised ASC submitted February 2014 (BergerABAM 2014). The August 2013 proposal focused on providing the optimal and safe mooring configuration by reinforcing the existing berth structure. Overall, the previous proposal would have included the installation of new permanent piling and the creation of additional overwater coverage (which would have been mitigated by removing the existing piling at another location). Through continued design, the Applicant developed a proposal that allows the strengthening of the existing structure by in-place improvement of existing piling, and by tying the structure into improvements constructed in the upland portion of the shoreline. This design modification resulted in a configuration that requires no new permanent in-water piling, and which minimizes the additional overwater coverage while enhancing berth structural conditions.

2.22.7 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.

In August 2014, the Applicant chose to use electrical energy to provide heat to two of the six storage tanks instead of using natural gas fired boilers, and proposing a limitation on the use of Area 200 boilers (Flint 2014). This resulted in an overall Facility emissions reduction, especially for greenhouse gas emissions.

2.22.8 Route Selection

Route selection is not applicable to this Facility, as the Facility does not have any linear electrical or gas transmission elements.

2.22.9 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. 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
MMPA	USFWS and NMFS 50 CFR 18 and 50 CFR 216	3.4, Appendix H.1
Migratory Bird Treaty Act	USACE and USFWS 16 USC 703, Executive Order 13186, 50 CFR 21	3.4
Bald and Golden Eagle Protection Act	USFWS 16 USC 668, 50 CFR 22	3.4
NHPA Section 106 Review	USACE, in consultation with DAHP 16 USC 470	4.2.5
Section 10 Permit	USACE Rivers and Harbors Act 33 CFR 322	Appendix H.2
PATON Permit	USCG 33 CFR 62	4.3
Hazardous Materials & Oil Transportation Regulations	U.S. Department of Transportation 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
Rail Security Regulations	TSA 49 CFR 1520 and 1580	2.19
Facilities Transferring Oil or Other Hazardous Materials in Bulk	USCG 33 CFR 154 Subpart E Vapor Control Systems 33 CFR 154 Subpart F Response Plans for Oil Facilities	4.1.4.2

Permit or Approval	Agency/Statute and/or Regulation	Application Section
Oil and Hazardous Material Transfer Operations	USCG 33 CFR 156	2.10
Discharge of Oil ("Sheen Rule")	EPA 40 CFR 110	2.10
Oil Pollution Prevention	40 CFR 112, Subpart A, Subsection 112.8 of Subpart B	2.10
EPCRA	EPA 40 CFR 350-372	4.1.6.1
CERCLA	EPA 42 USC 103	4.1.3
Pretreatment Section 307(b)	EPA Section 307(b) of the Clean Water Act, 40 CFR 403	2.9
State Permits/Approvals		
SEPA Compliance	Ecology (EFSEC lead agency for this project) RCW 43.21C and WAC 197-11	Parts 2, 3, and 4
Section 401 Water Quality Certification	Ecology Section 401 CWA	3.3
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
Aquatic Land Management	DNR RCW 79.105 and WAC 332-30-123	H.2
NPDES Industrial Stormwater Permit and oSWPPP	Ecology CWA, 40 CFR 122.28, RCW 90.48 and WAC 173-220	2.11, 3.3, 5.2 Appendix C.2
NPDES Construction Stormwater Individual Permit and cSWPPP	Ecology CWA, 40 CFR 122.28, RCW 90.48 and WAC 173-220	2.11, 3.3, 5.3 Appendix C.1
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 WAC 173-180 (Facility Oil Handling Standards)	2.10, 2.19, 4.1
Vessel Oil Transfer Advance Notice and Containment	Ecology WAC 173-184	4.1
Spill Prevention and Contingency Plans	Ecology RCW 90.56 (Oil and Hazardous Substance Spill Prevention and Response), WAC 173-180 (Facility Oil Handling Standards), WAC 173-182	2.10, 2.11, 5.2, 5.3

Permit or Approval	Agency/Statute and/or Regulation	Application Section
	(Oil Spill Contingency Plan), WAC 173-183 (Oil Spill Natural Resource Damage Assessment) 40 CFR 300 (National Oil and Hazardous Substances Pollution Contingency Plan)	
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
Hazardous Chemical Emergency Response Planning And Community Right-To-Know Reporting	Ecology WAC 118-40	4.1.6.1
Boiler and Unfired Pressure Vessel Rules	Labor and Industries RCW 70.79;WAC 296-104	2.3
Washington State Waste Discharge Permit Program	Ecology WAC 173-216	2.9
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.1
Major Grading Permit	City IBC, VMC Title 12 and Title 17	3.1, Appendix I.1
Civil Engineering Review	City VMC Title 10, Title 11, and Title 14	Appendix F.2, I.1, J.1
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
Hazardous Materials Regulatory Fee Certificate	City of Vancouver VMC 16.40	2.3, 4.1.6.1
Industrial Waste Discharge Permit	City Wastewater Discharge Standards WAC 173-221A VMC 14.10	5.2

Permit or Approval	Agency/Statute and/or Regulation	Application Section
Air Discharge Permit(s)	SWCAA Federal Clean Air Act (as delegated to SWCAA) Washington Clean Air Act RCW 70.94 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 TAPs WAC 173-460 Particulate Matter WAC 173-470 Sulfur Oxides WAC 173-474 VOCs WAC 173-490 BACT WAC 173-400-113 Reporting of Emissions of Greenhouse Gases WAC 173-441 Mandatory Report of Greenhouse Gas Rule 40 CFR 98 General Conformity Rule 40 CFR 93, Subpart B	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 could require the preparation of an environmental assessment (EA) or environmental impact statement (EIS), or may rely on programmatic NEPA compliance available through one or more Nationwide Permits. 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 2.23.2.8).

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 be 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) was prepared and submitted in September 2014 to the USACE as the federal lead for consultation with the USFWS and NMFS. The BE was revised in December 2014 to respond to comments received from the USACE in a Memorandum for the Record (MFR), dated November 19, 2014. A final August 2015 revision responds to comments received from the USACE, USFWS, and NMFS, in a letter from the USACE, dated May 28, 2015, regarding the effects analysis, effects determinations, and extent of the Action Area in which the impacts are evaluated. Federal agency concurrence with the BE was obtained from USFWS on March 16, 2016. NMFS' review of the BE is ongoing as of May 2016.

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 was prepared and submitted in September 2014 to the USACE as the federal lead for consultation with NMFS. The BE was revised in December 2014 to respond to comments received from the USACE in a MFR, dated

November 19, 2014. A final August 2015 revision responds to comments received from the USACE, USFWS, and NMFS, in a letter from the USACE, dated May 28, 2015, regarding the effects analysis, effects determinations, and extent of the Action Area in which the impacts are evaluated. Federal agency concurrence with the BE was obtained from USFWS on March 16, 2016. NMFS' review of the BE is ongoing as of May 2016.

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. 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 removal associated with the improvements to berths 13 and 14 will generate sound levels that could exceed established disturbance thresholds for marine mammals. The Applicant has developed and submitted to the USACE and EFSEC for review a marine mammal monitoring plan (MMMP) (Appendix H.3) for vibratory installation and removal of temporary piles and upland impact pile driving. The MMMP was developed to minimize the exposure of marine mammals to temporarily increased underwater noise levels. The plan describes procedures to identify the presence of marine mammals during construction activities, which may result in "take" and establishes actions that will be taken to minimize impacts to such marine mammals.

2.23.2.5 Migratory Bird Treaty Act

USFWS and USFWS
16 USC 703, Executive Order 13186 and 50 CFR 21

The Migratory Bird Treaty Act of 1918 prohibits the taking or possessing of and commerce in certain migratory birds.

Project Compliance

The proposed project is not expected to result in the taking, possession, or commerce of migratory birds.

2.23.2.6 Bald and Golden Eagle Protection Act

USFWS
16 USC 668 and 50 CFR 22

The Bald and Golden Eagle Protection Act of 1940 prohibits the taking or possessing of and commerce of bald and golden eagles with limited exceptions (16 USC 668–668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978). The statute is administered by USFWS. Potential

occurrence of bald eagles in the vicinity of the proposed Facility and potential impacts from the proposed project are discussed in section 3.4.

Project Compliance
The proposed project is not expected to result in the taking, possession, or commerce of bald and golden eagles. A construction wildlife monitoring plan will be implemented during impact pile-driving and vibratory pile installation and removal activities to demonstrate that noise levels attenuate to a level of non-disturbance to bald eagles potentially present in the vicinity of the construction site.

2.23.2.7 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 2.23.4.7. A cultural resources report has been prepared and submitted to the USACE as part of the Section 10 permit process. The Applicant has submitted a preliminary cultural resources inadvertent discovery plan (CRIDP) (Flint 2015) to the USACE and EFSEC for review (Appendix A.3). The inadvertent discovery plan describes the procedures to be implemented in the event of the discovery of previously unidentified archaeological resources during construction of the Facility, and in the event ground disturbing activities are required in response to an emergency event during operations.

2.23.2.8 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, may trigger 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 was submitted on February 14, 2014 to the USACE for review and potential issuance of the Section 10[28] permit or acknowledgement that the work is authorized through one

[28] The USACE issued public notice for review of an individual permit application in July 2015. The USACE Public Notice references review under Section 404 of the CWA for placement of fill inside existing piles. The Applicant has provided comments to the USACE that Section 404 does not apply in this situation (Carson 2015).

or more nationwide permits. The JARPA was submitted with applicable reports and studies completed for the project to demonstrate how the project complies with the permitting requirements. A revised JARPA was submitted to the USACE in July 2015.

2.23.2.9 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.

2.23.2.10 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.

2.23.2.11 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.

2.23.2.12 Maritime Transportation Security Act (MTSA)

USCG
33 CFR 101-107

The 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.

2.23.2.13 Facilities Transferring Oil or Other Hazardous Materials in Bulk

USCG
33 CFR 154 Subparts A through F, and Subpart P

The 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.

Subpart F, *Response Plans for Oil Facilities*, addresses oil spill response contingency planning for fixed marine transfer 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).

Subpart P, *Vapor Control Systems*, regulates the manner in which vapors inside marine vessels are collected, conditioned, and then disposed of to ensure the safety of the loading operation at all times. 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.

Project Compliance

The Facility will incorporate the necessary design elements to comply with these regulations, and the Applicant will make the necessary submittal to the USCG to obtain approval of the MVCU prior to beginning operations of the vessel loading systems, and prepare a spill response contingency plan.

2.23.2.14 Oil and Hazardous Material Transfer Operations

USCG
33 CFR 156

This regulation 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. The regulation establishes procedures for advance notification of transfers to the USCG, design considerations for the equipment used to transfer oil, supervision and monitoring of transfer operations, and transfer equipment tests and inspections.

Project Compliance
The Applicant will design the transfer equipment to comply with the requirements of 33 CFR 156, and will implement the necessary procedures for advance notification, supervision and monitoring, and tests and inspections.

2.23.2.15 Discharge of Oil ("Sheen Rule")
EPA
40 CFR 110

This regulation addresses the reporting of spills to the National Response Center.

Project Compliance
The Applicant will document and implement the requirement to notify the National Response Center in the event of reportable spills of oil in its cSPCCP, oSPCCP and spill response contingency plan.

2.23.2.16 Oil Pollution Prevention
EPA
40 CFR 112

Subpart A and Subsection 112.8 of Subpart B, address the requirements for an oSPCCP 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).

Project Compliance
The Applicant will develop and implement an oSPCCP.

2.23.2.17 EPCRA
EPA
40 CFR 350-72

The Emergency Planning and Community Right-to-Know Act (EPCRA) establishes requirements for federal, state and local governments, Indian Tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. Based on the quantities of crude oil stored and the presence of extremely hazardous substances contained in the crude oil stored on-site in quantities greater than corresponding threshold planning quantities TPQs, the Facility is likely to be required to participate in emergency planning efforts with the Clark County Local Emergency Planning Committee, and to file reports with EPA and Ecology.

Project Compliance
The Applicant will make the necessary determinations regarding the quantities of extremely hazardous substances stored on site in relation to the corresponding threshold planning quantities and will initiate applicable planning and reporting activities in consequence.

2.23.2.18 CERCLA

EPA
42 USC 103

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) establishes cleanup requirements for uncontrolled or abandoned hazardous-waste sites, as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Terminal 5 is the former location of an aluminum smelter and cleanup activities have been performed pursuant to CERCLA. The project site is subject to the consent decree and environmental restrictive covenants implemented by Ecology for the existing site contamination left in-place by the former operations.

Project Compliance

Construction of the Facility will comply with the site-specific restrictive covenants, consent decrees, MTCA, RCRA, and Dangerous Waste Regulations, as well as the CMMP developed for the project. Disturbance of the deed restricted areas will be avoided to the extent practical.

2.23.2.19 Pretreatment Section 307(b)

EPA
Section 307(b) of the Clean Water Act, 40 CFR 403

Section 307(b) of the Clean Water Act (CWA) establishes pretreatment standards for toxic pollutant discharge to publicly owned treatment works.

Project Compliance

The Facility will discharge to the City of Vancouver Wastewater Treatment Plant and will comply with the General Pretreatment Standards outlined in 40 CFR 403, WAC 173-216, and VMC 14.10.080 as described in section 2.9.

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 Section 401 Water Quality Certificate

Ecology
Section 401 Clean Water Act

A Section 401 water quality certification is required by the federal permitting agency (USACE) when an activity may result in any discharge into navigable waters. Water quality certificates are issued by Ecology.

Project Compliance
The project will require an individual 401 water quality certification. The Applicant included a JARPA in the ASC, and has prepared a water quality protection and monitoring plan.

2.23.3.3 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. WDFW will also likely review the project for consistency with management recommendations that have been developed to protect habitat for designated Priority Habitats and Species.

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.

2.23.3.4 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.

2.23.3.5 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.

2.23.3.6 NPDES Industrial Stormwater Permit and Operations Stormwater Pollution Prevention Plan

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. An oSWPPP and monitoring plan is a requirement of the NPDES permit.

Project Compliance

Section 5.3 includes the required application materials for the NPDES permit. A preliminary oSWPPP is included in this Application in Appendix C.2.

2.23.3.7 NPDES Construction Stormwater Individual Permit and Construction Stormwater Pollution Prevention Plan

Ecology
Clean Water Act, 40 CFR 122.28, RCW 90.48 and WAC 173-220

An NPDES Construction Stormwater Individual Permit is required for the Facility.

Project Compliance

A preliminary cSWPPP has been developed and submitted to EFSEC. A final cSWPPP will be submitted prior to construction and will be maintained throughout construction. The cSWPPP covers inspection, monitoring, and reporting as required during construction. The cSWPPP will detail specific applications in which BMPs will be installed to prevent and mitigate any construction-related impacts to surface water.

2.23.3.8 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.

2.23.3.9 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. A preliminary Operations Facility Oil Handling Manual is included as Appendix B.5.

2.23.3.10 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.

2.23.3.11 Spill Prevention and Contingency Plans

Ecology
40 CFR 112, 40 CFR 300, RCW 90.56, WAC 173-180 and WAC 173-182, WAC 173-183

An SPCCP 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 cSPCCP 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

A preliminary cSPCCP and oSPCCP are included in Appendices B.2 and B.3, respectively, to address WAC 463-60-205 and described in sections 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 SPCCPs for both construction and operations will be completed prior to the beginning of construction or operations.

2.23.3.12 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. Should any hazardous materials be excavated from the site during the construction, they will be handled in accordance with existing covenant requirements and disposed of in accordance with applicable state and federal regulations.

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.

2.23.3.13 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. Preliminary construction and operation safety plans are provided as Appendices D.2. and D.3, respectively.

2.23.3.14 Hazardous Chemical Emergency Response Planning and Community Right-To-Know Reporting

Ecology
WAC 118-40, RCW 38.52.030(2); 38.52.050 (1) and (3); and 43.63A.060.

This chapter implements the provisions of EPCRA in the state of Washington to establish a mechanism for compliance by state and local governmental agencies and industry. Compliance with the requirements of EPCRA, as recognized by the United States Environmental Protection Agency, is regarded as compliance with the provisions of this chapter.

Project Compliance
The Applicant will make the necessary determinations regarding the quantities of extremely hazardous substances stored on site in relation to the corresponding threshold planning quantities and will initiate applicable planning and reporting activities in consequence.

2.23.3.15 Boiler and Unfired Pressure Vessel Laws and Rules

Labor and Industries
RCW 70.79; WAC 296-104

These laws and rules establish requirements for construction, installation, repairs and general requirements applicable to boilers.

Project Compliance
The boilers will be designed, installed, and operated in accordance with these provisions.

2.23.3.16 Washington State Waste Discharge Permit Program

Ecology
WAC 173-216

The Washington State Waste Discharge Permit Program was established to satisfy the requirement for discharge permits under the Water Pollution Control Act, Chapter 90.48 RCW and to implement applicable pretreatment requirements under Section 307 of the Federal Water Pollution Control Act. Ecology delegates authority to the City of Vancouver to permit and accept industrial wastewater discharges. However, RCW 90.48.262 states that EFSEC shall issue Waste Discharge Permits for energy facilities subject to Chapter 80.50 RCW.

Project Compliance
The project will comply with the City's industrial pretreatment ordinance VMC 14.10 and will submit to EFSEC for issuance of permit an Industrial Waste Discharge Permit as described in section 2.23.5 and as submitted in section 5.2.

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 and operating capacity, 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 capacity. 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.1 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 cSWPPP will be developed and implemented. A preliminary cSWPPP is included in as Appendix C.1; this preliminary cSWPPP was developed based on the Facility level of design at the time of submittal. A final cSWPPP will be developed prior to beginning any Facility-related ground disturbance.

BMPs will be used in accordance with the cSWPPP 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 the Engineering Report in section 5.3 of this ASC. 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.

2.23.4.5 Hazardous Material Regulatory Fee Certificate

City
VMC Title 16.40

Title 16.40 of the VMC requires that no hazardous materials occupancy shall operate within the City of Vancouver without a hazardous material regulatory fee certificate.

Project Compliance
Certificates are issued upon payment of the hazardous material regulatory fee.

2.23.4.6 Critical Areas Protection

City
VMC Title 20.740

VMC 20.740 designates ecologically sensitive and hazardous areas (critical areas) establishes criteria to protect their functions and values. Critical areas protected include geologically hazardous areas, wetlands, frequently flooded areas, and wildlife habitat conservation areas.

Geologic Hazard Areas
The Critical Areas Protection ordinance (VMC 20.740.130) adopts standards for geologically hazardous areas including landslide, seismic, and erosion hazard areas. The ordinance provisions are designed to protect human health and safety, infrastructure and to avoid impacts on adjacent hazards. The provisions related to seismic hazards require compliance with the adopted building codes.

Wetlands
VMC 20.740.140 establishes standards for development or clearing activities within wetlands and associated wetland buffers. These standards require that project activities result in no net loss of wetland or buffer functions. Base buffer widths are established based on wetland category, wetland characteristics, and land use intensity.

The Facility would be sited on an existing industrial site and would not result in any impacts to wetlands or wetland buffers.

Frequently Flooded Areas
VMC 20.740.120 establishes standards for development within the 100-year floodplain. These standards require development within the 100-year floodplain to be developed in a manner that

prevents increased risk of flooding and flood damage on adjacent properties and to ensure that structures are built to withstand floods.

Wildlife Habitat Conservation Areas

VMC 20.740.110 establishes standards for development within fish and wildlife habitat conservation areas. Project activities at berths 13 and 14 in Area 400 are located within the riparian management area and riparian buffer area of the Columbia River. The riparian boundaries are measured landward from the biological OHWM and are limited by existing impervious surfaces.

The City adopts state-designated Priority Habitats and areas associated with Priority Species, as fish and wildlife habitat conservation areas. WDFW publishes a list of Priority Species and Habitat. These are species that require special management for their survival due to their population status, sensitivity to habitat alteration, and/or recreational, commercial, or tribal importance. Priority Species include state endangered, threatened, sensitive, and candidate species; animal aggregations (e.g., heron colonies, bat colonies) considered vulnerable; and species of recreational, commercial, or tribal importance that are vulnerable.

Project Compliance

If not reviewed through the EFSEC process, the proposed project would be subject to the City's critical areas review process as described in VMC 20.740.040. The Applicant would prepare a critical areas report in accordance with VMC 20.740.050. The Applicant has demonstrated compliance with the provisions of the Critical Areas Code in the following sections: Geologic Hazards – sections 2.18 and 3.1; Wetlands – section 3.5; Frequently Flooded Areas – section 3.3; Wildlife Habitat Conservation Areas – section 3.4 and Appendix H.1.

2.23.4.7 Archaeological Resource Protection

City

VMC Title 20.710

VMC 20.710.020 establishes procedures and criteria for determining a project's impact on archaeological resources. It requires preparation of a study or survey to determine the potential presence of archaeological resources and if a significant archaeological resource is present, it needs to be shall be further evaluated, avoided, properly mitigated, or properly recovered.

Project Compliance

The geoarchaeological investigation conducted for the project, as well as previous studies, indicate a low likelihood for encountering cultural material during construction. The Applicant has submitted a preliminary CRIDP (Flint 2015) to EFSEC for review (Appendix A.3) that describes the procedures to be implemented in the event of the discovery of previously unidentified archaeological resources during construction of the Facility, and in the event ground disturbing activities are required in response to an emergency event during operations.

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 is 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

The project will comply with the City's industrial pretreatment ordinance VMC 14.10 and will submit to EFSEC for issuance of permit an Industrial Waste Discharge Permit as described in section 2.23.6 and as submitted in section 5.2.

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, 40 CFR 98, 40 CFR 93 Subpart B, RCW 70.94 and WAC 173-400-110, WAC 173-401, WAC 173-441, 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 that trigger applicable permitting requirements. Per WAC 463-60-537 a Notice of Construction application is included with this Site Certification Application for criteria pollutant emissions that do not trigger PSD thresholds and for hazardous and toxic air pollutants.

The application includes the requisite 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.

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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. Three series of field explorations of subsurface materials and conditions were conducted. A geotechnical investigation of Facility upland areas was conducted in the summer of 2013. The report of these investigations is provided as Appendix L.1 to this ASC. The investigation addressed the entire Facility site with the exception of a portion of Area 300. A geotechnical investigation of project areas around the proposed berth modifications was completed in the summer of 2014. The report of these investigations is provided as Appendix L.2 to this ASC. Finally, additional geotechnical investigations were completed in areas 300 (including the locations that were not tested in 2013) and 400 in late 2014. The report of these investigations is provided as Appendix L.3 to this ASC.

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, compaction and subsurface soil improvements 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 as addressed in Appendices L.1 through L.3.

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

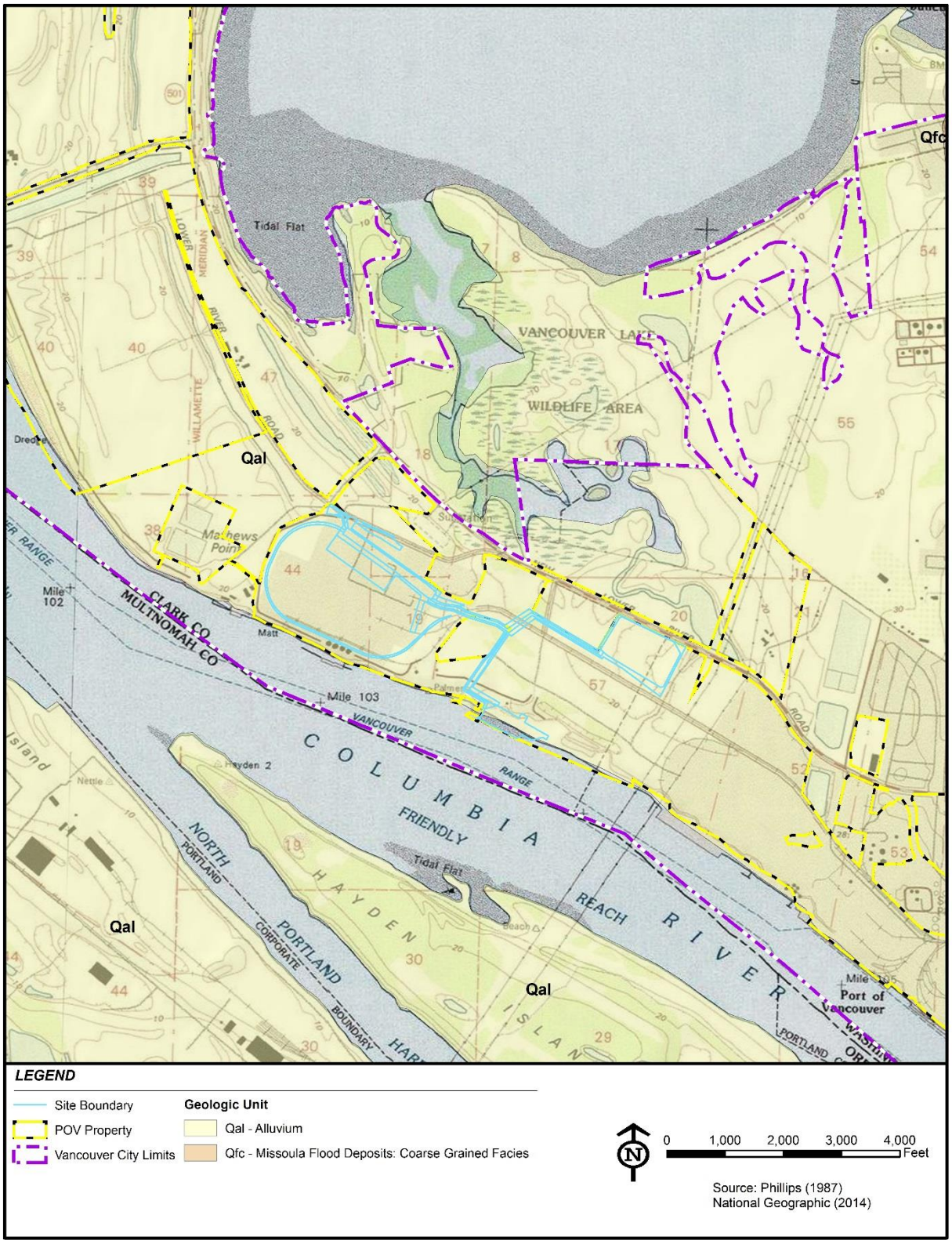
Palmer 1994; Mabey, Madin, Youd et al. 1993; Atwater and Hemphill-Haley 1997; Wong et al. 2000; Pratt et al. 2001; Palmer et al. 2004).

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

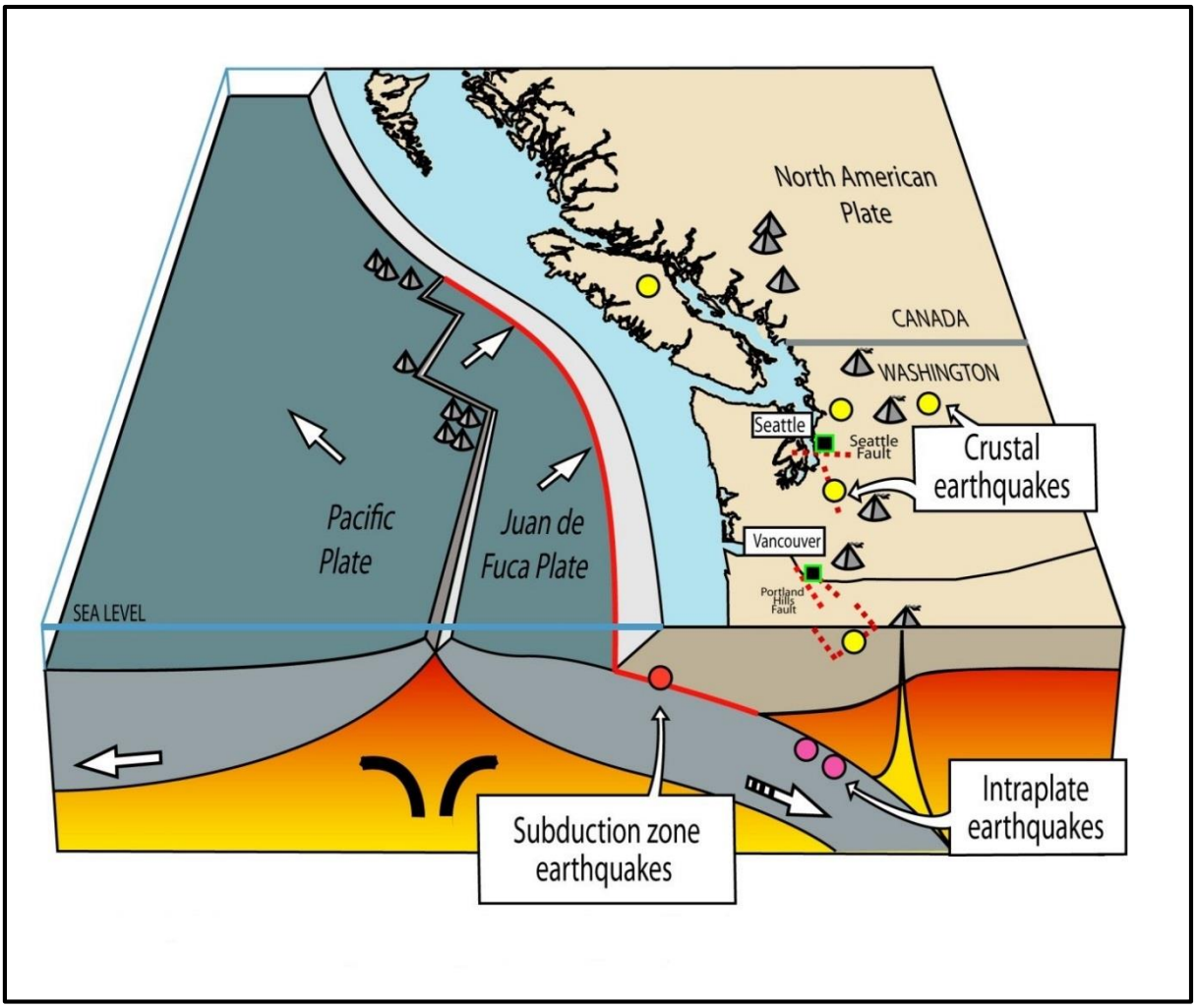
Large subduction zone earthquakes result from the sudden slip between the upper surface of the Juan de Fuca tectonic plate and the lower surface of the North American tectonic plate. Geological studies show that subduction zone earthquakes have occurred repeatedly in the past 7,000 years (Atwater et 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).



BergerABAM

Figure 3.1-1. Site Geology (Revised)



Source: USGS 2000

BergerABAM	**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) (see Table 3.1-1). 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 2.18.2, 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).

The Applicant's geotechnical investigations concluded that portions of the site could potentially liquefy during the design level earthquake resulting in settlement, a reduction of soil strength, and significant lateral spreading deformations near the riverbank. The geotechnical report

findings state ground improvements and deep structural foundations will be required to mitigate static and seismic settlement, liquefaction movement, and lateral deformations under the tanks, transfer pipeline, and near the dock abutment (Hayward Baker 2015, see Appendix L.3).

As illustrated in Figure 3.1-6, the USGS estimates that there is between a 0.01 and 0.02 percent annual probability that 4 inches or more of ash would be deposited at the site from eruptions throughout the Cascade Range, with the highest probability resulting 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.

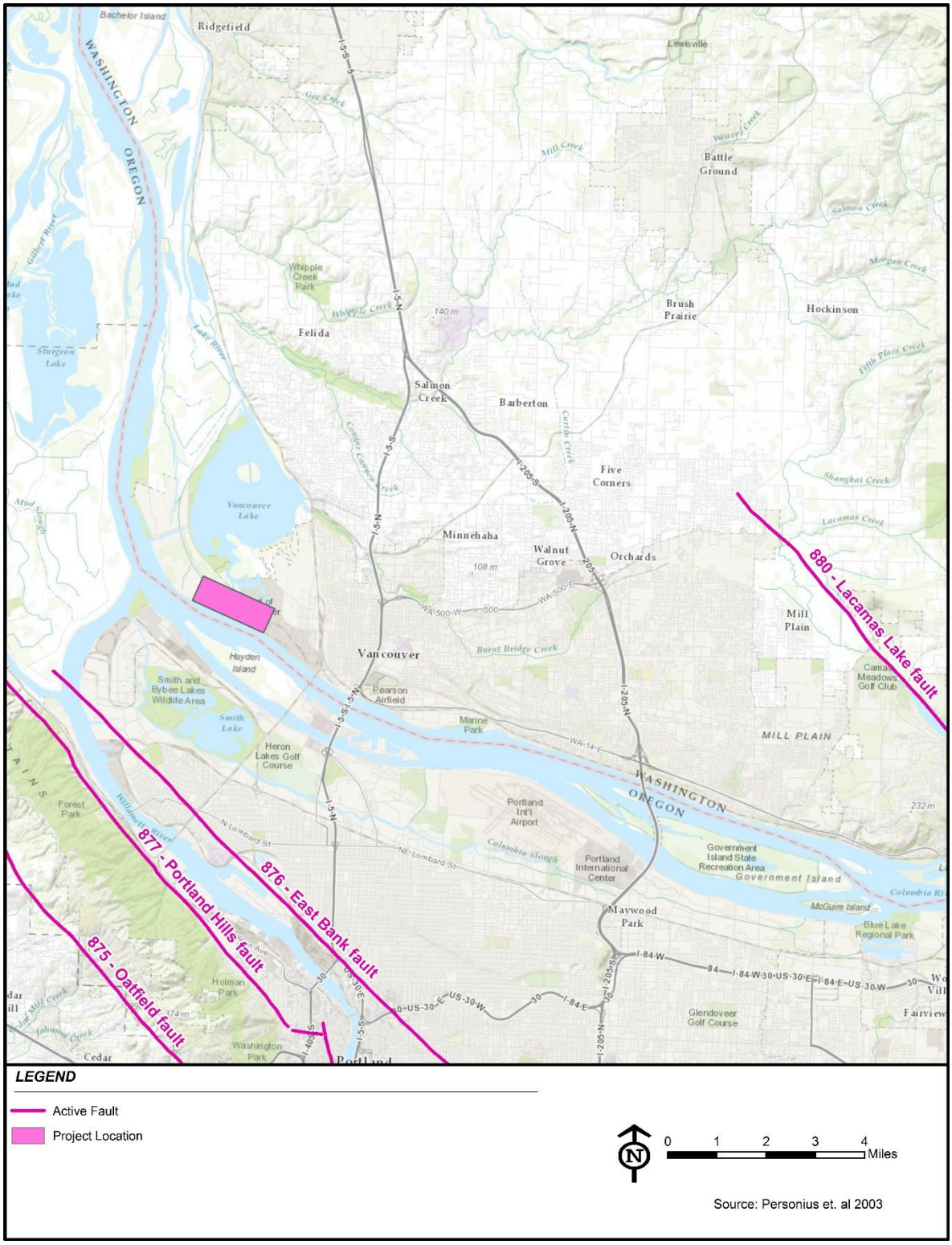


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Figure 3.1-3. Local Fault Map (Revised)

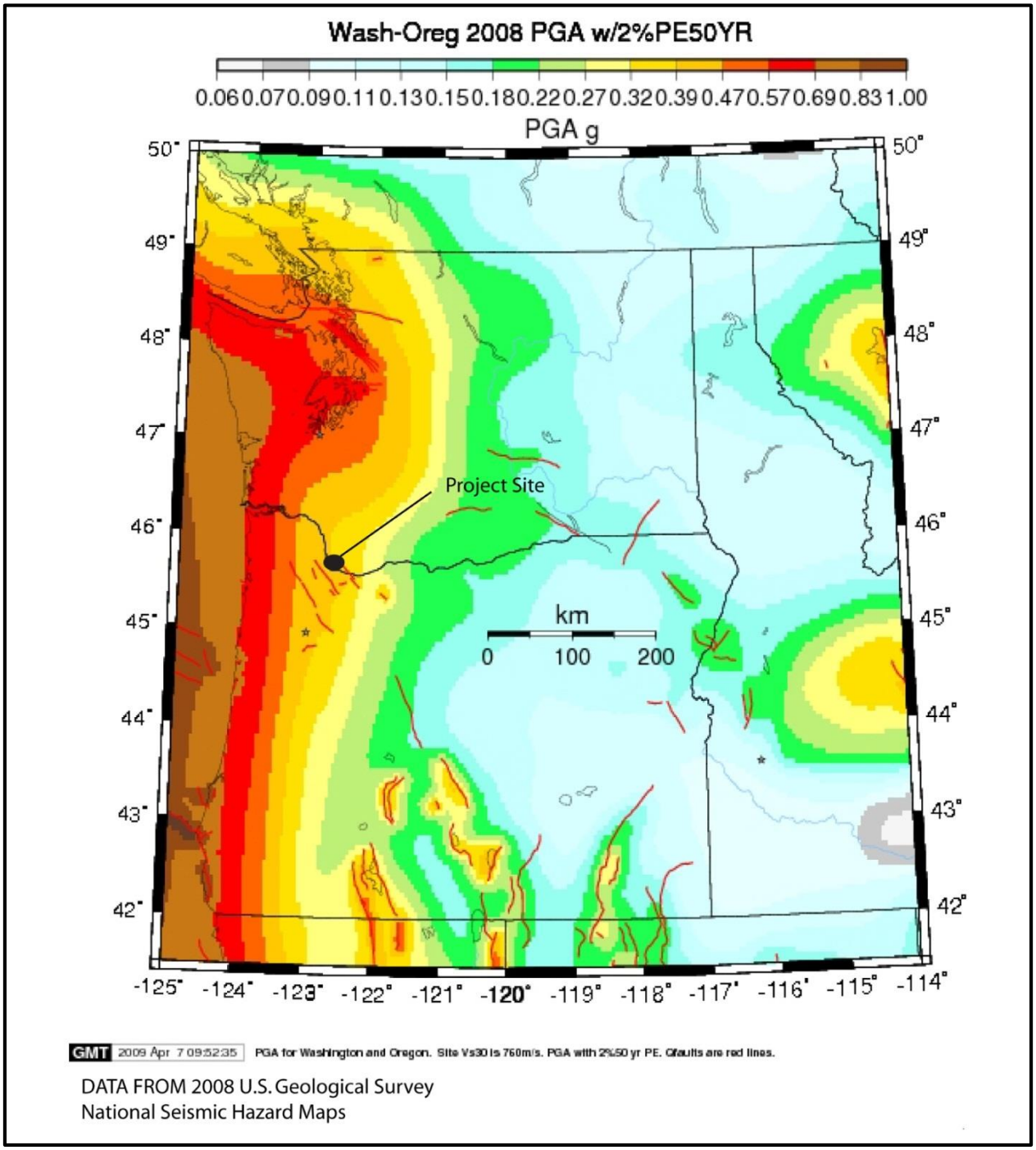

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Figure 3.1-4. Ground Motion

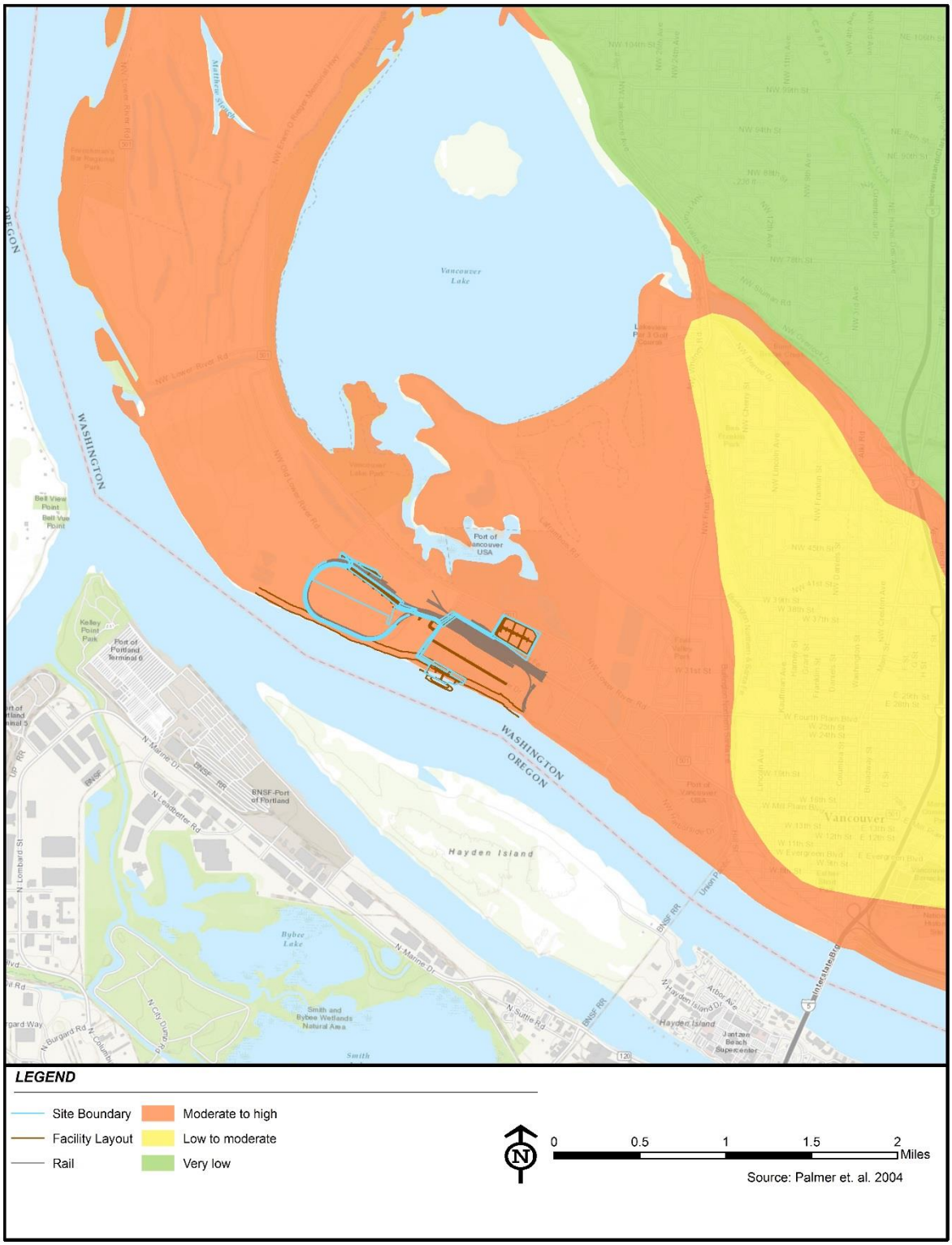

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Figure 3.1-5. Site Liquefaction Susceptibility

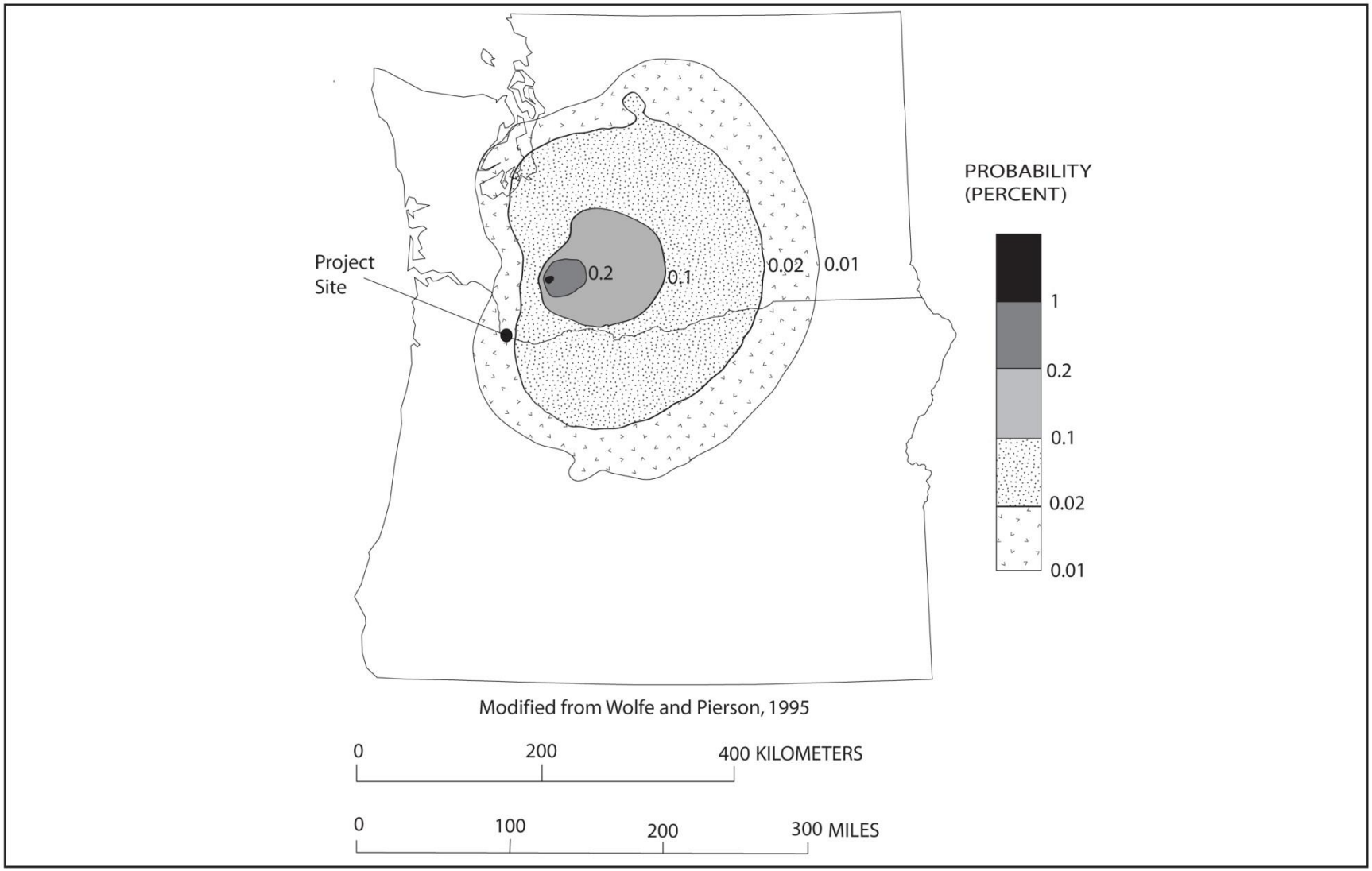

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Figure 3.1-6. Ash Accumulation

3.1.3.6 Mitigation

Based on the data derived from the geotechnical investigations described in section 3.1.1, the Applicant's geotechnical consultant established the seismic threshold, identified potential site risks, and conducted specific ground motion analyses for the upland portions of the site and for the site locations in vicinity of the dock structure (see Appendices L.1 and L.2). These data sets were used to establish design criteria for ground improvements, as well as aboveground structures, transfer pipelines, and storage tanks (see section 2.18.1.4 and Appendix L.3). The geotechnical investigations concluded that portions of the site could potentially liquefy during the design level earthquake resulting in settlement, a reduction of soil strength, and significant lateral spreading deformations near the riverbank. Several types of ground improvement methods and deep structural foundations could be implemented to mitigate liquefaction-induced settlement and lateral spreading deformations of the nature possible at the Facility location, as follows (Hayward Baker 2014, Hayward Baker 2015, see Appendix L.3).

- **Vibro-Stone Columns (Stone Columns** is a ground-improvement technique that constructs dense aggregate columns (stone columns) by means of a crane-suspended downhole vibrator, to reinforce all soils and densify granular soils. Vibro replacement stone columns are constructed with either the wet top feed process or the dry bottom feed process.

  In the wet top feed process, the vibrator penetrates to the design depth by means of the vibrator's weight and vibrations, as well as water jets located in the vibrator's tip. The stone (crushed stone or recycled concrete) is then introduced at the ground surface to the annular space around the vibrator created by the jetting water. The stone falls through the annular space to the vibrator tip, and fills the void created as the vibrator is lifted several feet. The vibrator is lowered, densifying and displacing the underlying stone. The vibro replacement process is repeated until a dense stone column is constructed to the ground surface.

  The dry bottom feed process is similar, except that no water jets are used and the stone is fed to the vibrator tip through a feed pipe attached to the vibrator. Predrilling of dense strata at the column location may be required for the vibrator to penetrate to the design depth. Both methods of construction create a high modulus stone column that reinforces the treatment zone and densifies surrounding granular soils.

- **Jet Grout** creates soilcrete (grouted soil) using a grouting monitor attached to the end of a drill stem. The jet grout monitor is advanced to the maximum treatment depth, and then high-velocity grout jets (and sometimes water and air) are initiated from ports in the side of the monitor. The jets erode and mix the in situ soil as the drill stem and jet grout monitor are rotated and raised.

  Depending on the application and soils to be treated, one of three variations is used: the single fluid system (slurry grout jet), the double fluid system (slurry grout jet surrounded by an air jet), or the triple fluid system (water jet surrounded by an air jet, with a lower grout jet). The jet grouting process constructs soilcrete panels, full columns, or anything in between (partial columns) with designed strength and permeability.

Jet grouting is effective across the widest range of soil types of any grouting system, including silts and most clays. Because it is an erosion-based system, soil erodibility plays a major role in predicting geometry, quality, and production. Cohesionless soils are typically more erodible by jet grouting than cohesive soils. Because the geometry and physical properties of the soilcrete are engineered, the properties of the soilcrete are readily and accurately predictable.

- **Deep Soil Mixing (DSM)** improves the characteristics of weak soils by mechanically mixing them with cementitious binder slurry. To construct columns, a powerful drill advances drill steel with radial mixing paddles located near the bottom of the drill string. The binder slurry is pumped through the drill steel to the tool as it advances, and additional soil mixing is achieved as the tool is withdrawn. To perform mass wet soil mixing, or mass stabilization, a horizontal axis rotary mixing tool is located at the end of a track hoe arm.

  The binder slurry is injected through a feed pipe attached to the arm. The process constructs individual soilcrete columns, rows of overlapping columns, or 100 percent mass stabilization, all with a designed strength and stiffness. The technique has been used to increase bearing capacity; decrease settlement; increase global stability; and mitigate liquefaction potential for planned structures, tanks, embankments, and levees.

- **Dry Soil Mixing** improves the characteristics of soft, high moisture content clays, peats, and other weak soils, by mechanically mixing them with a dry cementitious binder to create soilcrete. To construct columns, a high-speed drill advances drill steel with radial mixing paddles located near the bottom of the drill string. During penetration, the tool shears the soils preparing them for mixing. After the tool reaches the design depth, the binder is pumped pneumatically through the drill steel to the tool where it is mixed with the soil as the tool is withdrawn. To perform mass soil mixing, or mass stabilization, a horizontal axis rotary mixing tool is located at the end of a track hoe arm. The binder is pneumatically injected to the soil mixing tool through a feed pipe attached to the track hoe arm.

  The dry soil mixing process constructs individual soilcrete columns, rows of overlapping columns, or 100 percent mass stabilization, all with a designed strength and stiffness. The technique has been used to increase bearing capacity; mitigate liquefaction; fixate contaminants in situ; decrease settlement; and increase global stability for planned structures, embankments, and levees. Dry soil mixing is low vibration and quiet, and uses readily available materials. The process is often used in high groundwater conditions and has the advantage of producing practically no spoil for disposal.

- **Wick drains** provide drainage paths for pore water in soft compressible soil, using prefabricated geotextile filter-wrapped plastic strips with molded channels. These drains assist in draining and capturing excess pore water pressures that can develop during the stone column installation or during an earthquake.

  A hollow mandrel is mounted on an excavator or crane mast. The wick drain material, contained on a spool, is fed down through the mandrel and connected to an expendable anchor plate at the bottom of the mandrel. A vibratory hammer or static method is used to

insert the mandrel to design depth. The mandrel is then extracted, leaving the wick drain in place. The wick drain is cut at the ground surface, a new anchor plate is connected to it, and the mandrel is moved to the next location. A pattern of installed vertical wick drains provides short drainage paths for pore water; thereby accelerating the consolidation process and allowing for a faster construction schedule.

Structural foundations that will be used include the following:

- **Driven piles** are deep foundation elements driven to a design depth or resistance. If penetration of dense soil is required, predrilling may be required for the pile to penetrate to the design depth. Steel piles are anticipated to be used. The finished foundation element resists compressive, uplift, and lateral loads.

- **Spread footings** are shallow foundation elements that are constructed by excavating the footing footprint, layering base materials, concrete forming and pouring, and backfilling.

A preliminary ground improvement design was submitted to EFSEC for review (Appendix L.3), and is described in section 2.18.1.2.

It is anticipated that EFSEC will contract with the City for the review of final project design for compliance with the required code provisions as well as for providing the required inspections and issuance of occupancy permits. The Applicant will submit the required plans, which will be designed in compliance with the codes and requirements referred to above.

The Applicant will also implement the following plans.

- Construction Emergency Plan to address actions and responses related to seismic activities
- Operations Emergency Plan to address actions and responses to site emergencies, including those related to seismic events

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.

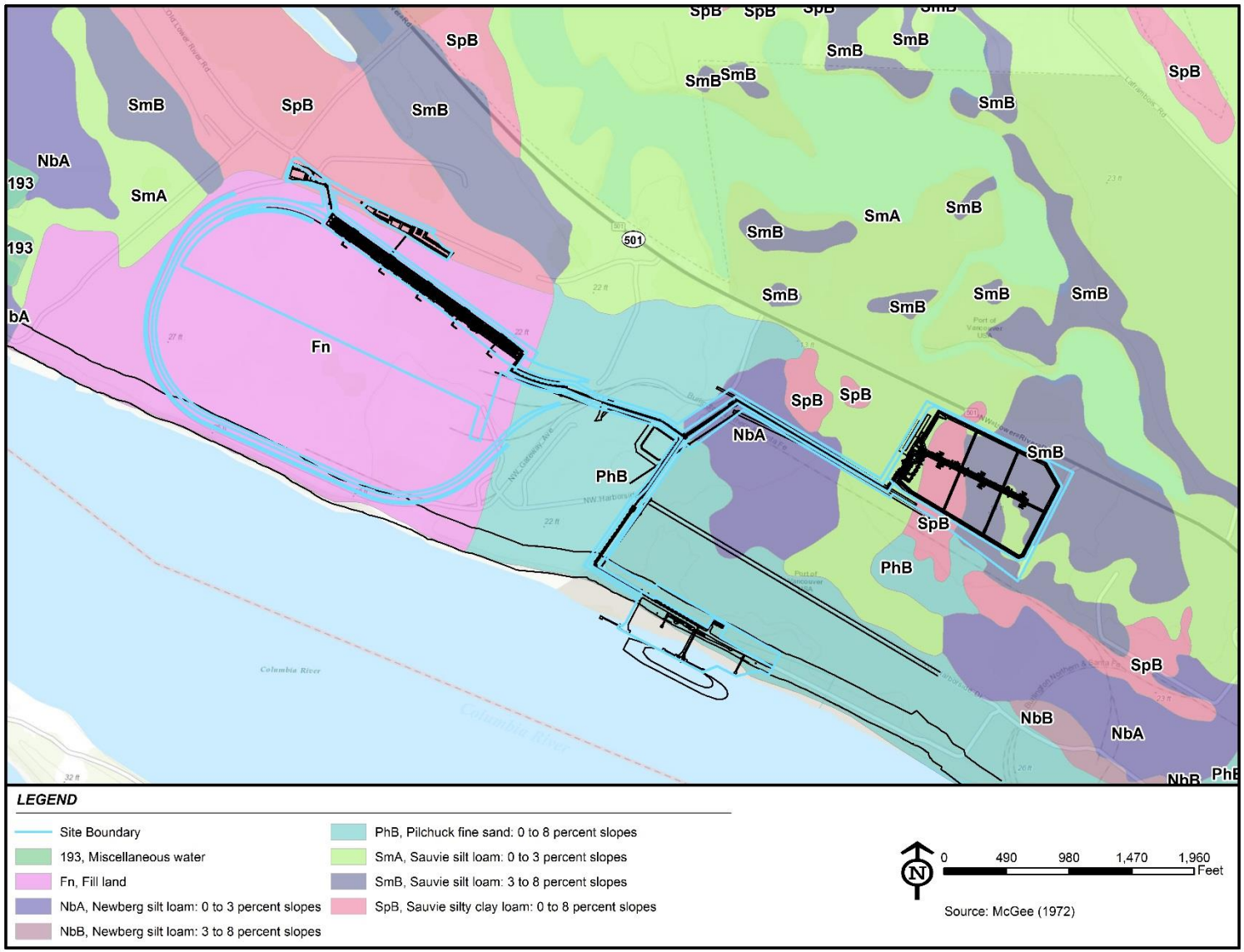

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Figure 3.1-7. Soil Map (Revised)

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 deep soil mixing and/or jet grouting may be necessary for soils that are susceptible to settlement or liquefaction, as described above. 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. As described in section 3.1.3.6, appropriate types of ground improvements will be selected during final design based on the specified performance criteria for the elements of the Facility. Final ground improvement methods will be determined during design refinements and documented in construction plans submitted to EFSEC for review.

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. At the Marine Terminal (Area 400), there will be a temporary topographical modification to the shoreline that will include temporary benching of the shoreline at the location of ground improvement installation to accommodate safe construction equipment staging during installation of ground improvements. The shoreline will be returned to its existing configuration when construction is complete. 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. Temporary benching used along the shoreline during construction will be removed when construction activities are complete and the shoreline will be restored to its previous condition. Therefore, no mitigation measures will be required for topography impacts.

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. 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 ordinary high water mark (OHWM) and include the construction of the MVCU, control room, maintenance parking area, and transfer pipeline, as well as the temporary benching during ground improvements installation. Construction in these areas may disturb soils and could lead to potential soil erosion if proper

mitigation practices are not in place. The project will not significantly impact the potential for erosion along the riverbank.

3.1.7.2 Mitigation

The potential erosion impacts (temporary erosion, long-term erosion, and sedimentation) will be minimized through the use of mitigation measures described below. Erosion impacts associated with construction and operation will be mitigated by erosion and sedimentation control measures outlined in the construction and operation stormwater polution prevention plans (SWPPPs) (Appendices C.1 and C.2), and through implementation of city, county, and state best management practices (BMPs) and as described in section 2.11 of this application.

Construction

The Applicant submitted a preliminary construction SWPPP (cSWPPP) to EFSEC for review (Appendix C.1). The cSWPPP identifies the stormwater pollution prevention measures to minimize potential impacts of erosion and sediment transport at the construction site and is described in section 2.11. The Applicant will also implement city, county, and state BMPs.

Construction staging and laydown activities will only occur in areas that have been previously disturbed and developed. Construction activities will be sequenced and controlled to limit erosion. In some locations, light surface leveling might be required to provide safe access to the site by construction employees and equipment. Surface disturbance in these areas is not anticipated. Clearing, excavation, and grading will be limited to the areas necessary to construct the Facility. Individual excavations will be used for equipment foundations. Following completion of foundations, the site will be filled and compacted to the final grade.

Disturbed areas will be surrounded with silt fencing, wattles to prevent migration of eroded materials to other areas. Interim surface protection measures, including temporary ditches, sediment fences, silt traps, dust control, straw matting, and erosion control blankets, will be required to prevent erosion. Earth movement and other construction activities associated with installation of the benches and ground improvement installation activities will be subject to the cSWPPP and associated BMPs.

Final surface restoration will be completed within 14 days of an area's final disturbance. All construction practices will emphasize erosion control to eliminate the sources of stormwater contamination. 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.

Fill, grade, and excavation areas will be completed per final construction plans submitted to EFSEC. Permanent erosion control will be installed within 14 days upon completion of construction activities, including on-site stormwater collection systems.

Operation

Permanent erosion control will be installed as necessary upon completion of construction activities, including on-site stormwater collection systems.

The Applicant will use the following erosion control measures during operation of the Facility:

- Design site surfacing to capture stormwater directly from hardscape to limit erosion

- Design industrial yards and landscape areas to either infiltrate or use flow dispersion to avoid concentration of runoff that contributes to erosion
- Incorporate BMPs from the 2012 Stormwater Management Manual for Western Washington for erosion and sediment control during operations
- Stabilize surfaces that may become exposed during operation in accordance with Facility National Pollutant Discharge Elimination System (NPDES) construction stormwater permit and final construction plan requirements
- Collect and convey stormwater from new impervious surfaces using systems that avoid contact of stormwater with bare soil
- Incorporate BMPs from the stormwater manual addressing soil erosion and sediment control for industrial yard areas

In addition. Applicant has submitted a preliminary operation SWPPP (oSWPPP) to EFSEC for review (Appendix C.2). The oSWPPP identifies the stormwater pollution prevention measures to minimize potential erosion impacts (long-term) at the Facility and is described in section 2.11.

The Applicant will be responsible to ensure Facility stormwater components operate in compliance with the stormwater permits issued by EFSEC relative to the Facility. The Port will continue to be in charge of compliance with permit requirements applicable to Port systems.

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. 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 will issue the preconstruction permits that allow construction of the Facility to begin.

The review of air quality impacts of a source requires an understanding of the difference between air emissions and air contaminant concentrations. Emission regulations limit the amount of a particular air pollutant that can be emitted (e.g., 10 pounds per hour [lbs/hr] of particulate matter) from a stack or other emission unit. Outdoor ambient air quality standards limit concentrations of certain air pollutants (in parts per million [ppm] or micrograms per cubic meter of air [$\mu g/m^3$]) in the outdoor 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 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 Best Available Control Technology (BACT) has been employed for all pollutants not previously emitted, evaluates ambient concentrations resulting from these emissions to ensure compliance with ambient air quality standards, and issues an Order of Approval.

3.2.1.2 Prevention of Significant Deterioration (PSD)

The PSD regulations were established by EPA 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. The Facility will not be subject to PSD regulations because it will not have the potential to emit any regulated pollutant at an annual rate that exceeds the PSD threshold (see Table 2.12-1).

3.2.1.3 Emission Standards

EPA 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 Small Industrial-Commercial-Institutional Steam Generating Units;

- Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels; (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984
- 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.

Under the provisions of Section 112 of the 1990 Clean Air Act Amendments, EPA regulates emissions of 187 HAPs from stationary sources. EPA has identified specific industry categories and tailors controls to the major sources of emissions and the HAPs of concern from those particular industry categories. The emission control requirements for a particular category are determined to by the maximum achieveable control technology (MACT) standards being achieved by the best-performing similar sources in that category. As discussed in greater detail in section 5.1.3.1.2, the following MACT standards apply to the Facility:

- Part 61, Subpart A – General Provisions;
- 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
- Part 63, Subpart A, General Provisions.

As discussed in section 5.1, Attachment 1, BACT is the best control technology technology determined by the permitting authority on a case-by-case basis that is feasible for a specific application, considering the economic, energy and environmental and other costs of each technology 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 pollutants 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.

3.2.1.4 Ambient Air Quality Standards

Ambient air quality standards have been established by EPA 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 provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Table 3.2-1. Ambient Air Quality Standards

Pollutant	National Ambient Air Quality Standards		Washington
	National Primary	National Secondary	
Inhalable Particulate (PM_{10}) 24-hour Average ($\mu g/m^3$)[b]	150	150	150
Fine Particulate ($PM_{2.5}$) Annual Arith. Mean ($\mu g/m^3$)[c] 24-hour Average ($\mu g/m^3$)[d]	12 35	15 35	12 35
Sulfur Dioxide (SO_2) Annual Arith Mean ($\mu g/m^3$) 24-hour Average ($\mu g/m^3$) 3-hour Average ($\mu g/m^3$) 1-hour Average ($\mu g/m^3$)[e]	 196	 1,300 	 52 365 1,300 196
Carbon Monoxide (CO) 8-hour Average ($\mu g/m^3$) 1-hour Average ($\mu g/m^3$)	 10,000 40,000		 10,000 40,000
Ozone (O_3) 8-hour Average (ppm) [g]	0.075	0.075	0.075
Nitrogen Dioxide (NO_2) Annual Arithmetic Average ($\mu g/m^3$) 1-hour Average ($\mu g/m^3$)[h]	 100 188	 100 	 100 188
Lead (Pb) Quarterly Average ($\mu g/m^3$)	 0.15	 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 PM_{10} concentrations at each monitor.

[c] Based on the 3-year average of annual arithmetic mean $PM_{2.5}$ concentrations.

[d] Based on the 3-year average of the 98th percentile of 24-hour $PM_{2.5}$ 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)

3.2.1.5 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 by Ecology to protect human health. The regulations also identify Small Quantity Emission Rates (SQERs). If the total emissions of a given TAP 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 TAP emissions from the source are sufficiently low to protect human health. The Facility TAP emissions are below either the SQERs or ASILs established by Ecology.

3.2.1.6 Existing Air Quality

Ecology and EPA designate regions as being "attainment" or "nonattainment" areas for particular air pollutants based on ambient 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.[1] 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:

- CO: SE Lafayette, Portland, Oregon, EPA AQS Site No. 41-051-0080 (about 10 miles southeast 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 (Oregon DEQ 2012).
- 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

[1] U.S. EPA AirData website archive of monitoring data. http://www.epa.gov/airquality/airdata/

State.[2] 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 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
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 five-year dataset was produced using the AERMOD meteorological preprocessor AERMET using meteorological data from the Vancouver Airport/Pearson Airfield (KVUO), located about 4 miles east of the project site on the north bank of the Columbia River. Pearson Airfield was judged to be the best available source of meteorological data for air quality dispersion modeling of the proposed Facility. The meteorological station at Pearson Airfield is the station closest to the proposed project site that is part of the National Weather Service (NWS) Automatic Surface Observing System (ASOS), and provides 1-minute wind speed and wind direction data that are used to resolve calm and variable wind conditions, as recommended by the EPA.

[2] NW-Airquest "design values" tool website: http://lar.wsu.edu/nw-airquest/index.html

A "wind-rose" plot of the 2008-2012 wind speed and direction measured with a cup-anemometer at 10-meter elevation at KVUO is illustrated in Figure 3.2-1. The majority of surface winds are from the northwest and the east-southeast, indicating strong influence from the surrounding terrain and 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 wind speed was 21.5 knots from the west-southwest occurring March 15, 2009.

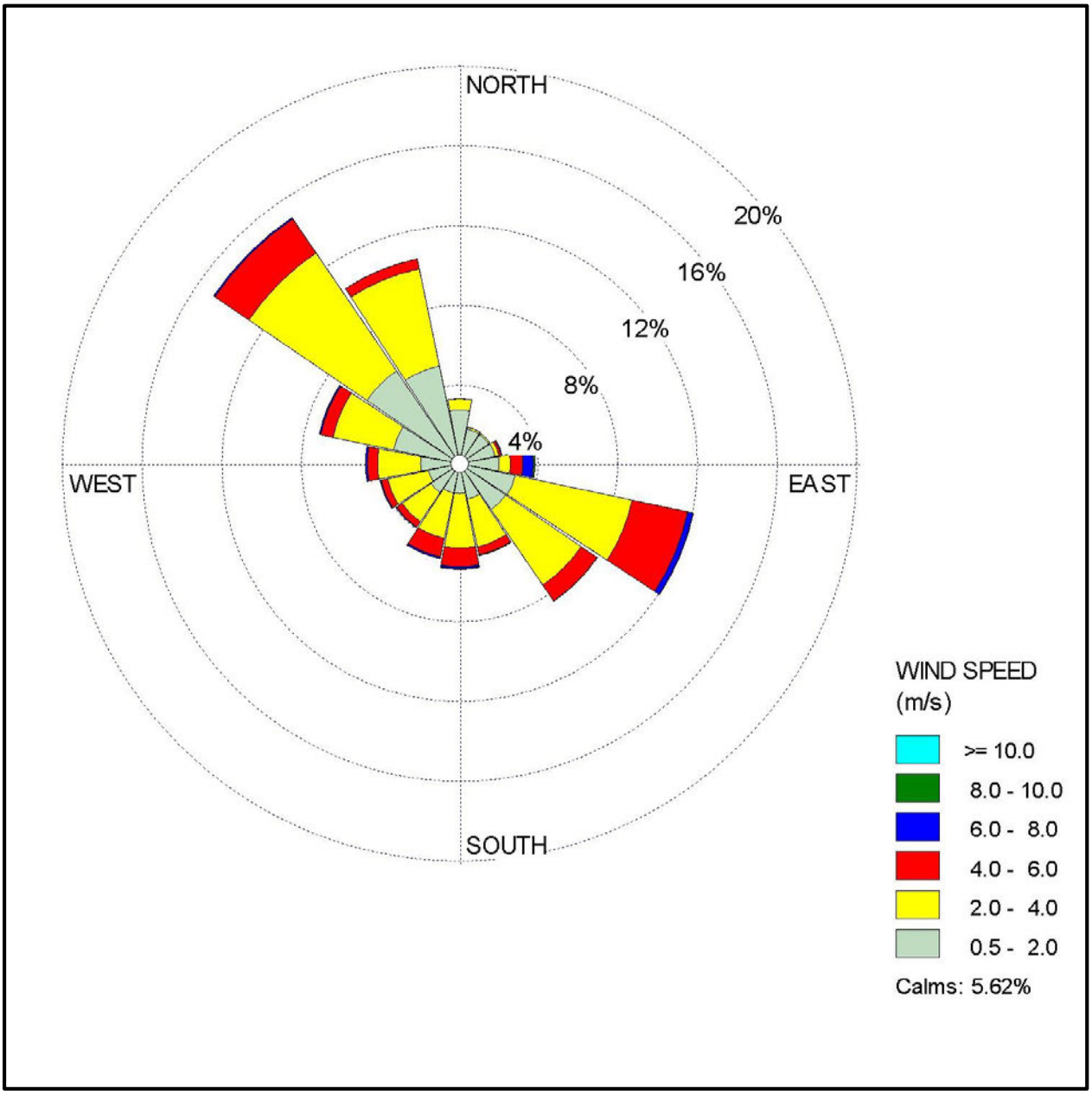
Atmospheric stability has traditionally been classified using the Pasquill-Gifford (P-G) system ranging from Class "A" (very unstable) to Class "F" (very stable). The categories indicate the level of thermal stratification within the atmospheric boundary layer, which determines the vertical advection 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 five-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

1) Analysis 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 158 years of data, is included in Table 3.2-4 (Western Regional Climate Center 2013). 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.



BergerABAM	**Figure 3.2-1. Pearson Field Airport Windrose (2008-2012)**

A 17-year dataset of relative humidity and dewpoint temperature collected at the Portland International 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°F generally occur in summer during periods of warm advection from the south and dewpoints near 70°F 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.

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 EPA regulatory guidelines (40 CFR Part 51, Appendix W).

Compliance with ambient air quality standards was assessed using total concentrations, which were calculated by combining model-predicted design concentrations with background concentrations based on air quality monitoring data discussed in section 3.2.1.6 and summarized in Table 3.2-2. Background concentrations represent the influence of other sources of emissions in the area.

Total predicted concentrations are compared to the WAAQS and NAAQS in Table 3.2-5. The analysis indicates that when predicted design concentrations are added to the monitored design concentrations, the resulting 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	Modeled Design Concentration[1]	Background Concentration	Total Concentration[2]	NAAQS/ WAAQS
		($\mu g/m^3$)			
CO	1-hour	87.5	2,364	2,452	40,000
	8-hour	69.4	1,461	1,530	10,000
NO2	1-hour	19.6	70	89.6	188
	Annual	0.588	13	13.6	100
PM10	24-hour	10.1	31	41.1	150
PM2.5	24-hour	6.59	20	26.6	35
	Annual	0.295	6	6.30	12
SO2	1-hour	16.9	25	41.9	196
	3-hour	17.1	19	36.1	1,300
	24-hour	10.4	9	19.4	365
	Annual	0.207	8	8.21	52

Notes:

[1] The forms of the design concentrations are as follows:

CO, 1- & 8-hour average & SO_2, 3- & 24-hour average – highest 2nd high concentration over the five modeled years of meteorological data

NO_2, 1-hour average – 98th percentile of the annual distribution of daily maximum 1-hour average concentrations averaged at each receptor over the five modeled years of meteorological data

NO_2 & SO_2, annual average – maximum annual average concentration

PM_{10}, 24-hour average – highest 6th high concentration over the five modeled years of meteorological data

$PM_{2.5}$, 24-hour average – 98th percentile of the annual distribution of 24-hour average concentrations averaged at each receptor over the five modeled years of meteorological data

$PM_{2.5}$, annual average – maximum annual average concentration averaged over the five modeled years of meteorological data

SO_2, 1-hour average – 99th percentile of the annual distribution of daily maximum 1-hour average concentrations averaged at each receptor over the five modeled years of meteorological data

[2] Total Concentration = Modeled Design Concentration + Background Concentration

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 5.1-12. 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	Averaging Period	Maximum Predicted Concentration ($\mu g/m^3$)	ASIL ($\mu g/m^3$)
10102-44-0	Nitrogen dioxide	1-hour	22.6	470
7446-09-5	Sulfur dioxide	1-hour	18.6	660
7783-06-4	Hydrogen Sulfide	24-Hour	1.55E-01	2.00E+00
57-97-6	7,12-Dimethylbenz(a)anthracene	Annual	8.41E-07	1.41E-05
7440-38-2	Arsenic	Annual	1.05E-05	3.03E-04
71-43-2	Benzene	Annual	2.29E-02	3.45E-02
7440-43-9	Cadmium	Annual	5.78E-05	2.38E-04
18540-29-9	Chromium, (hexavalent)	Annual	2.94E-06	6.67E-06
N/A	Diesel Engine Particulate	Annual	1.45E-03	3.33E-03
50-00-0	Formaldehyde	Annual	3.94E-03	1.67E-01

3.2.1.9 Title V (Air Operating) Permit

EFSEC implements a Title V (Air Operating) Permit Program through its adoption by reference of Ecology's WAC 173-401-100 through -300, and -500 through -820 (see WAC 463-78-005(2). The Facility will not emit any criteria pollutant in an amount greater than 100 tons per year, is not a major source, and is, therefore, not required to obtain a Title V permit.

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 will 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 during operation. Some of the site will 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. The following design measures will address odor control:

Area 200 – Unloading, and Area 500 – Transfer Pipelines: Throughout the unloading process, crude oil is contained within rail cars and piping prevent the exposure of the oil to the ambient atmosphere. Pumping of the crude oil from the unloading area to containment tanks and from the containment tanks to the Marine Terminal is also conducted in closed piping, and pumping systems, which prevents exposure of the crude oil to the ambient atmosphere.

Area 300 – Storage: Within the storage tanks, crude oil exposure to the atmosphere is minimized through the use of an internal floating roof which minimizes the formation of hydrocarbon vapors.

Area 400 – Marine Terminal: As for areas 200 and 500, transfer of the crude oil to marine vessels is conducted in closed piping and pumping systems that prevent exposure of the crude oil to the atmosphere. A submerged loading configuration will be used to fill all marine vessel cargo compartments in accordance with U.S. Coast Guard (USCG) regulations. A potential source of odors is the vapors that are displaced from the vessel holds during transfer operations. These sulfurous gases (such as H_2S) and petroleum hydrocarbon vapors are routed through the vapor containment system to an H_2S treatment system and then to the MVCU. The MVCU will reduce sulfurous compounds to SO_2 gas and convert most hydrocarbons to odorless carbon dioxide. The odor detection threshold of SO_2 is less than the SO_2 NAAQS; the local ambient air quality modeling analysis summarized in section 5 demonstrates that the SO2 NAAQs threshold will not be exceeded at any time, and therefore will not result in perceptible odors.

Area 600 – Unloading Boilers: Emissions from the boiler units are not expected to cause any significant offensive odors at the Facility or adjacent properties. Although the natural gas supplied to the boilers is odorized by the supplier for safety purposes, odor impacts will not be observed because combustion of the natural gas is odorless and the methyl mercaptan used to odorize the gas is destroyed during combustion.

Slight minor odor impacts due to road and rail diesel traffic may occur but will 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 and MVCU, no visible plumes are expected from the Facility emissions units. Consequently, no off-site fogging, misting, visibility impairment, or icing is expected.

3.2.4 Climate Change

Although most scientists concur that anthropogenic global emissions of greenhouse gases (GHGs) are affecting climate, there are no analytical tools or established procedures for evaluating climate impacts from individual projects. Ecology estimates 2010 statewide GHG emissions were 96.1 million metric tons (CO_2e) (Ecology 2013). The Facility is estimated to have the potential to emit approximately 86,200 metric tons of GHGs (CO_2e) annually. (See Table 2.13-1.) The Facility stationary source GHG emissions are approximately 0.09 percent of the state GHG emissions. Consequently, the incremental effect of project emissions on global climate change is insignificant.

3.2.5 Dust

Because the site is flat, there will be very little grading of the site prior to construction. Therefore, dust generated by excavation and grading will be controlled and short term. Dust from access roads will 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

Construction

- To control dust during construction, water will be applied as necessary. Site access and travel roads would be graveled or paved.
- During construction activities, dust and diesel emission control measures will be implemented consistent with Washington Associated Gneral Contractors Brochure, "*Guide to Handling Dust from Construction Projects,"* including the following*:*
  - Proper maintenance of off-road mobile equipment
  - Use off-road mobile equipment that meets applicable emission standards
  - Encourage carpool and trip reduction strategies for construction workers
  - Minimize construction truck and other vehicle idling time
  - Spray exposed soil with water or other suppressant to reduce windblown emissions
  - Pave or gravel staging areas
  - Use appropriate methods to control dust from trucks transporting materials
  - Rock exits or provide wheel washers to reduce particulate matter carried off site by vehicles
  - Cover dirt/gravel/debris piles to reduce dust and wind-blown debris

Operation

- BACT will be incorporated into the Facility design and implemented to minimize air pollution emissions.
- During operational activities, dust and diesel emission control measures will be implemented as needed consistent with Washington Associated Gneral Contractors Brochure, "*Guide to Handling Dust from Construction Projects"* stated above.

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, 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, containment tank, 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 47.4-acre site, the volume of precipitation will total approximately 156.4 acre-feet per year.

3.3.1.1 Impacts to Surface Water

Potential impacts to surface water include sediment discharge and other pollutants associated with ground improvement construction activity, and with stockpiling/storage of raw materials used for grout batching. A typical result of jet grouting ground improvement installation is that some amount of soil/grout mixture spoils are brought to the surface. At Area 400, jet grouting occurs in proximity to the Columbia River adjacent to the OHWM and could potentially result in the introduction of high pH materials in the river.

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.

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 and minimal 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, containment 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.

Stormwater, during construction and operation, 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. A complete description of the existing stormwater systems in place is discussed in section 2.11 and in the Engineering Report in section 5.3. Stormwater from the Facility site is currently collected, treated, and released to the Columbia River through existing outfalls permitted under existing NPDES permits.

The Port manages three stormwater treatment systems within a half-mile of the site: the Terminal 5 water quality lagoons, Terminal 4 water quality ponds, and Parcel 8 water quality pond.. Discharges from the site will be treated on site and monitored for water quality compliance prior to discharge to the existing stormwater treatment systems and outfalls as described in sections 2.9 and 2.11 of this Application.

This project will reduce the amount of existing impervious surface coverage at the Facility site and will convert a portion of the existing pollution-generating impervious area to non-pollution-generating roof areas.

3.3.1.2 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 sections 2.11.2 and the Engineering Report at section 5.3. It 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.

Construction

Construction Stormwater Capture and Treatment

The Applicant will use management techniques to reduce the discharge of contaminated stormwater runoff. These techniques will be implemented on site prior to beginning construction activities and will include establishment of stormwater monitoring and maintenance programs to ensure compliance of erosion control practices.

The Applicant will also implement site-specific BMPs selected from the Stormwater Management Manual for Western Washington and meet the following water quality criteria:

- Chapter 173-200 WAC
- Chapter 173-201A WAC
- Chapter 173-204 WAC

During construction, the contractor will be directed to implement an environmental protection program for construction-related activities that complies with specific site conditions. Impacts to surface water will be mitigated through the use of on-site stormwater management. BMPs that reduce erosion will be emphasized to reduce the sources of stormwater contamination. Ground disturbing activities will be limited to necessary construction areas. Construction methods will be modified as needed to protect surface water quality, and sequenced and controlled to limit potential erosion and sediment transport, including monitoring the installation and removal of temporary piles. Sediment control measures will be designed based on 10-year design storm. Water quality measures (other than sediment control) will be designed on a six-month, 24-hour design storm.

The Applicant will conduct construction activities in accordance with the provisions of the NPDES Individual Construction Stormwater Permit issued for the Facility. Under the provisions of this permit, the Applicant's responsibilities will include, but are not be limited to:

- Prepare and implement a cSWPPP.
- Install and maintain stormwater BMPs as specified in the cSWPPP to prevent and mitigate any construction-related impacts to surface water.
- Provide training to construction employees regarding provisions of the cSWPPP.
- Conduct site inspections at least once a week and within 24 hours following any discharge from the site and as required by the Permit.
- Implement the construction water quality protection and monitoring plan (WQPMP) (Appendix F.2)
- Monitor and sample construction storm water discharges in compliance with permit provisions, and report such results as required.

Additional Measures for Jet Grouting Activities

The potential stormwater and non-stormwater runoff from jet grout-related spoils will be mitigated to reduce the likelihood of contaminants released into the Columbia River.

The Applicant will conduct additional monitoring of surface water quality within the Columbia River upstream and downstream of the ground improvement installation to monitor for changes in pH and sulfate levels.

The mitigation measures listed below as part of the cSWPPP were specified in the Applicant's Project Refinement Report (May 2015). These mitigation measures were listed specifically for the containment and handling of jet grout-related spoils. The BMPs are in addition to those already included in the cSWPPP.

Construction Stormwater Pollution Prevention Plan

The preliminary cSWPPP (February 27, 2015) has been submitted to EFSEC for review. The cSWPPP, identifies specific construction stormwater BMPs to address stormwater within the ground improvement construction areas, techniques to reduce the discharge of contaminated stormwater runoff, establishment of stormwater monitoring and maintenance programs to ensure compliance of erosion control practices, and specific applications for installation of BMPs to prevent and mitigate any construction-related impacts to surface water. The final cSWPPP will be submitted to EFSEC for review and approval before any Facility-related ground disturbance begins.

The cSWPPP places specific emphasis on protecting surface water quality of nearby wetlands and the Columbia River. Downslope and perimeter protection was identified for all construction areas and where ground improvements are necessary. Specific BMPs identified in the cSWPPP are summarized in Table 2.11-1 in section 2.11.1. The following BMPs are identified specifically for use during ground improvement activities:

- Wheel washes will be provided at applicable construction entrances during all ground improvement activities.
- Groundwater or jet water used and brought to the surface during ground improvements at the Marine Terminal will be collected and pumped into weir tanks for turbidity control.
- Silt fencing will be installed along the top of bank where the transfer pipelines and ground improvements are constructed along the river. Compost socks would be installed along river embankment above the OHWM or waterline whichever is higher.
- All groundwater or jet grout slurry resulting from ground improvements will be processed through chemical treatment BMPs, such as pH reducers and/or polymer assisted stormwater filtration and will be used between areas of ground improvement (stone columns, soil mixing, jet grouting, etc.) and surface waters and wetlands.
- Wick drains will be used between areas of ground improvement (stone columns, soil mixing, jet grouting, etc.) and surface waters and wetlands.
- At Area 300, wick drains will be installed at a minimum of 16 feet on center where ground improvements are within 150 feet of the adjacent wetlands to the north and east. At areas 400 and 500, wick drains will be installed along the top of bank at 8 feet on center for the entire bank area receiving ground improvement. Visual monitoring of turbidity within the wetlands or Columbia River will occur daily during ground improvement. If any turbidity is observed as a result of ground improvement, ground improvement activities will be stopped and additional mitigation measures will be installed, including additional wick drains, turbidity curtains, or change in ground improvement methods will be considered.
- Cutoff channels would be installed in Area 300 – Storage tanks along the downslope construction area to capture construction stormwater where existing site grading is insufficient to direct stormwater into conveyances for the construction stormwater. These channels would also be used to contain ground improvement runoff where necessary.
- Channel lining and check dams would be used to protect channel from erosion, and check dams to assist in flow control.
- Install and maintain an erosion/sediment control barrier along the top of the Columbia River embankment for the areas adjacent to stone column installations consisting of silt fencing, filtration fabric, and straw wattles or similar measures approved by EFSEC. Monitor the

water on the river side of the sediment control barrier to ensure the expected level of water quality is maintained. If the water quality on the river side of the barrier is unacceptable, implement additional sediment control measures until the desired level is achieved. These measures would reduce impacts to minor levels.

Where ground improvement may extend below top of the river embankment, the following additional stormwater BMPs were also identified to protect downslope water quality:

- Install sheet pile wall landward of the OHWM to act as a barrier to grout migration waterward of the OHWM. The sheet pile is most likely installed using a vibratory hammer.
- Sequence installation of the first row of jet grout columns landward of the temporary sheet pile wall to act as a barrier to potential grout migration during the installation of subsequesnt jet grout columns landward of OHWM. This will reduce the potential for later grout installations to migrate through seams in the wall, or under the wall, toward the Columbia River.
- Earthen berms, sheeting, straw wattles, or shallow trenches, will be used to isolate the work area and contain spoils exiting the grouting hole to prevent their entry into surface water. In addition, in-ground containment will be achieved by the installation of a temporary sheet pile wall between the river and the ground improvement treatment area. The sheet pile wall will be installed with vibratory methods landward of the OHWM.
- Spoils will be extracted from the containment area by vacuum pumps. Spoils may be loaded to trucks to be removed from the site, or may be handled on site to separate solids from liquids for additional treatment and disposal. If handled on site, soils will be removed and placed in a temporary holding area, such as lined ponds or tanks; these will temporarily hold spoils until they can be treated as necessary and disposed of holding ponds would be constructed in previously disturbed locations and would be located away from sensitive resources. Holding areas would be lined to prevent the migration of high pH water into the ground.
- High pH water will be pumped from these holding areas or tanks into portable water quality treatment systems and neutralized. Following neutralization, the water will be discharged similar to other construction site groundwater that has been treated to the appropriate water quality standards.
- Remaining solid materials in holding areas or tanks will be tested as necessary and disposed of in accordance with applicable regulations if they classify as hazardous waste. If the solids do not classify as hazardous waste they will be used on site (for construction of the Area 300 containment berm for example, or will be disposed off site at an appropriate location.
- A WQPMP has been prepared and submitted to EFSEC; the monitoring provisions of this plan will continue to address how activities are monitored to identify potential surface water exceedances. The plan will be revised to address protection measures specific to ground improvement construction activities, which are described above.
- Conduct site inspections at least once a week and within 24 hours following any discharge from the site and as required by the NPDES Individual Construction Stormwater Permit to be issued by EFSEC. The WQPMP (Appendix F.2) also identifies additional in-stream monitoring within the Columbia River to monitor construction activities.

The NPDES Individual Construction Stormwater Permit is anticipated to include reporting and correction requirements that are substantially similar to those of the Construction Stormwater

General Permit (Ecology 2015). These reporting notifications and noncompliance standards within the General Permit Section S5.F require the steps below. Note that for EFSEC issued permits, "Ecology" would be replaced by "EFSEC."

- Ecology will be immediately notified of the failure to comply.
- Immediate action will be taken to control the noncompliance issue and to correct the problem. If applicable sampling and analysis of any noncompliance will be repeated immediately and results submitted to Ecology within five days of becoming aware of the violation.
- A detailed written report describing the noncompliance will be submitted to Ecology within five days, unless requested earlier by Ecology.

Construction Spill Prevention Control and Countermeasures

The construction spill prevention control and countermeasure plan (cSPCCP) (Appendix B.2) will also be implemented and includes a listing of responsible personnel, spill reporting procedures, project and site information, pre-existing contamination at the Facility site, potential spill sources, spill prevention and response training, spill report form(s), plan approval, and cSPCCP acknowledgement forms (to be signed by all project personnel). The cSPCCP will meet NPDES permit requirements.

Any required surface restoration will the completed within 14 days after an area's final construction-related disturbance.

With the above-stated cSWPPP, cSPCCP, and additional mitigation measures and BMPs in place, the resulting impacts to surface water from construction stormwater activities should be reduced from moderate to negligible.

Operation

Surface water quality will be protected during operations through the use of the BMPs designed in accordance with Ecology's stormwater manual. 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 installation of the permanent stormwater management system.

Once all permanent stormwater BMPs are in place, operations-related impacts to surface water will be minimized through the use of operational and structural source control BMPs and operational procedures. The Applicant will implement secondary structural containment measures to supplement the structural source control BMPs. BMPs are from Volume IV of the Stormwater Management Manual for Western Washington and will meet the following water quality criteria:

- Chapter 173-200 WAC
- Chapter 173-201A WAC
- Chapter 173-204 WAC

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 or spill 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 pans, pumps, and containment 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. Equipment and parts wash (including facility washdown, railcar exterior cleaning) will be conducted in a covered portion of the rain unloading building. Wastewater will be pumped to secondary containment tanks.

Area 300 secondary containment area will be surrounded by a containment berm approximately 6 feet high with a full impervious liner that will have a capacity at least equal to 110 percent of the API 650 maximum capacity of the largest tank, plus precipitation from a 24-hour, 100-year storm 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. For example, API 653 requires tanks to be inspected every 10 years to assess the tanks' physical condition and determine suitability for continued use.

The transfer pipelines (Area 500) will be constructed of welded steel pipe, designed specifically for crude 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 secondary containment with leak detection will be provided for pipe installed underground. The above-grade portion of the pipeline will be subject to visual inspection for leaks and secondary containment with leak detection provided for pipe installed underground.

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.

Parking and access areas will be designed with a combination of catch basin spill traps and water quality filter vaults to treat stormwater runoff.

See sections 2.10 and 2.11.2 and Appendices B.2 and C.1 for additional Facility design features and spill control and prevention measures.

The Applicant will implement planning and preparedness actions required by state and federal regulations to prevent, contain, and respond to inadvertent releases that could impact surface water, including, but not limited to:

- A comprehensive site-specific operations SPCCP (oSPCCP) developed in accordance with 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
- Prepare coordinated plans to meet all applicable local, state, and federal requirements

The Applicant submitted to EFSEC for review a preliminary oSWPPP (Appendix C.2) based on the preliminary design in place when this Application was submitted. BMPs are described in the preliminary oSWPPP. A final oSWPPP will be submitted for review prior to the beginning of Facility operations.

In accordance with the permitted levels of the downstream system, discharge stormwater meeting established water quality benchmarks will be consistent with the Industrial Stormwater General Permit. To the maximum extent possible, stormwater will be protected and segregated from contact with industrial activity and crude oil. With the oSWPPP, mitigation measures and BMPs in place, stormwater discharges from the Facility will meet state and local water quality standards. A Tier II anti-degradation analysis is being completed in accordance with WAC 173-201A-320 to demonstrate water quality compliance. The final report will be submitted to EFSEC.

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 Individual NPDES Construction Stormwater Permit issued to the Facility by EFSEC. Construction stormwater BMPs will be used to control erosion and sediments on the site. Additional detail on construction BMPs are included in the preliminary cSWPPP located in Appendix C.1. 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 Map (FIRM) Panels #53011C0363D and 364D include the project area (Figure 3.3-1). FEMA FIRM data 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, and in a portion of Area 500. 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.

The project is located within the inundation area of the 500-year flood event. The entire upland portion of the site is located above the 100-year floodplain and therefore also out of the 5- and 50-year floodplain.

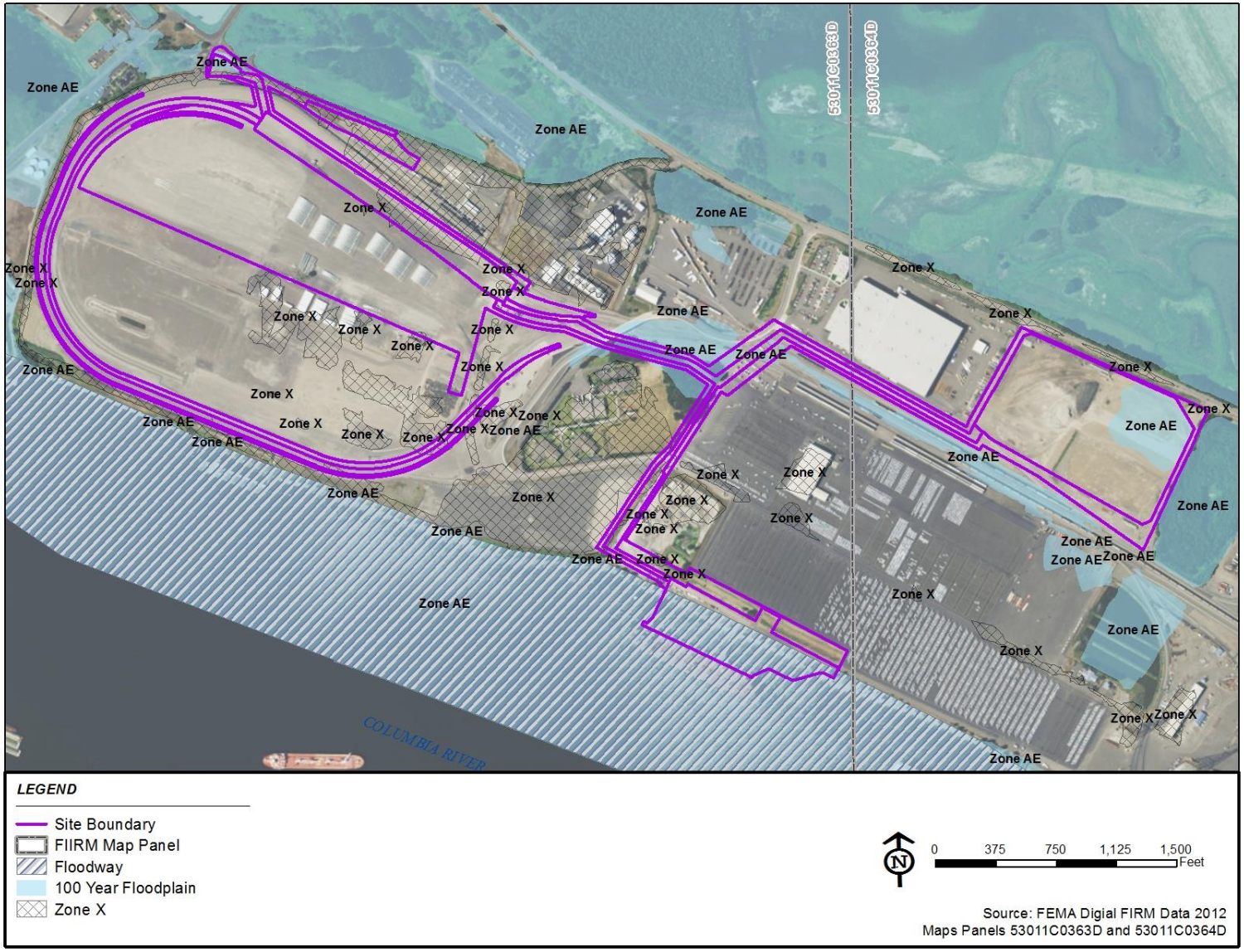


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Figure 3.3-1. Mapped Floodplains (Revised)

3.3.3.2 Potential for Flooding and Mitigation Measures

There are no impacts to the site for the 5- and 50-year flood events.

Construction/100-500-Year Flood

Construction activities will cease if a flood event is predicted and move, to the extent possible, hazardous materials and equipment from the site to above the 500-year floodplain.

Operation/100-5-Year Flood

Within Area 200, the below-grade trenches will be watertight eliminating inundation concerns during the 100-year flood, or from seasonal shallow groundwater.

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 is located in the floodplain, the pipeline will be elevated above the 100-year flood elevation. 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 structures or portions of structures located in Area 400 will be located outside the 100-year floodplain. These include a dock transformer pad, combined control room/E-house, 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.

Floodwaters are anticipated to inundate the facilities with approximately 1-foot of water during the 500-year event and a maximum of 3 feet in the lowest areas. The Facility will be designed to maintain integrity in these worst-case flood conditions. The containment berm around the product storage tanks (Area 300) provides protection against inundation. The unloading facility is located within the inundation area of the 500-year flood plain. Flood waters inundating the unloading area would fill the below-grade trenches and containment pans. In order to prevent the contamination of flood water, operating procedures will require that any crude oil spill, including minor leaks and drips be contained and affected surfaces cleaned promptly limiting the amount of any residue that could comingle with flood waters inundating the containment pans, containment piping, and below-grade trenches.

In the event of flood events exceeding the 100-year or 500-year flood stages, the Applicant will monitor the rate of flood water rise and suspend threatened Facility operations prior to the flooding occurring.

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

The impacts to groundwater from operations and maintenance activities are expected to be minor. 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.

Clark County GIS (Clark Count 2013a) indicates that the project site is not located within a public wellhead protection zone. The nearest public well is for the Port of Vancouver's domestic supply and is located approximately 7,700 feet southeast of Area 300. Based upon the 10-year wellhead protection zone, the well is too far removed from the project site to be affected. The Facility is also located outside of the nearest private wellhead zone, which is located approximately 1,200 feet from Area 600. This well is for the West Vancouver Materials Recover Center. During the final phase of the site cleanup and demolition activities, two supply wells were discovered and decommissioned (Anchor QEA, LLC 2009). Clark County GIS database does indicate that there is a wellhead zone for the Alcoa (Vanalco Inc.) wells (Well 700061). The associated high production wells from the Alcoa are believed to have been decommissioned during the site remediation and at a minimum are no longer active. Therefore, these high-production wells cannot contribute to migration of contaminants.

Ground improvements, such as piles, jet grout columns, wick drains, and/or stone columns, are not located within contaminated areas identified in the contaminated media locations

(Appendix F.1). The project is limiting disturbance within the contaminated media locations to shallow excavations and work within these areas will comply with a contaminated media management plan (Appendix F.1).

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.

Construction

Construction of foundations and utility and pipeline excavations for the project may require dewatering of the excavations. 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.

During construction, the Applicant will conduct on-site investigations where production wells were known to be located. If a borehole is located, confirmation will be made that the borehole has been properly sealed to a depth at least 10 feet below the finished ground surface with a cementitious grout. Abandoned production wells on the site could potentially be impacted and will be monitored during construction.

As part of the Contaminated Materials Management, construction activities will be identified that could potentially impede monitoring and access of groundwater through existing water supply wells if access is necessary for ongoing remediation activities.

The Applicant has submitted a preliminary cSWPPP to EFSEC for review (Appendix C.1). The cSWPPP identifies the stormwater pollution prevention measures to be implemented at the construction site and as described in section 2.11 of this Application.

Operation

Secondary containment systems will be provided under storage tanks and in buried transfer piping to capture leaks, preventing discharges directly into the soil, which could impact groundwater.

The potential for the discharge of contaminants to the groundwater due to surface water infiltration will be limited through development of surface water control infrastructure and the implementation of water quality control protocol.

Site design monitoring and control systems will be incorporated to allow early detection of a release when containment and remediation can be most effective.

During final design, potential contaminants in the soil will be identified and addressed in the plans and specifications to establish procedures to minimize the potential for groundwater impacts, including the following:

- Restrictions on work in portions of the site,
- Minimize/controlling grading to prevent ponding water that would promote leaching, and
- Use of temporary covers over disturbed areas, and controlling tracking of contaminants from one portion of the Site to another.

An oSPCCP (Appendix B.3) and oSWPPP (Appendix C.2) will be implemented to establish procedures to prevent and control the impact of spills on the natural environment. The oSPCCP (Appendix B.3), 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 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. The oSPCCC will be used for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. Applicable spill response equipment and material designated in the oSPCCP will be maintained at the job site. In the event of an inadvertent release, containment and begin cleanup efforts will begin immediately and be completed in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work. Cleanup will include proper disposal of any inadvertently released material and used cleanup material. The cause of the inadvertent release will be assessed and appropriate action will be taken to prevent further incidents or environmental damage. Inadvertent releases will be reported to Ecology's Southwest Regional Spill Response Office.

There are no anticipated adverse impacts to existing groundwater sources resulting from the use of City-supplied potable, process, and emergency fire suppression water.

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 73,984 gpd of process water, and 6,370 gpd of domestic potable water, and 4,771 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 (see Engineering Report in section 5.3 of this ASC) 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 capacity and operational capacity.

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 public wellhead protection map is shown on Figure 3.3-2. 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 during construction and operation 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 as shown on Figure 3.3-3. 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.

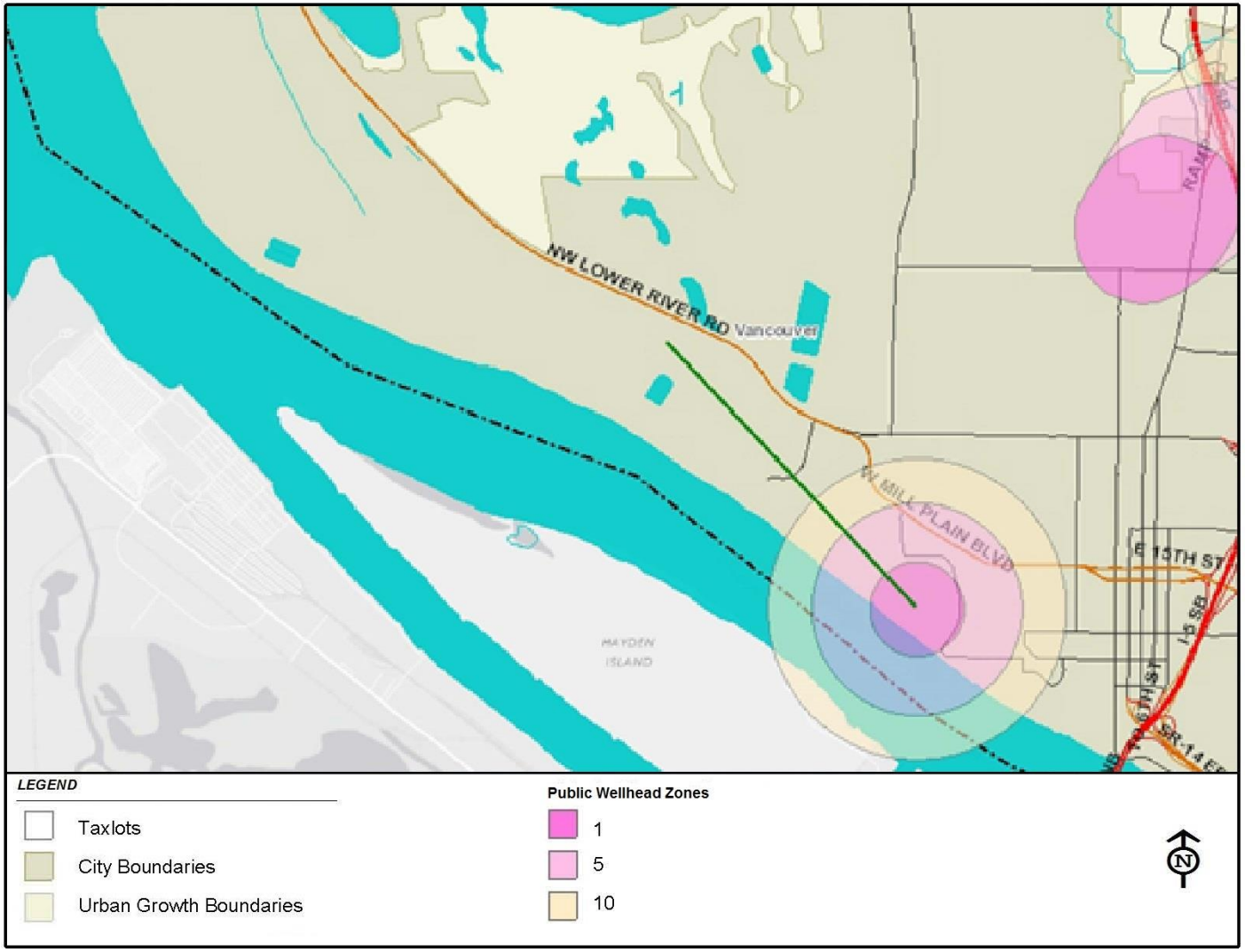

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Figure 3.3-2. Public Wellhead Zones (New)

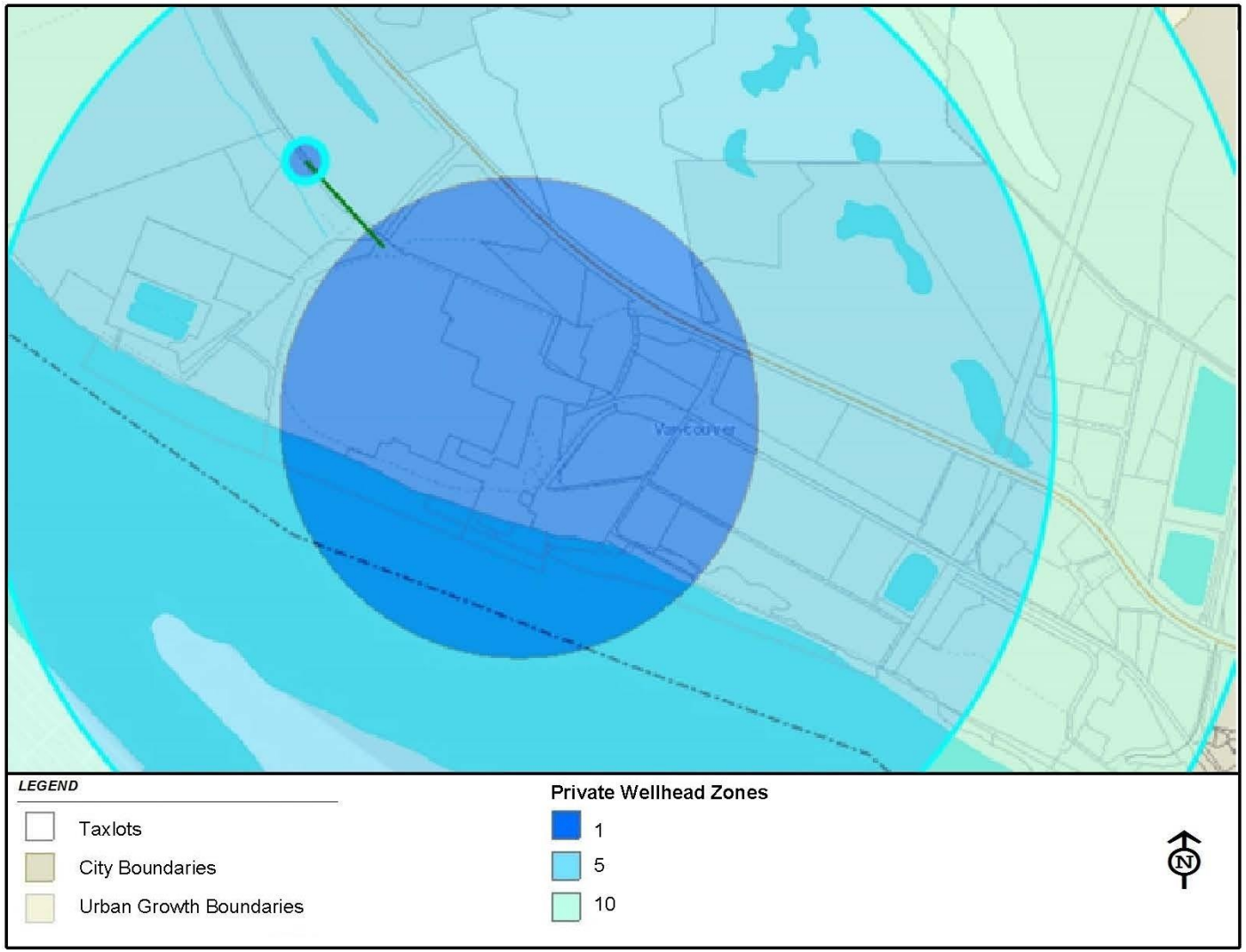

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Figure 3.3-3. Private Wellhead Zones (New)

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 map-able 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

The analysis includes 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 coast of Washington, out to the extent of the Washington Coastal Zone, a distance of 3 nautical 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.

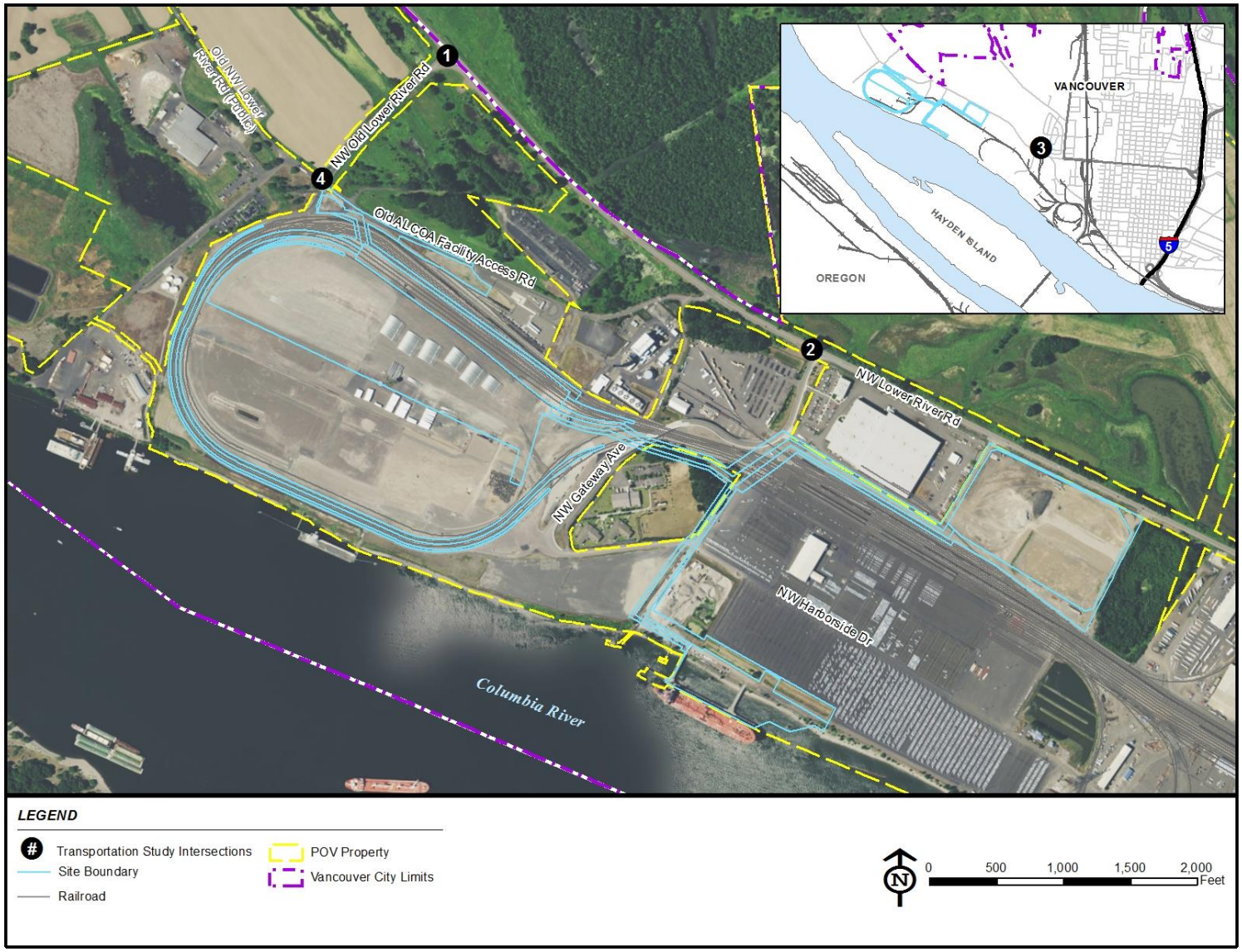

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Figure 3.4-1. Biological Resource Overview (Revised)

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 the Washington Department of Fish and Wildlife's (WDFW) 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. The Applicant has not conducted site-specific wildlife or vegetation species surveys to determine use of the Facility site or the project vicinity, because there is ample documentation which demonstrates that there is negligible habitat present to support wildlife species. The Applicant's consultant for biological resource issues, BergerABAM, has extensive knowledge of the Facility site and vicinity based on previous work conducted for the Port and Port tenants. The presence (or lack thereof) of terrestrial wildlife is indicative of the highly disturbed nature of the site (i.e., an active industrial area), and the small amount of habitat present to support wildlife species.

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 vegetation and 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. For the purposes of this analysis, vegetation communities are defined by the observed vegetation present. Terrestrial habitats are characterized by the wildlife-habitat associations described by Johnson and O'Neill (2001). 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 vegetation communities at the project site can be described according to the following subcategories (Figure 3.4-2).

- *Unvegetated Industrial* – The unvegetated industrial habitat type comprises most of the project site (over 95 percent of the relative cover at the 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*). [3] This vegetation type represents approximately 2 percent of the relative cover at the project site. 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 and quality 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. Riparian habitat represents less than 1 percent of the relative cover at the project site. 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.

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[3] 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

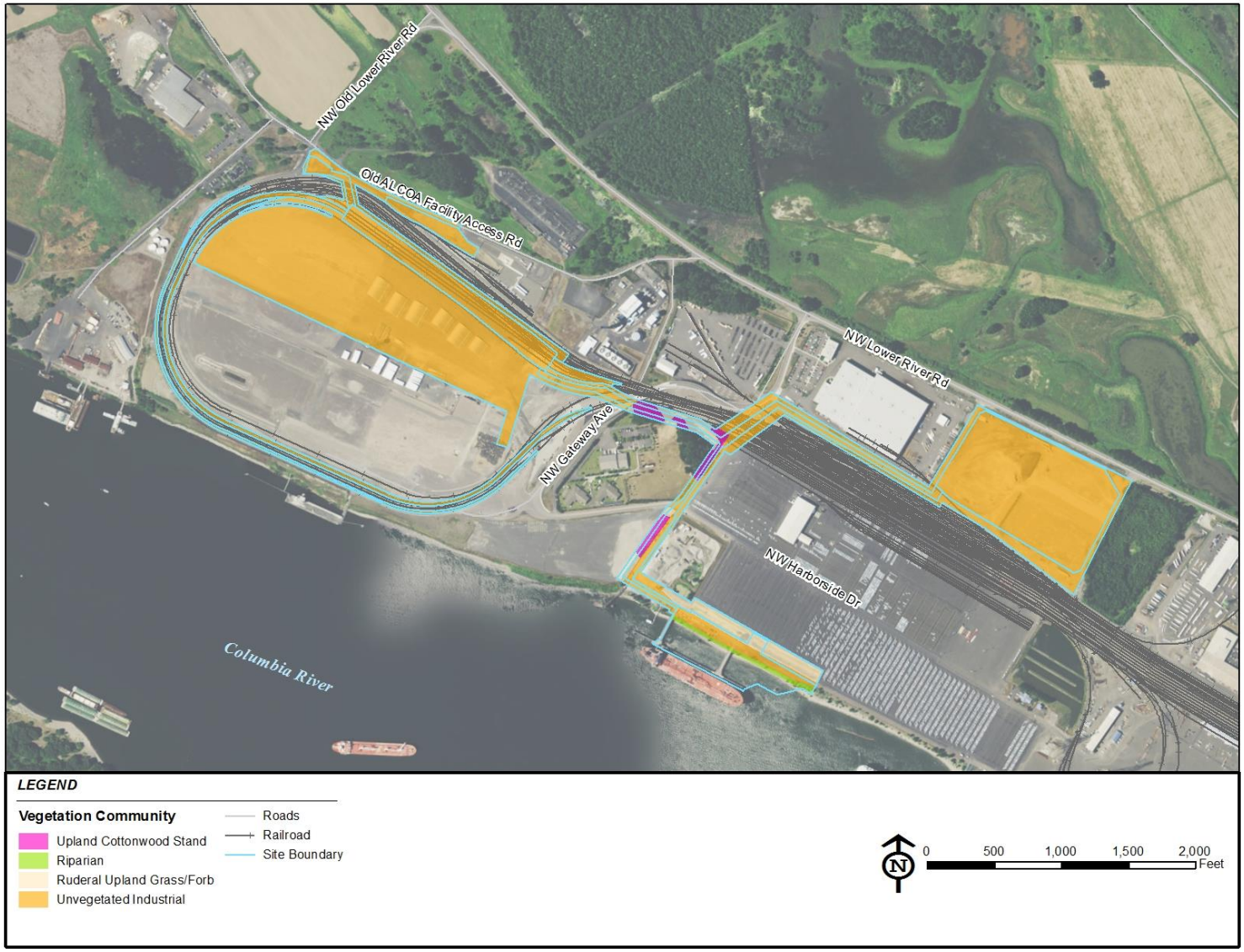

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Figure 3.4-2. Terrestrial Vegetation Communities (New)

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. This habitat type represents approximately 2 percent of the relative cover at 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.

A previously permitted project for the Clark Public Utilities substation is removing 246 trees greater than 6 inches in diameter, over approximately 1.1 acres. This project has yet to be constructed, but when complete would alter the quality of the existing forested habitat.

Terrestrial habitat of the project site is characterized by several habitat types described by Johnson and O'Neill (2001): Urban/Mixed Environs, Westside Riparian-Wetlands, Westside Lowland Conifer-Hardwood Forest. Available habitat mapping (using data compiled by Johnson and O'Neill [2001]) is shown below in Figure 3.4-3. Within the immediate project footprint, habitats have been modified from the original habitat mapping based on site-specific reviews of available data.[4]

- *Urban/Mixed Environs* – The Urban/Mixed Environs wildlife habitat covers the majority of the project site. Vegetation communities present in this habitat classification include the Unvegetated Industrial and Ruderal Upland Grass/Forb communities, which provide very little wildlife habitat function. The Urban/Mixed Environs habitat type is the most drastically altered from native conditions. The high-density distinction describes the least amount of total tree canopy cover, the lowest tree density, the highest percentage of exotics, the poorest understory and subcanopy, and the poorest vegetative structure (Johnson and O'Neill 2001). They are small, isolated patches of vegetation with little potential or opportunity to provide significant function. While this habitat is generally poor, the area may provide some opportunities for songbirds to forage and rest.
- *Westside Riparian-Wetlands* – WDFW defines riparian habitats as a Priority Habitat for the important hydrologic, water quality, and habitat functions they provide (WDFW 2008). Because riparian habitat at the project site is highly altered (i.e., riprap armored bank, minimal riparian vegetation, lack of structural complexity), it does not provide any

[4] Outside of the project footprint existing habitats are displayed from the source data, available at: http://www.nwhi.org/index/gisdata#Columbia%20River%20Basin%20GIS%20Data. Mapped habitats were interpolated from aerial imagery and may not match existing land use.

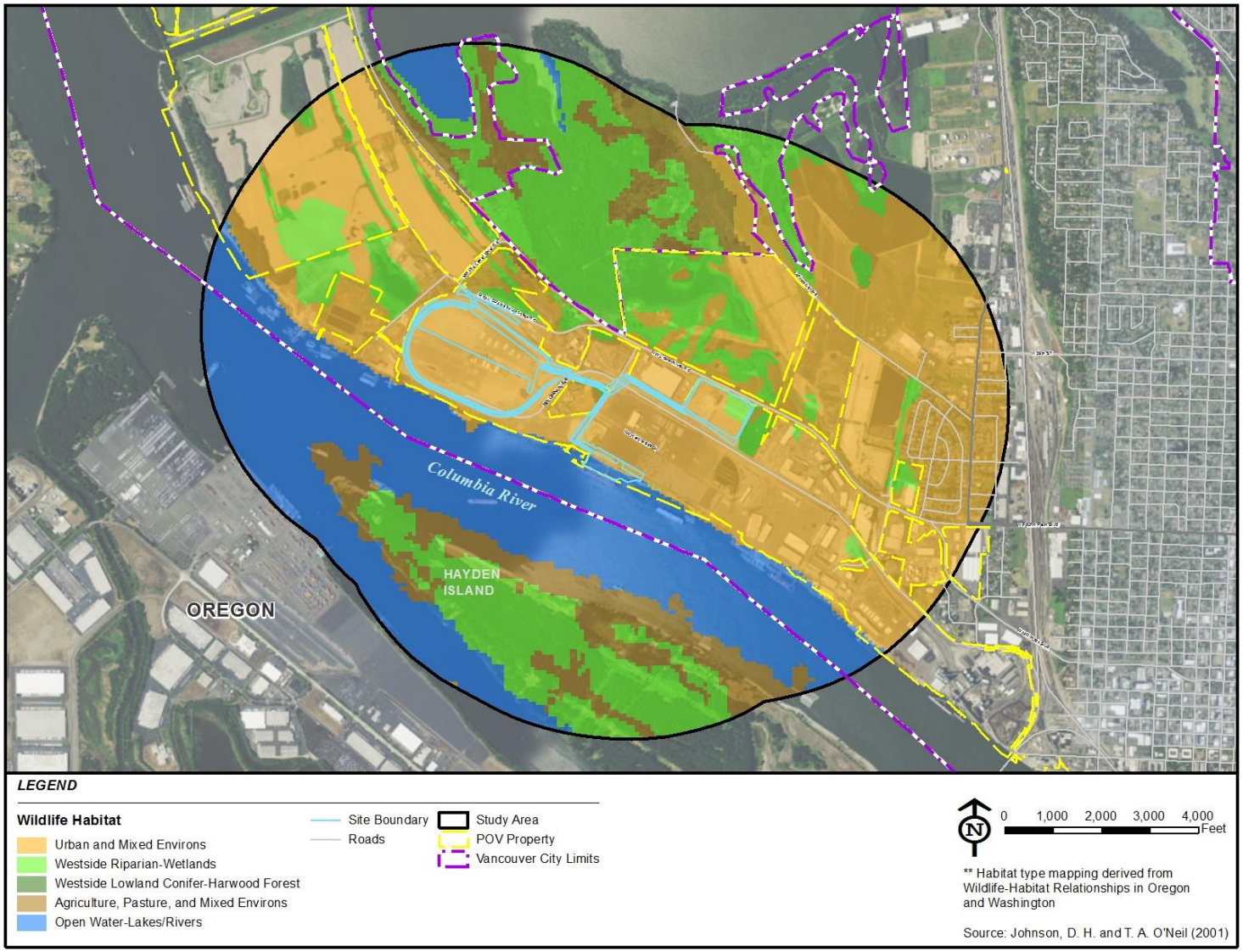
significant hydrologic, water quality, or habitat functions. Existing riparian vegetation communities in the immediate project site comprise this habitat type.

- *Westside Lowland Conifer-Hardwood Forest* – Westside Lowland Conifer-Hardwood Forest habitat is scattered throughout the study area, but it is highly fragmented. These habitat types include the Upland Cottonwood Stands. Several isolated cottonwood stands are present within the immediate area near the JWC and Parcel 3; however, the nature of these stands limits their habitat function and values for wildlife. They likely provide refuge and foraging habitat for songbirds and small mammals, as well as perching and nesting habitat for raptors. Within the study area, the species composition of this habitat is dominated almost exclusively by black cottonwood and Oregon ash, similar to the forested communities identified within the Westside Riparian-Wetlands habitat. The difference in the habitat type is related to the presence of aquatic habitat. Westside Lowland Conifer-Hardwood Forest is primarily upland and therefore not associated with aquatic areas. This habitat provides refuge and foraging habitat for migratory songbirds and small mammals, perching and nesting habitat for raptors, and cover and foraging habitat for upland mammals.

Aquatic habitat is characterized as the Open Water—Lakes, Rivers, Streams type and is limited to a stretch of the Columbia River at project site (see Figure 3.4-3).

- *Open Water—Lakes, Rivers, Streams* - At the project site, aquatic habitat is the Columbia River and conditions are typical of an industrial waterway and port operations. In general, this reach of the Columbia River provides suitable habitat for the entire Columbia River bank, which has been armored with riprap, and the entire portion of the location that is above OHWM, which has been isolated from the historical floodplain. At this location, the river is approximately 2,800 feet wide with a maintained channel width of 600 to 800 feet, and a depth from -43 CRD. Water quality conditions at the project site are generally appropriate for aquatic life, although the reach of the Lower Columbia River has several areas listed on the 2008 Ecology 303(d) list for chemical- and nutrient-related contamination (Ecology 2012).

  An important component of aquatic habitat is the shallow water habitat (SWH) zone, which is also referred to in the literature as the nearshore, in the Columbia River. The SWH zone is considered to be the nearshore migratory corridor for salmonids and other fish species. Typically, the literature uses a water depth of 20 feet to describe the SWH zone. Recent literature suggests that shallow water habitat varies with river and tide stage in the Lower Columbia and is defined as the area with water depth from 0.1 to 2.0 meters for any given river stage (Bottom et al. 2005; Kukulka and Jay 2003). At the project site, ordinary high water has been defined as 15.2 feet and 1.7 feet for mean lower low water in the CRD. Using this definition, the SWH zone at the project site would range from 15.2 feet to -4.3 feet CRD. Within this zone, existing conditions include the riprap shoreline with no riparian vegetation, an existing pile-supported trestle for access to Terminals 13 and 14, and a sandy/silty benthic substrate with no aquatic vegetation. The existing marine terminal is situated at an elevation of -20 feet CRD, and do not fall within the defined SWH zone.



BergerABAM

Figure 3.4-3. Wildlife Habitats (New)

Project Vicinity – Vegetation communities are not assessed outside the project site, but generally consist of the same communities as described for the project site. While there is little habitat present at the project site, there are several areas of relatively higher quality terrestrial habitat adjacent to the project site, and within the immediate vicinity. These include Westside Riparian-Wetlands, Westside Lowland Conifer-Hardwood Forest and Agricultural, Pasture, and Mixed Environs. Aquatic habitat within the project vicinity includes the Columbia River and Vancouver Lake.

- *Westside Riparian-Wetlands* – Within the project vicinity, Westside Riparian-Wetland habitats are present on Hayden Island to the south and Vancouver Lake to the north, and include wetland, shrub and forested communities[5]. Forested communities are dominated by black cottonwood and Oregon ash, while various willow species comprise the shrub communities. Cottonwood-dominated riparian forests border the river west of the proposed Facility and south on Hayden Island. Riparian areas most likely provide 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.

  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.

[5] As described in Section 3.5.3 below, the imagery used in Figure 3.4-3 predates the permitted filling of Parcel 1A where Area 300 is located. There are no existing wetlands within the Facility footprint, and no wetland fill is proposed.

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 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 to improve aquatic habitat functions.

- *Westside Lowland Conifer-Hardwood Forest* – 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, Pasture, and Mixed Environs Lands* – Agricultural habitats are present within the project vicinity, notably to the northeast and west of the proposed Facility. Existing habitat mapping (Figure 3.4-3) shows these areas as Urban and Mixed Environs, which can include surrounding agricultural lands (Johnson and O'Neil 2001). 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 (e.g., sparrows and other songbirds) and for a variety of small mammal species (e.g., mice, voles, and squirrels).

Aquatic habitats in the project vicinity are associated with the Columbia River and Vancouver Lake, and equate to the Open Water – Lakes, Rivers, Streams type described by Johnson and O'Neill (see Figure 3.4-3).

- *Open Water—Lakes, Rivers, Streams* - The Columbia River is an important waterway for commercial vessel traffic. Water depth is artificially maintained in the Columbia River Navigation Channel, approximately 600 feet wide and 43 feet deep, which extends from the mouth to River Mile 106.5. The Columbia River Navigation Channel has been historically dredged by USACE to allow commercial vessel traffic to the Ports of Portland and Vancouver. Routine vessel traffic is normal in the vicinity of the proposed Facility and generates underwater noise. Existing vessel traffic in the Columbia River consists of a variety of vessel types and sizes, all of which generate different sound levels. Recent studies of background noise levels in the Columbia River indicate average sound levels between 110 and 120 decibel (dB), though passing vessels increased ambient sound to between 145 and 157 dB (CRC 2011).

  Aquatic habitats are used by a variety of species, including mammals, birds, amphibians, and invertebrates (fish are discussed separately in section 3.4.3). Habitat at the immediate proposed Facility location is generally lacking in quality. Prior investigations of aquatic conditions at the marine terminal location indicate a general lack of habitat due to the steep shoreline and absence of overbank and riparian vegetation (Anchor Environmental 2007). Shallow water substrate is generally sands and gravels without the presence of large woody debris or submerged vegetation. The sandy bottom is not likely to support large communities of benthic invertebrates, which makes it less suitable as foraging habitat for fish. The lack of submerged vegetation also makes it less likely to be used by foraging waterfowl. Between berths 10 and 13, an area of higher quality habitat lies within the Port's shoreline. The channel bathymetry gradually transitions to deep water that provides some shallow water nearshore habitat, which many juvenile species of fish prefer (see section 3.4.3) and potentially provides some foraging habitat for piscivores when fish are present.

  Habitat for marine mammals is primarily limited to moderate-quality foraging habitat that occurs within the Lower Columbia River, namely Steller sea lion (*Eumatopius jubatus*), California sea lion (*Zalophus californianus*), and harbor seal (*Phoca vitulina*). As described previously, existing underwater noise is elevated from commercial vessel traffic and likely exceeds the threshold for behavioral effects throughout the lower reaches. Areas of noise refuge may occur in side channels where landforms and orientation to the navigation channel block sound transmission. No documented marine mammal haulouts are located within the study area; therefore, these species are considered to be transitory and likely only foraging within the vicinity (WDFW 2013). Diving ducks and other waterfowl forage within and adjacent to aquatic habitats at the study area where potential food sources are more likely to be present. Terrestrial wildlife (e.g., otter or muskrat) do not likely use aquatic habitat at the study area extensively due to the low habitat suitability and limited connectivity to other terrestrial habitats.

Aquatic habitat conditions throughout the study area are similar to those present at the proposed Facility location. There are several areas of relatively higher quality habitat within the immediate vicinity, however, which provide relatively higher levels of habitat function for terrestrial wildlife species. Some of these areas also provide relatively higher levels of connectivity to other areas of habitat, allowing terrestrial species better access to freshwater aquatic habitats. Vancouver Lake provides higher-quality habitat for multiple bird species, primarily dabbling ducks, kingfishers, raptors and songbirds, and forage within and adjacent to aquatic habitats throughout the vicinity of the proposed Facility. Terrestrial mammals, reptiles, and amphibians that use habitats within the vicinity also likely forage within accessible nearshore aquatic habitats.

Project Shipping Prism – The rail prism includes portions of nearly every major watershed and habitat type, ranging from forested to grasslands, within the state. The project's rail prism also crosses or parallels numerous freshwater rivers and smaller tributaries to the Columbia River and to Puget Sound. The WDFW priority habitats and species (PHS) list identifies 20 habitat types as having priority status within the state (WDFW 2008), all of which likely occur within the project's rail prism. A detailed discussion of each of these habitats is beyond the scope of this document, as the anticipated potential for and extent of impacts to priority habitats within the shipping prism are expected to be low, and are addressed programmatically within this document.

Aquatic habitat within the project's vessel prism includes the mainstem Columbia River from the project site downstream to the river mouth and includes PHS-listed aquatic habitats (instream, freshwater wetlands – deep water, and coastal nearshore). The Columbia River Navigation Channel begins at the mouth of the Columbia River and is maintained at a depth of approximately 43 feet deep and approximately 600 feet wide at the project site. This reach of the river provides habitat for a variety of freshwater aquatic species, including Pacific salmon and other resident and anadromous fish species, marine mammals (Steller sea lion, California sea lion, and harbor seal), and several species of aquatic reptiles and amphibians.

The shorelines of the Columbia River downstream of the project site are highly variable and provide different habitat types and vegetation communities. Shoreline types within the lower Columbia River are influenced by substrate composition, bank characteristics, currents, and waves among other variables. The Lower Columbia River Geographic Response Plan (GRP) has identified 14 shoreline types, listed below in Table 3.4-1, that occur between the project site and mouth of the Columbia River (Ecology 2003).

Table 3.4-1. Lower Columbia River GRP Shoreline Types

1	Exposed rock shores and vertical, hard man-made structure (e.g., seawalls)
2	Exposed wave-cut platforms
3	Fine to medium grained sand beaches and steep unvegetated river banks
4	Course grained sand beaches
5	Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A	Gravel beaches - pebbles to cobble
6B	Gravel beaches - cobbles to boulders
6C	Exposed riprap

7	Exposed tidal flat
8A	Sheltered vertical rock shores and vertical, hard man-made structures (e.g., seawalls, docks, bulkheads)
8B	Sheltered rubble slope
9A	Sheltered sand and mud flats
9B	Sheltered vegetated low bank
10	Marshes

Note: Shoreline lengths are not quantified in the GRP.

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 3.4-2 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 3.4-2. 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 bradshawii*)	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

Noxious Weeds

Noxious weeds are non-native plants that have been designated as undesirable plants under federal and state law. Weeds displace native species; decrease plant species diversity; degrade habitat for rare species and wildlife; decrease productivity of farms, rangelands, and forests; create unattractive areas dominated by single species; and impair the full use of the landscape by wildlife and humans.

Several noxious weeds are present in the project site, including Canada thistle, Himalayan blackberry, and false indigo bush, and are typically found in developed industrial sites. Additional noxious weed species could be present, but specific inventories have not been completed. Table 3.4-3 lists weed species known to occur in Clark County that may be present at the project site and within project vicinity (Clark County 2013).

Table 3.4-3. Noxious Weeds Known to Occur in Clark County

Class[a]	Common Name	Scientific Name	County Control Priority
A	Buffalobur	*Solanum rostratum*	Yes
A	Garlic mustard	*Alliaria petiolata*	Yes
A	Giant hogweed	*Heracleum mantegazzianum*	Yes
A	Ricefield bulrush	*Schoenoplectus mucronatus*	Yes
A	Shiny geranium	*Geranium lucidum*	Yes
A	Italian thistle	*Carduus pycnocephalus*	Yes
A	Milk thistle	*Silybum marianum*	Yes
A	Slenderflower thistle	*Carduus tenuiflorus*	Yes
B	Butterflybush	*Buddleja davidii*	Yes
B	Common fennel	*Foeniculum vulgare*	Yes
B	Dalmatian toadflax	*Linaria dalmatica*	Yes
B	Eurasian watermilfoil	*Myriophyllum spicatum*	Yes
B	Hairy willow-herb	*Epilobium hirsutum*	Yes
B	Mouseear hawkweed	*Hieracium pilosella*	Yes
B	Orange hawkweed	*Hieracium aurantiacum*	Yes
B	Yellow hawkweed	*Hieracium caespitosum*	Yes
B	Herb-robert	*Geranium robertianum*	No
B	Indigobush	*Amorpha fruticosa*	No
B	Knapweed, diffuse	*Centaurea diffusa*	Yes
B	Knapweed, meadow	*Centaurea jacea x nigra*	Yes
B	Knapweed, spotted	*Centaurea stoebe*	Yes
B	Knotweed, Bohemian	*Polygonum bohemicum*	Yes
B	Knotweed, giant	*Polygonum sachalinense*	Yes
B	Knotweed, Himalayan	*Polygonum polystachyum*	Yes
B	Knotweed, Japanese	*Polygonum cuspidatum*	Yes
B	Loosestrife, purple	*Lythrum salicaria*	Yes
B	Parrotfeather	*Myriophyllum aquaticum*	Yes

Class[a]	Common Name	Scientific Name	County Control Priority
B	Poison hemlock	*Conium maculatum*	Yes
B	Puncturevine	*Tribulus terrestris*	Yes
B	Scotch broom	*Cytisus scoparius*	Yes
B	Spurge, leafy	*Euphorbia esula*	Yes
B	Sulfur cinquefoil	*Potentilla recta*	Yes
B	Tansy ragwort	*Senecio jacobaea*	Yes
B	Thistle, plumeless	*Carduus acanthoides*	Yes
B	Wild chervil	*Anthriscus sylvestris*	No
B	Yellow archangel	*Lamiastrum galeobdolon*	No
B	Yellow nutsedge	*Cyperus esculentus*	Yes
C	Common groundsel	*Senecio vulgaris*	No
C	Common St. Johnswort	*Hypericum perforatum*	No
C	Common tansy	*Tanacetum vulgare*	Yes
C	Curlyleaf pondweed	*Potamogeton crispus*	No
C	English ivy	*Hedera helix*	No
C	Evergreen blackberry	*Rubus laciniatus*	No
C	Field bindweed	*Convolvulus arvensis*	No
C	Hawkweeds	*Hieracium spp.*	No
C	Himalayan blackberry	*Rubus armeniacus*	No
C	Old-man's-beard	*Clematis vitalba*	No
C	Oxeye daisy	*Leucanthemum vulgare*	No
C	Perennial sowthistle	*Sonchus arvensis*	No
C	Reed canarygrass	*Phalaris arundinacea*	No
C	Spiny cocklebur	*Xanthium spinosum*	No
C	Thistle, bull	*Cirsium vulgare*	Yes
C	Canada Thistle	*Cirsium arvense*	Yes
C	Tree-of-heaven	*Ailanthus altissima*	No
C	Wild carrot	*Daucus carota*	No
C	Yellowflag iris	*Iris pseudacorus*	No
C	Yellow toadflax	*Linaria vulgaris*	No

Source: Clark County (2013)

[a] Class A weeds are the highest priority as these species have limited distribution in the state and can readily be controlled. Class B species are currently present in the state and control is decided that the local level. Class C species are widespread within that state, and control may be locally enforced, but not required.

3.4.2.2 Impacts

Construction

Direct Habitat Modification – 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

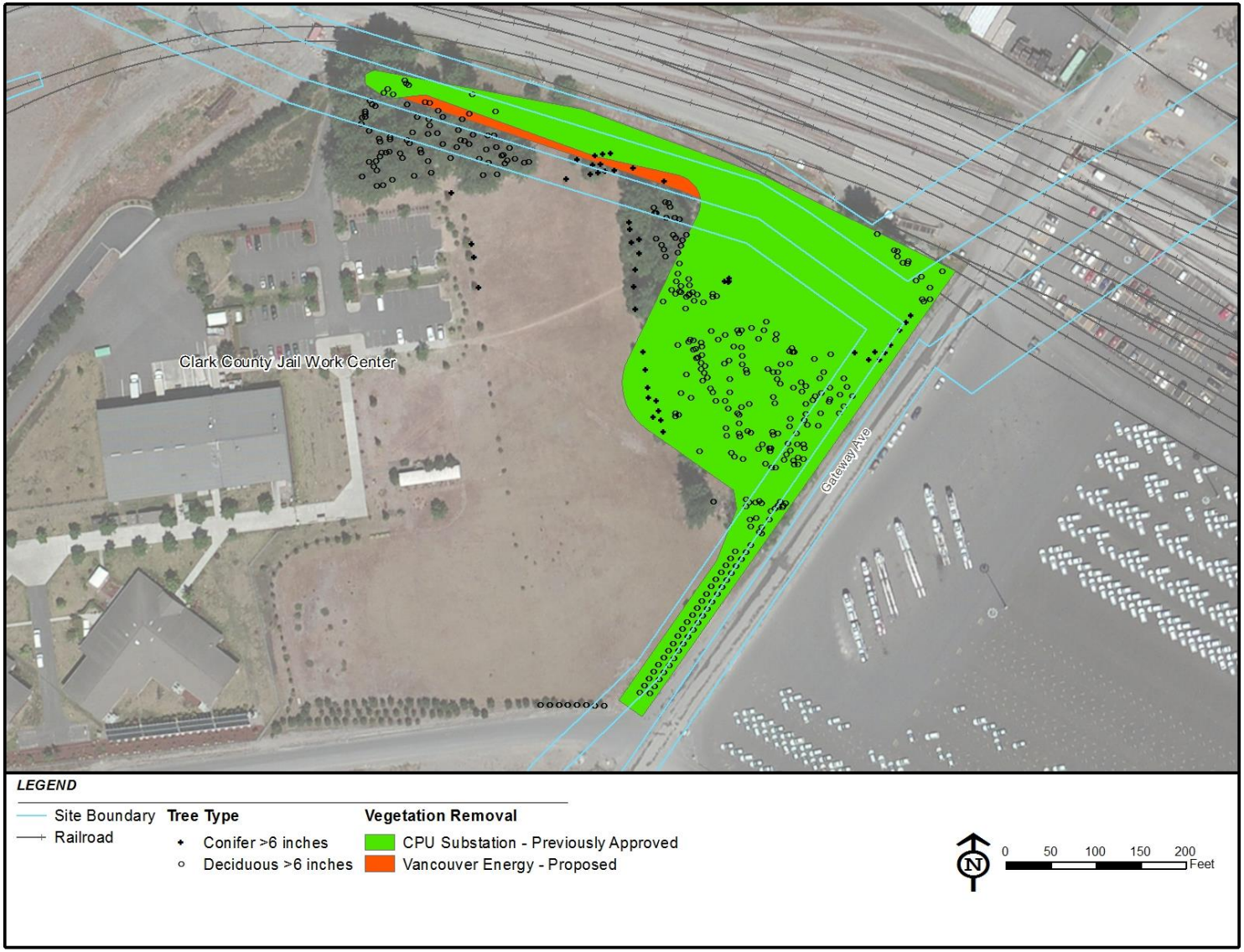
present at the project site. Most of the site has been filled, paved, and/or capped in association with previous development and cleanup activities. What little natural vegetation is present is small and isolated, and/or significantly disturbed from its natural condition. As such, construction of the 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 and ruderal upland grass/forb vegetation communities (Table 3.4-4). These vegetation communities correspond to the Urban/Mixed Environs habitat type (Table 3.4-5) which provides little or no wildlife habitat function. Direct permanent impacts to unvegetated industrial communities total approximately 40.21 acres and will not result in any impacts to vegetation or habitat resources. Temporary impacts, approximately 53.65 acres for staging and construction access, will be restored to previous conditions following construction and are not expected to result in a permanent loss of the vegetation community and the associated habitat function it provides.

Approximately 42,000 square feet (0.96 acre) of ruderal upland grass/forb vegetation will be permanently impacted by construction in Area 200 related to the office building and Area 500 related to portions of the pipeline. Temporary impacts associated with staging and construction access, approximately 3.49 acres, will be restored to existing conditions following construction. These areas provide very little habitat function because of their isolated and disturbed nature. Therefore permanent and temporary 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 3,252 square feet (0.07 acre) of a small, isolated upland cottonwood stand north of the Jail Work Center. This stand contains approximately 273 trees, 246 of which have previously been 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). The current stand provides moderate habitat function, which would be reduced to low quality following construction of the CPU substation because of the limited number and extent of the remaining trees. The proposed pipeline will remove 9 of the remaining 27 trees, which are not already permitted for removal associated with the CPU project (see Figure 3.4-4). The tree removal is not expected to change habitat quality, the trees to be removed are located on the fringes and would not increase fragmentation of the remnant stand.

While the proposed pipeline will pass through the riparian area, this will occur primarily in an unvegetated portion of the riparian area. Construction of the pipeline and other improvements at Area 400 will not impact high quality vegetation and riparian function will not be affected. As stated previously, 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.



BergerABAM

Figure 3.4-4. CPU Tree Plan (Revised)

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. Table 3.4-4 summarizes the impacts to each of the vegetation communities present resulting from construction of the Facility, while Table 3.4-5 summarizes the corresponding impacts to habitats.

Noxious Weeds – Construction of the proposed project could result an increase in the establishment and spread of noxious weeds in the project site. Proposed construction would result in new ground disturbance potentially allowing existing weed populations to spread. Seeds could also be introduced through construction vehicles entering and leaving the proposed Facility location, which could result in the establishment and spread of new species.

Aquatic Exotic and/or Invasive Species – Aquatic exotic and/or invasive species could be introduced during construction through the following activities. Vessels could be used to support in-water construction that could be contaminated with aquatic invasive species if it was previously used in waterbodies outside the Columbia River where such species are present and if the equipment was not properly cleaned prior to arrival at the Facility work location. Certain construction materials (e.g., temporary piles) could also have been previously used at other locations.

Temporary Water Quality Impacts – The project has the potential to result in temporary water quality impacts during pile removal, which could affect aquatic habitat by temporarily disturbing sediments and elevating levels of turbidity during construction. 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 increases in turbidity as a result of the project is not anticipated to measurably exceed levels caused by normal periodic increases of natural turbidity. Additionally, the volume of flow of the Lower Columbia River will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

Temporary Construction Noise – Construction of the Facility has the potential to result in temporarily elevated terrestrial habitat and underwater habitat noise levels at the project site and with the project vicinity during the operation of construction equipment and during in-water pile removal and installation, and upland impact pile driving assocaited with Area 400 improvments (i.e., shore-based mooring points, dolphin access points, and the trestle abutment). These activities have the potential to temporarily affect marine mammals and the quality of their habitat within the project vicinity. During construction aquatic species may tend to avoid the work area or move through the area faster.

Peak terrestrial noise generation would occur from upland impact pile driving impact pile driving in Area 200 and in Area 400 (for area upland of OHWM). Increased sound levels will be temporary and will be expected to decrease to ambient conditions within a maximum distance of

approximately 5,000 feet from the immediate project site. Most of the terrestrial habitat within approximately 5,000 feet of the dock is not suitable for wildlife species, and terrestrial wildlife habitats at the project site are of limited quality and quantity. Wildlife occupying adjacent habitats within 5,000 feet may avoid these habitats or exhibit startle responses to periods of loud noise.

Other sources of temporary construction noise could include general construction activities, however, these activities are not expected to be distinguishable from adjacent industrial activity.

Table 3.4-4. Summary of Vegetation Community Acreage Impacts

Vegetation Community	Existing Community Acreage	Permanent Impacts							Total Permanent Impact	Temporary Construction and Laydown Impacts
		Area 200 – Rail Unloading	Area 200 – Admin	Area 300	Area 400	Area 500	Area 600	Rail Improvements		
Ruderal Upland Grass/Forb	4.45	0.0	0	0.00	0.44	0.52	0.00	0.00	0.96	3.49
Upland Cottonwood Stands	1.68	0.00	0	0.00	0.00	0.07[a]	0.00	0.00	0.07[a]	0
Riparian	0.88	0.00	0	0.00	0.0[b]	0.00	0.00	0.00	0.0	0[b]
Subtotal	*7.01*	*0.0*	0	0.00	*0.44*	*0.59*	*0.00*	*0.00*	*1.03*	*3.49*
Unvegetated Industrial	92.99	6.24	1.60	20.85	1.74	3.55	0.8	5.43	40.21	53.65
Open Water	4.62	0	0	0	4.62[c]	0	0	0	4.62[c]	0
Total Acreage	104.63	6.24	1.60	20.85	7.68	4.89	0.81	5.43	47.47	57.14

[a] Impacts to upland cottonwood stands include prior approvals for the construction of the Clark County PUD substation and total 0.81 acres. Actual impacts associated with the transfer pipeline that occur outside of previous approved tree removal are listed in this table.

[b] Facility elements would be constructed in an area with scarce riparian vegetation at Area 400 covering approximately 0.85 acre. Temporary construction areas would cover approximately 0.03 acre. No high-quality riparian vegetation would be removed and existing riparian habitat function would not be negatively affected.

[c] Construction activities occurring within open water would occur on the existing structure.

Table 3.4-5. Summary of Habitat Acreage Impacts

Habitat Type	Area 200 – Rail Unloading	Area 200 - Admin	Area 300	Area 400	Area 500	Area 600	Rail Improvements	Total Permanent Impact	Temporary Construction and Laydown
Urban/Mixed Environs[a]	6.24	1.60	20.85	2.84	4.89	0.81	5.43	42.66	57.14
Westside Riparian-Wetlands	0.00	0.00	0.00	0.00[b]	0.00	0.00	0.00	0.00	0.00
Westside Lowland Conifer-Hardwood Forest	0.00	0.00	0.00	0.00	0.07[c]	0.00	0.00	0.07	0.00
Open Water – Lakes, Rivers, Streams	0.00	0.00	0.00	4.62	0.00	0.00	0.00	0.00	0.00
Total Acreage	6.24	1.60	20.85	7.68[d]	4.96	0.81	5.43	47.47[d]	57.14

[a] A total of 1.13 acres of vegetation communities within this habitat would be converted and result in a loss of habitat (Table 3.4-4). The remaining area is unvegetated industrial and not considered habitat.

[b] Facility elements would be constructed in an area with scarce vegetation and no high-quality vegetation would be removed or existing riparian habitat function would be negatively affected.

c Impacts to upland cottonwood stands include prior approvals for the construction of the Clark County PUD substation and total 1.7 acres. Actual impacts associated with the transfer pipeline that occur outside of previous approved tree removal are listed in this table.

d Includes water areas of 4.8 acres within the Marine Terminal.

Operation

The operation of the proposed project could affect vegetation and terrestrial wildlife habitats 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 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 shipping traffic that will occur in conjunction with the proposed project.

Vegetation Maintenance – Improper application of herbicides for control of vegetation for safety reasons (see section 2.10.2) could result in impacts to vegetation outside the Facility boundary.

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, SWH zone shading 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 47.4 acres, and the proposed construction will result in approximately 44.4 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).

Overwater Coverage – During loading operations, potential activities that could affect the SWH zone include the use of two moveable, grated walkways to provide access to the mooring dolphins. These walkways are only intended to cross the SWH zone when vessels are mooring or departing. When not in use, the walkways will be staged onshore. The vessel mooring occurs in deep water, outside the SWH zone, and will not increase temporary shading. Therefore, no additional impacts will occur to the SWH zone as a result of project operations and there will be no further degradation of the nearshore migratory corridor used by salmonids and other fish species.

Operational Water Quality Impacts – The operation of the Facility also has the potential to increase the risk of inadvertent releases of crude oil to the environment. According to projected volumes, the proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. Spills could occur at the project site or while docking or loading, or in transit downstream on the Columbia River or in marine waters.

A marine traffic risk assessment completed for the project (see Appendix P.1) assessed the frequency of various types of marine incidents, including: collisions in transit and at the berth, allisions, and groundings. The study assessed the frequency based both on existing vessel traffic on the Columbia River (see Appendix P.2), and very conservatively all other currently proposed maritime cargo projects on the Columbia. The study identified that not all vessel-related incidents result in a release of cargo, and calculated the risk of spill from such incidents based on the size of vessels proposed to call at the Facility. The study also assessed the risk of releases during vessel loading operations. The study reported the following results.

- The model predicts that the Vancouver Energy Terminal vessel traffic will increase the risk of marine incidents for current traffic (with or without consequences of concern) on the Columbia River by approximately 2 percent. The number of incidents predicted by the model for the study area is approximately 40 per year for current marine traffic. The incident return period for an incident of any type (most of which will not result in a spill) is approximately:
  - one every 0.8 year for 47,000 DWT tankers
  - one every 3 years for 105,000 DWT tankers
  - one every 57 years for 165,000 DWT tankers
- When considering all future marine traffic – a combination of current traffic, Sample Vessels, and traffic proposed for future projects – the frequency of an oil spill from a collision was approximately:
  - 1 every 43years1 for 47,000 DWT tankers
  - 1 every 170 years for 105,000 DWT tankers
  - 1 every 3,100 years for 165,000 DWT tankers
- When considering all future marine traffic the frequency of an oil spill from a grounding is:
  - 1 every 40 years for 47,000 DWT tankers
  - 1 every 150 years for 105,000 DWT tankers
  - 1 every 2,800 years for 165,000 DWT tankers

- When considering all future marine traffic, the frequency of an oil spill from a collision at the dock is:
  - 0.00004/year (1 every 25,000 years) for 47,000 DWT tankers
  - 0.00001/year (1 every 100,000 years) for 105,000 DWT tankers
  - 0.0000006/year (1 every 1.6 million years) for 165,000 DWT tankers

When a laden tanker is assisted by a tethered escort tug as opposed to having no tethered escort tug, it was estimated that a laden tanker is 10 times less likely to run aground than it is without a tethered escort tug.

The study concluded that with respect to releases resulting from vessel loading operations small releases (less than 100 bbl) were the most likely, with an estimated frequency of one every seven to nine years. This conclusion was supported by the historical record, which demonstrates that the majority of spills are less than 1 bbl. Loading hoses contribute to the majority of this risk. The replacement of these hoses every five years (as mandated by state and federal regulations) is expected to further reduce the likelihood of these small releases. Spills of tens of thousands of bbl resulting from full bore rupture of the largest transfer pipeline were estimated to be very significantly less frequent, occurring once every 39,000 years or more.

Terrestrial vegetation and wildlife habitats will not be affected significantly by any potential water quality impacts associated with operation of the Facility. Terrestrial habitats that would remain at the project site post-construction could potentially be affected by an increased potential for spills or leaks. 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. A comprehensive strategy for spill prevention and control will be implemented as described in detail in section 2.10 of this Application and in the oSPCCP (Appendix B.3). A spill to surface water would not be likely to affect terrestrial vegetation or terrestrial wildlife habitats.

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 project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. Marine traffic on the Columbia River has the potential to result in impacts to vegetation and wildlife habitats through increases in the potential for minor shoreline erosion associated with propeller wash as well as waves, and through the introduction of exotic species. The potential impacts are discussed in further detail below.

Bank Erosion – Propeller wash from ships in transit, as well as vessel wakes breaking on shore, could cause an increase in bank erosion along unarmored sections of the shoreline. This could result in a minor decrease in the quantity and quality of vegetation and terrestrial wildlife habitat along the shoreline. The USACE's Channel Deepening EIS (USACE 1999) reported that the natural shorelines of the lower Columbia River (encompassing the vessel corridor for the project) have remained very stable over the past 100 years, consisting largely of erosion-resistant sand, silt, and clay deposits (USACE 1999). Approximately half of the shoreline between RM 21 and 106 are consists of dredge disposal sites which are not natural shorelines and are highly susceptible to erosion (USACE 1999). The disposal sites are subject to vessel wakes, currents, and continual wind waves which contribute to regular erosion patterns in the river (USACE 1999).

The vessel corridor and habitats along the shoreline are already exposed to vessel wakes from the ships that use the river and a baseline level of propeller scour aleady occurs (see Appendices H.5 and H.6). The vessels that would call at the Facility terminal are within the size range of current vessels and would be piloted at similar speeds and course through the navigation channel. Therefore, the wakes from these vessels would be similar to wakes from vessels currently using the navigation channel. This means the natural shorelines, which have little susceptibility to erosion, would be subject to an incremental increase in vessel wakes that are not currently causing erosion. As a result, any localized minor change would not be expected to result in a long-term change to the habitat because there is a regular state of disturbance. In addition, these habitats are continually disturbed by natural currents and waves.

The shoreline at the Facility site is well armored, and not particularly sensitive to erosion. At the Facility, and other armored shorelines on the river, the impact of vessel traffic on bank erosion should be negligible. Effects associated with bank erosion would be minor, temporary and localized to unarmored banks, and would result in only minor impacts to vegetation and terrestrial wildlife habitat. The risk of adverse effects to shoreline habitat from increased bank erosion caused by vessels calling at the Facility is minimal.

- *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.

  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 requirements. These practices include requirements 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. This also reduces the risk of the transport of exotic species. Vessels calling at the Facility are subject to state and federal requirments regarding ballast water treatment and discharge, as described in section 3.4.3.2 below.

  During operation, with the exception of tanker vessel and ATB calls for loading as discussed below, the following activities involve an in-water component that could also potentially introduce exotic species: the placement and removal of Facility-owned mobile spill booms

during vessel loading operations; participation of Facility[6] and contractor vessels[7] in spill response exercises; and participation of Facility and contractor vessels in spill response activities.

With respect to Facility-owned equipment, the skiff and mobile booms will be primarily used at Vancouver Energy Terminal. The Applicant may enter into mutual aid agreements with other facilities; in the event of drills or incidents at such other facilities the skiff and booms could be dispatched to those locations to participate in response; it is anticipated that mutual aid agreements would primarily be entered into with facilities located along the Columbia River. The skiff and booms would therefore most likely only be exposed to waters within the Columbia River, and there is negligible potential for contamination with invasive species which are not already present in this waterbody. If the equipment was dispatched outside the Columbia River, it would be inspected and cleaned in accordance with the state requirements noted above before being re-introduced to the Columbia River.

With respect to spill response equipment not owned by the Facility but furnished by third party organizations that the Applicant will contract with (including organizations providing mutual aid), based on the current equipment requirements for the Columba River, there are sufficient response resources to meet the current 300,000 bbl response planning standard currently staged on or in proximity to the river[8]. Therefore, this equipment also has minimal potential for introduction of species not already present in the Columbia River. Contractors and mutual aid providers may source equipment from other locations in the event of larger and more complex spill drills or response activities. In such cases, contractors and mutual aid providers are also required to comply with applicable state statutes and rules aimed at preventing the introduction of such species, as identified above.

3.4.2.3 Mitigation Measures

The project will implement several minimization measures and BMPs to minimize the potential for impacts to terrestrial habitats and vegetation. In addition to the following discussion, see sections 3.4.3, Fish, and 3.4.4, Wildlife, and section 1.4.1.11 for additional mitigation measures and BMPs for these habitats.

Construction

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,

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[6] The only vessel anticipated to be directly operated by the Facility will be the skiff associated with the Area 400 Marine Terminal, as described in Section 2.3.7 of the Application for Site Certification No. 2013-01 Supplement, February 2014.

[7] The Applicant has identified mutual aid agreements in their Operations Spill Contingency Plan, July 2015; organizations providing mutual aid may supply vessels during drills and spill response activities.

[8] If an increase of the spill response planning standard were approved in the future, spill response organizations receiving such approval would acquire necessary additional response equipment and stage it appropriately in proximity to the Columbia River on a permanent basis, thereby also minimizing the potential for introduction of aquatic invasive species.

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. Construction fencing will be used to protect existing vegetation to be retained.

Mitigation measures will be implemented for each of the habitats impacted by construction of the Facility as follows:

- Unvegetated Industrial Land: Impacts to unvegetated industrial land do not require mitigation.
- Ruderal Upland Grass/Forb and Upland Cottonwood Stands: As noted above, the 0.96 acre of ruderal upland grass/forb habitat have very limited value; nevertheless, even if no net loss to this impact was required, together with the Upland Cottonwood Stands (0.07 acre) 1.03 acres of compensatory habitat mitigation is warranted for no-net loss. To mitigate for the removal of these habitats, the project will install urban landscaping including trees and shrubs in areas 200 and 300. Native species will be used to the extent practical. Area 200 will include native trees planted in groups within the landscape to provide additional mitigation for loss of trees onsite. These landscaped areas will provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. This action also complies with VMC 20.770 and will plant additional trees to compensate for development that will impact pervious surfaces. Trees will be planted as part of landscaped buffers and parking lot landscaping where currently no trees exist. In total approximately 2.21 acres of planted areas will be completed.

  Locations where ruderal habitat has been impacted by temporary construction laydown will be restored to previous condition so as to result in no net loss to this community.
- Riparian: As noted above, the riprapped bank has very limited riparian vegetation, and the Applicant is not disturbing any existing high quality vegetation or negatively impacting existing habitat function. No mitigation is therefore warranted.

The project will-provide 1.13 acres of compensatory habitat mitigation, including urban landscaping. Approximately 2.21 acres of planted areas, including trees and shrubs in areas 200 and 300 will offset the removal of nine trees associated with construction. Area 200 will include in the landscape plan for the Support Buildings the use of native trees planted in groups within the landscape to provide additional mitigation for the loss of trees onsite. These landscaped areas will provide wildlife habitat typical in an urban environment. In addition, the Applicant will adhere to the requirements of VMC 20.770[9] and plant a minimum of 30 tree units per acre for

[9] VMC 20.770.070(B)(4) allows trees planted in landscaped islands and other areas to meet the tree density requirements. The project includes a Landscaping Plan in Area 200 that calls for the planting of buffer landscape trees and parking lot trees that would exceed the eight tree units required for the project under VMC 20.770. The planted trees would be deciduous and planted at a minimum of 2-inch caliper. These landscaped areas would provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. In total, about 2.21 acres of planted areas would be completed.

undeveloped sites, and, based on a development area of 10,550 square feet, plant a minimum of eight tree units in other areas of the Facility.

No purple martin or nest boxes would be directly affected by the construction of the proposed project. Construction activities do not include removal of any creosote-coated wood piling. All existing piles at the marine terminal are steel and do not contain cavities for nesting wildlife. Purple martin have a low suspected occurrence within the Facility site as noted in the DEIS, Table 3.5-3.

The Applicant has identified the following construction mitigation measures to minimize impacts to avian habitat during construction:

- Perform tree removal outside of the nesting season (February 15 to September 1), to avoid potential impacts to active nests of protected migratory birds. If trees are to be removed during the nesting season, a preconstruction nesting survey will be completed no more than two weeks prior to removal to ensure that no active nests are present. If active nests of protected migratory birds are found, tree removal activities will be suspended until after nests have hatched and young have fledged.
- Monitor the approximate 2.2 acres of landscape plantings (discussed above) for two years after planting and replace all trees that do not become successfully established.

BMPs will be implemented during construction to minimize the spread and establishment of noxious weeds, including the following:

- Complete a weed survey for the proposed Facility site, followed by eradication of any noxious weeds and invasive plants currently established at the site prior to initiation of construction to help prevent the spread of noxious weeds to nearby wetland mitigation and wildlife areas.
- Provide wheel wash equipment at the Area 200 access to limit the dispersion of noxious weed seeds
- Restrict construction activities to the area needed to work effectively to limit the ground disturbance and prevent the spread of noxious weed species.
- Use weed-free straw, hydromulch, or similar ground cover for temporary erosion control during construction.

Aquatic Invasive Species

WDFW hydraulic code rules require that the transportation and introduction of aquatic invasive species be prevented by thoroughly cleaning vessels, equipment, boots, waders, and other gear before removing the gear from a job site [WAC 660-120 (7)(j)]. Contractors would be required to provide documentation that all equipment and materials that will be used in- and over-water have be cleaned to comply with applicable aquatic invasive species statutes and rules, including WAC 660-120 (7)(j). This would include providing documentation that in-water equipment and construction materials have either not been in contact with waters containing state prohibited aquatic invasive species which could be potentially transferred to the Columbia River, or that equipment and materials have been appropriately decontaminated from potentially transferrable aquatic invasive species prior to arrival at the project site.

Temporary Construction Water Quality

A WQPMP (Appendix F.2) has been developed and describes how the project will monitor and control releases of turbidity, suspended sediment, concrete, and other construction-related materials that may be generated during Facility construction activities in, over, and adjacent to the Columbia River and other adjacent water bodies. The plan describes water quality protection measures; monitoring parameters, methods, evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during such construction activities.

All in-water temporary pile installation and removal below the OHWM will be conducted within the published in-water work period for the project, which is November 1 to February 28[10]. This work window has been established to minimize potential impacts to aquatic habitat and native fish species and avoids the peak migration timing for marine mammals in the Lower Columbia River.

Construction at the site will be governed by an cSPCCP, which the Applicant has submitted to EFSEC for review (Appendix B.2). The cSPCCP defines specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills and outlines responsive actions in the event of a release, and notification and reporting procedures. 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. The cSPCCP will be used for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. Applicable spill response equipment and material designated in the cSPCCP will be maintained at the job site. In the event of an inadvertent release, containment and begin cleanup efforts will begin immediately and will be completed in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work. Cleanup will include proper disposal of any inadvertently released material and used cleanup material. The cause of the inadvertent release will be assessed and appropriate action will be taken to prevent further incidents or

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[10] In the Applicant-prepared PDEIS for the project, and in the JARPA and Biological Evaluation (BE) for the project, the Applicant has proposed to conduct work below the Ordinary High Water Mark (OHWM) within the US Army Corps of Engineers' (USACE) published in-water work window for the Columbia River mainstem between the mouth of the river to the Snake River confluence (November 1–February 28).[1] This work window has been established by the USACE, in coordination with resource agencies, for the protection of fish life, including ESA-listed species.

In the Advisory HPA, as well as in Sections 3.6.3.1 and 3.6.5 of the DEIS, EFSEC proposes a modified in-water work window of September 1 - January 15 to avoid peak migration and larval stages of salmonid and nonsalmonid species.

The USACE is currently reviewing the JARPA and BE for the project and consulting with National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) as obligated under Section 7 of the Endangered Species Act (ESA). Each of these regulatory agencies may have additional feedback on the preferred window for in-water work.

In the absence of a consensus among the resource agencies regarding a modified work window, EFSEC should defer to the USACE-published in-water work window of November 1 – February 28, as this is the window under consideration with the federal permitting agencies.

If USACE, NMFS, USFWS, and EFSEC can agree upon a modified window in which the project can be accomplished, and which is no shorter in duration than the window proposed in the federal permit application, then the Applicant would support discussions regarding a modified in-water work window.

environmental damage. Inadvertent releases will be reported to Ecology's Southwest Regional Spill Response Office.

Temporary Construction Noise

Aquatic and terrestrial habitat noise associated with construction has been minimized to the extent practicable. The dock modifications have been designed to use vibratory pile removal and installation methods and no in-water (below OHWM) impact pile driving, which will greatly reduce the extent of terrestrial and underwater noise generated during construction. This reduction in the intensity of underwater noise will limit the potential for adverse effects to wildlife, including special status species that may utilize habitats at the project site and within the project vicinity.

All in-water work that generates temporary noise, including temporary pile vibratory installation and removal, will occur during the published work window from November 1 to February 28 to minimize potential impacts to native fish species, and avoid 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. Drilling for casing installation may also generate underwater noise and will follow the same work window.

The Applicant has submitted a marine mammal monitoring plan (MMMP) (Appendix H.3) to EFSEC for review to address vibratory installation and removal of temporary piles and upland impact pile driving. The MMMP was developed to minimize the exposure of marine mammals to temporarily increased underwater noise levels. The plan describes procedures to identify the presence of marine mammals during construction activities, which may result in "take" and establishes actions that will be taken to minimize impacts to such marine mammals. The MMMP will include, in addition to the current plan, two additional observers to assist in monitoring the 6-mile zone where marine mammals could be affected by in-water vibratory pile driving.

The impacts of peak terrestrial construction noise have been minimized through construction sequencing that will complete work as efficiently as possible when loud noises are expected. Additionally, all noise sources occur outside of recommended management buffers for priority species; therefore, no work window is proposed for terrestrial pile driving. Species that utilize these industrialized habitats are generally well adjusted to nearly continuous human presence and activity. The Applicant has committed to also conduct upland impact pile driving associated with Area 400 elements (shore based mooring points, foundations for the mooring dolphin access points, and the trestle abutment) during the published work window from November 1 to February 28 to minimize the potential for adverse impacts to aquatic habitat. Upland impact pile driving located outside of Area 400 (e.g., Area 200 rail unloading building and Area 500 pipeline supports) would not be subject to the in-water work window.

A construction wildlife monitoring plan (Appendix H.4) has also been developed that describes the means and methods to monitor noise levels during project upland impact pile-driving in order to demonstrate that noise levels attenuate to a level of non-disturbance to PHS species potentially present in the vicinity of the construction site. See section 3.4.4.1 for additional information on species of concern.

See sections 3.4.3.3, 3.4.4.3, and 1.4.1.11 for additional details on Temporary Construction Noise.

Operation

The operation of the Facility could affect vegetation and terrestrial wildlife habitats 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. There may also be minor effects associated with the shipping traffic calling at the Facility, such as bank erosion. Effects associated with bank erosion will be minor, temporary and localized to unarmored shorelines, and will result in only minor impacts to vegetation and terrestrial wildlife habitat.

Vegetation Maintenance – Facility vegetation maintenance impacts will be minimized with the use of the following mitigation measures:

- Conduct herbicide application activities using methods and products consistent with local, state, and federal regulations.
- Vegetation maintenance will not occur outside the Facility location.

Water Quality

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, operational stormwater will be collected, treated, and conveyed in permanent constructed conveyances from source to discharge. Stormwater from Area 300 will be treated to enhanced water quality standards and discharged to the 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 six-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 vegetation and terrestrial wildlife habitat are not adversely affected by operational stormwater.

As described in section 2.10, the Facility will include design measures aimed at avoiding releases, secondary containment measures to prevent releases from reaching terrestrial and aquatic habitats, and will implement a comprehensive suite of spill response planning and response plans.

Operations at the site will be governed by an oSPCCP (Appendix B.3), 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 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.

The Applicant has committed to using a self-healing biodegradable fire-fighting foam manufactured by Solberg (see Appnedix N.1 – Fire System Operation Description,

section 6.1.1). The raw materials used in the Solberg self-healing biodegradable foam have been evaluated to the Harmonized Offshore Chemical Notification Format and this is the only foam to date that has gone through this evaluation. This evaluation, which determines the impact of products discharged into marine and freshwater environments, concluded that the Solberg self-healing biodegradable foam is acceptable for use in the North Sea and in areas that discharge into the North Sea. As well, the German Institute of Hygiene has found the Solberg self-healing biodegradable foam to be of low impact upon discharge to the environment. It should be noted that fluorinated foam products will not achieve those listings because of the persistence of the fluorine molecule. For example, Solberg self-healing biodegradable foam is permitted by the Norwegian Government to allow runoff directly into the Fiords of the North Sea. This is not permitted with fluorinated surfactant based foam products.

Shipping

Bank Erosion

As presented in section 3.4.2.2, Operation, *Bank Erosion*, impacts related to vessel wakes caused by vessels calling at the Facility are not measurably different from those already occurring on the Columbia River navigational channel and will not cause any additional adverse impact (Flint 2016). Terrestrial habitats along the shoreline are already exposed to a baseline level of vessel wakes. The impact of vessel traffic on these habitats adjacent to the Facility will be negligible and as a result there are no recommended mitigation measures.

Exotic Species

The importation of aquatic invasive species as a result of vessels calling at the Facility is minized through vessel operator compliance with applicable state and federal regulations as described above, which address hull fouling and ballast water exchanges.

Facility-specific activities involving in-water placement of equipment (e.g., booming, skiff usage, third-party vessels participating in spill response traingina and drills) would abide by applicable state regualtions and rules mandating cleaning of equipment prior to its introduction into the Columbia River if it was sourced from a location where invasive species are present.

Vessel Transit-related Spills

Loaded vessels departing from the Facility will be escorted by a suitably matched tug until the escorted vessel arrives in the vicinity of the river mouth. Once in the vicinity of the river mouth, the tug will be released from the escorted vessel and will standby as a sentinel tug until the vessel crosses the bar and is safely underway in the open ocean.

In accordance with federal requirements transport vessels calling at the Facility will be 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 shipboard oil pollution emergency plan (SOPEP) govern the operation of each ship. All ships also will be required to comply with state spill prevention and contingency plans.

As described in section 3.4.2.2 above, the likelihood of a catastrophic spill is very low, and the proposed Facility BMPs and safety and security measures will minimize the risk of impacts to vegetation and terrestrial wildlife habitat.

Cumulative Impacts
The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to habitat and vegetation to the extent practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself will not result in any cumulative impacts to habitat and vegetation resources.

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 3.4-6 summarizes this information.

3.4.3.2 Impacts

This section describes the direct and indirect impacts that could occur to fish or fish habitat associated with the proposed project. Due to the nature of the resource and the varying degree of use of the habitat by each species, it is not possible to meaningfully estimate the numbers of individuals that could potentially be affected. Instead, the extent of impacts to individual fish are established based on an interpretation of the extent of impact to suitable or potentially suitable habitat.

Construction

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, the generation of temporarily elevated levels of underwater noise during temporary pile installation and removal, permanent pile removal, and installation of ground improvements, and the possible introduction of exotic species. At the scale of the shipping prism, fish and fish habitat would not be permanently directly or indirectly affected by project construction.

Table 3.4-6. Special-status Aquatic 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.
Mammals								
Steller Sea Lion (*Eumatopius jubatus*)	Eastern DPS	FT	Designated	ST	1, 2	Y	Moderate/High – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River and adjacent marine habitats are documented habitat.
Whales (Several species)	Varies	Varies	Varies	Varies	Varies	Varies	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/High – Aquatic portion of site is within migratory/foraging corridor	High – Columbia River is a documented migratory/foraging corridor.
Reptiles								
Sea Turtles (Various species)	Varies	Varies	Varies	Varies	Varies	Varies	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 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 Tr bal 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 associated with the project. The project proposes to remove 15 steel piles (eleven 18-inch steel pipe piles and four 12-3/4-inch steel pipe piles) restoring approximately 23 square feet of benthic habitat at the project site.

The project has been designed to minimize the extent of impact to the aquatic environment, and as such, will not require the installation of any permanent piles below the OHWM of the Columbia River. The project may, however, require the installation of up to 40 temporary piles to support the guides that will be used 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. 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 recolonize following removal.

Additionally, the project will result in a net reduction of approximately 400 square feet of solid overwater coverage, 1,370 square feet of grated overwater coverage, and a net increase of approximately 920 square feet of open truss overwater coverage associated with walkways.

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 3.4.3.1. 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 also provide these functions for returning adult ESA-listed salmon, and also provide 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 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.

Construction Lighting Impacts – During the installation of ground improvements, construction may occur at night to complete required work during the applicable fish window and would require additional temporary lighting on the shoreline, increasing the amount of light on the water. Increased light levels may affect fish by attraction.

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 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 (November 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.

Aquatic Invasive Species – Exotic and/or invasive species could be introduced during construction through the following activities. Vessels could be used to support in-water construction that could be contaminated with aquatic invasive species if it was previously used in waterbodies outside the Columbia River where such species are present and if the equipment was not properly cleaned prior to arrival at the Facility work location. Certain construction materials (e.g., temporary piles) could also have been previously used at other locations.

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 temporary pile installation and removal and upland impact pile driving associated with Area 400 improvments (i.e., shore-based mooring points, dolphin access points, and the trestle abutment).

Elevated underwater noise 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.

In-Water Pile Installation and Removal. As part of impact minimization, a vibratory hammer will be used for all in-water pile driving. Construction of the marine terminal is expected to install and remove up to approximately 40 temporary piles with vibratory methods. A vibratory hammer will also likely be used to remove approximately 15 existing piles from below the OHWM of the river at the marine terminal area. Some piles may also be removed through direct-pull methods, which would further reduce the potential for temporarily elevated underwater noise levels.

This analysis assumes that forty 30-inch-diameter temporary steel piles would be installed to support dock modifications. WSDOT recently published a memorandum reporting average root mean square (rms) values associated with vibratory installation of 30-inch steel piles as ranging from 164 to 176 dB_{RMS} with an overall average rms value of 171 dB_{RMS} (WSDOT 2010). WSDOT also published data in 2011 documenting average underwater sound pressure levels of 150 dB_{RMS} at a distance of 10 meters from the pile, during vibratory removal of timber piles (WSDOT 2011). For purposes of this analysis, therefore, it has been assumed that underwater noise associated with vibratory pile installation and removal will not exceed 176 dB_{RMS}.

Vibratory pile installation and removal is not expected to generate levels of underwater noise that will result in significant adverse effects to fish habitat or species. NMFS has established a disturbance threshold of 150 dB_{RMS} for fish of any size. Vibratory pile installation and removal may result in maximum underwater sound levels that meet or exceed this threshold at a distance of approximately 541 meters from the pile, respectively. Any fish that are present within this distance of the pile could be temporarily disturbed. During vibratory pile driving, 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 fish species, fish habitat, or any PCE of designated or proposed critical habitat for ESA-listed fish species.

Upland Impact Pile Installation. The project will conduct impact pile driving at the top of the bank within approximately 15 feet of the OHWM to construct several Area 400 elements, including two pile-supported shore-based mooring points, mooring dolphin access points, and strengthen the access trestle abutment. These structures would most likely be supported by 24- and/or 36-inch steel piles. Upland impact pile installation typically generates significantly lower levels of in-water noise than those generated during in-water pile driving. However, sound flanking (transmission of sound waves through substrate and into the aquatic environment) during upland impact pile driving has been documented in the literature (Batelle 2004; Caltrans 2012), and can potentially generate elevated underwater sound pressure levels in adjacent aquatic habitats. Upland impact pile driving will also occur within Area 200 (rail unloading building foundation support) and Area 500 (pipe foundation supports), but these locations are not in close proximity to OHWM and are not expected to result in sound flanking.

Underwater sound pressure levels generated by upland impact pile driving have been documented during construction of the Geyserville Bridge in Geyserville, California, in 2006 (Caltrans 2012), and during construction of a temporary work trestle for replacement of a portion of the Hood Canal Bridge in 2004 (Batelle 2004). Data collected during the Geyserville Bridge

project documented average sound pressure levels, recorded at a distance of approximately 30 to 35 meters from the pile, averaging approximately 186 dB_{PEAK}, 171 dB_{RMS}, and 162 dB_{SEL}, with maximum sound pressure levels approximately 5 dB higher (Caltrans 2012). Data collected during the Hood Canal Bridge project documented average peak sound pressure levels between approximately 164.3 and 179.6 dB_{PEAK}, and average RMS sound pressure levels ranging between approximately 147.6 and 166.2 dB_{RMS}. While site conditions are likely an important and highly variable factor in the extent to which sound pressure is transmitted to the adjacent aquatic environment, for purposes of this consultation, a worst case estimate of underwater noise levels that could be generated during upland impact pile driving of 24- and 36-inch steel piles is estimated at approximately 191 dB_{PEAK}, 176 dB_{RMS}, and 167 dB_{SEL} (Caltrans 2012).

The noise attenuation analysis indicates that the worst-case estimate of up to 6,000 strikes per day that may be necessary to drive upland piles to final elevation could exceed 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 1,338 feet of pile-driving activity. This would extend throughout the nearshore environment and approximately halfway across the Columbia River at the project site. However, these worst-case estimates result in turn from the worst-case estimate of 6,000 strikes per day, and the estimates also assume that noise is transmitted fully to the adjacent aquatic environment through the soil.

WSDOT (2014) reports that there is no approved method for calculating transmission loss (i.e., attenuation) through soil outside of the water, and then for calculating the sound level at the point at which sound is transmitted into the adjacent aquatic habitat. WSDOT has conducted monitoring on only a few projects in which piles have been driven in the dry adjacent to or within the OHWM of a river. This includes H-piles and 16-inch and 72-inch steel piles. In all cases, the pile installation did not exceed the currently established injury thresholds for fish (WSDOT 2014). Based on this information, WSDOT has concluded that pile driving in the dry is an effective means of minimizing effects to fish (WSDOT 2014).

In order to further minimize the potential for exposure of ESA-listed fish species to cumulative underwater sound pressure levels that could result in injury, upland impact pile driving associated with Area 400 improvements (i.e., mooring points, dolphin access points and trestle abutment) would be restricted to the in-water work window. Additionally, given the nature and quality of the habitat at the site, most fish are expected to be moving through the action area, and they would not be expected to be exposed to the sound from all of the impact strikes in a given day.

For these reasons, it is unlikely that any ESA-listed fish species would be exposed to cumulative underwater sound pressure levels above the established injury threshold.

Upland Ground Improvements. Temporary noise levels associated with vibratory installation of temporary sheet pile containment wall above the OHWM and installation of ground improvements will be less than those of impact-driven piles considered for possible effects. Additional impacts to aquatic species will, therefore, not be incurred. 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.

Upland impact pile driving associated with the installation of the upland mooring points, dolphin access points, and trestle abutment improvements would be restricted to the in-water work window. Additionally, given the nature and quality of the habitat at the site, most fish are

expected to be moving through the area, and would not be expected to be exposed to the sound from all of the impact strikes in a given day. For these reasons, it is unlikely that fish would be exposed to cumulative underwater sound pressure levels above the injury threshold that has been established for ESA-listed species, and this activity is not expected to result in any adverse effects to fish habitat, or to any PCE of designated or proposed critical habitat for ESA-listed fish species.

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.

Operational Water Quality Impacts – Operational water quality impacts that could be associated with the proposed project include an increased potential for impacts associated with temporary water quality during vessel berthing, 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.

During vessel berthing, temporary impacts to water quality (increased turbidity) could occur from sediment suspended by propeller wash. The impacts could occur twice per day as a vessels docks and departs. Temporary increases in turbidity are short in duration and dissipate naturally in response to river currents. Vessels will dock outside the SWH zone in deep water where any potential increase in temporary turbidity is not expected to be significant.

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 47.4 acres, and the proposed construction will result in approximately 44.4 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 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. Spills could occur at the project site or while docking or filling, or in transit downstream on the Columbia River or in marine waters. See section 3.4.2.2, Impacts, *Operations* and Appendix P.1 for additional information on vessel and spill risk assessment conclusions.

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.

Accidental release of crude oil 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. Fish that were exposed to high concentrations of spilled crude oil or other fuels could experience a range of effects up to and including direct mortality. A spill of crude oil to the aquatic environment within the project shipping prism could potentially result in long-term adverse effects to habitat suitability for a significant distance downstream of the spill. Impacts to fish and fish habitat would be significant. 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 Appendices B.2 through B.5) will manage the risk of impacts to fish species and habitats effectively.

As described in section 2.10, and elaborated in the preliminary spill prevention and response plans (Appendices B.3 through B.5) should a spill occur, the Applicant will have in place planning and and spill response measures (such as spill planning, Geographic Response Plans, etc.) to respond to events. These spill response measures are known to be effective. As confirmed in a recent internal assessment (spill drill) for the project of spill response actions and capabilities to a worst-case discharge, the proposed equipment and personnel response times meet and/or exceed timelines to mobilize equipment to address Geographic Response Plans in a timely manner given likely oil trajectories (see Appendix B.6, Vancouver Energy Spill Response Exercise Report). The report explains in detail the exercise determined the adequacy of response action resources. The Applicant was able to locate, allocate, and deploy adequate response equipment and trained personnel in accordance with all application spill planning standards. The results of this exercise to test the adequacy of proper execution of the response actions (along with pre-booming and secondary booming) show that response actions significantly impact oil spill trajectories positively. In addition, preventative measures will be built into the design of the Facility and operating procedures including containment at the facility, automatic shut-off valves in the pipeline, tank car design standards, and vessel design.

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.

Overwater Coverage – The proposed dock improvements have the potential to affect aquatic habitat through changes in the amount and configuration of overwater coverage at the site. However, these impacts would occur in deeper water and outside of the SWH zone. There would be no increase in the number of pilings or overwater coverage through the SWH zone as a result of improvements to the access trestle. Additional information regarding the impacts of the project to aquatic habitat with respect to fish can be found in section 3.4.3.2.

Operational Lighting Impacts – Vessel loading operations will occur 24 hours per day. Increased nighttime light levels may affect fish by attraction.

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 project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. 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* – Wake stranding occurs when fish are caught in the wave created by a passing ship and deposited on shore by the wave the wake generates. An analysis pertinent to vessel wakes and fish stranding within the Vessel Corridor area was completed for the project (see Appendix H.5) and provides a review of wake stranding as the mechanism which could cause mortality for juvenile salmonids and eulachon as a result of wakes caused by deep-draft vessels. The focus of this review is the lower 104 miles of the Columbia River, between the Pacific Ocean and Vancouver, Washington. The study concluded wake stranding occurs on a small subset of the shoreline beaches of the vessel corridor. Pearson et al. (2008) predicted that 16 percent or about 33 miles of non-contiguous beaches had some potential to strand fish. When additional beach morphology criteria (i.e. beaches with slopes flatter than about 5 or 6 percent) were included, Person et al. (2008) predicted that about 4 percent or about 8 miles of beaches had a high susceptibility to stranding. All the beaches in this 8 mile total are located upstream of RM 33. These results indicate that stranding risk is relatively high only in a very small portion of the 208 miles of shoreline in the Vessel Corridor and all these beaches are upstream of the lower 33 miles of the Columbia River.

  With respect to stranding of Chinook salmon, only small (35mm to 80mm) fish of one age group (0+ subyearlings) is at risk of stranding and only when present in shallow water. During the Pearson et al. (2006) study, a total of 126 ship passages were observed at the three study sites (County Line Park, Barlow Point, and Sauvie Island), and 46 passages resulted in the stranding of 520 fish of all species. The majority (426 fish, 82 percent) of stranded fish were small subyearling (age-0+) Chinook salmon. A total of eight juvenile chum salmon and seven juvenile coho salmon were stranded, for a combined total of 441 juvenile salmon (85 percent of all fish). Non-salmon comprised 15 percent of the observed stranded fish. Although yearling (age-1+) Chinook salmon, juvenile steelhead, and sculpin were detected in beach seines nets at the study sites in very low numbers, they were not observed in stranding events.

  Overall, subyearling (age-0+) Chinook salmon are the species that are most often stranded by vessel wakes. That species and life stage was also the most common fish captured in beach seine nets at the study sites, indicating they were highly available to be stranded. Based on

these results, no generalized conclusions about moderate to major long-term effects to nearshore fish can be supported by the data.

As indicated above, wake stranding does not pose a risk to all juvenile salmonids but rather only to small subyearling Chinook salmon. Extensive studies at specific locations on the Columbia River where wake stranding occurs have shown that ship wakes primarily result in stranding when small subyearling Chinook are present in the shallow water margin near the shore, and the majority of shorelines where wake stranding may occur are within the tidal freshwater region (Bauersfeld 1977, Ackerman 2002, Pearson et al. 2006, Pearson et al. 2008). This area is roughly defined as occurring from RM 34 to RM 104.

Finally, the vessels that would call at the Facility terminal are within the size range of current vessels and would be piloted at similar speeds and course through the navigation channel. Therefore, the wakes from these vessels would be similar to current wakes, and the effects of wakes on salmonids potentially stranded would be the same as stranding occurring presently. The potential for any additional impacts resulting from Facility related vessel trips also must be placed in the context of whether these trups even cause a measurable increase in the normal ebb and flow of the Columbia River vessel transportation system.

- *Bank Erosion* – The risk of adverse effects to shoreline habitat from increased bank erosion caused by vessels calling at the Facility is minimal. See section 3.4.2.2, Operation, *Bank Erosion* for detailed information on bank erosion.
- *Exotic Species* – See section 3.4.2.2, Operation, *Exotic Species* for detailed information on exotic species. Vessels calling at the Facility are expected to be crude oil tankers and articulated tug barges operating within the Exclusive Economic Zone (EEZ). These vessels will be subject to the U.S. Environmental Protection Agency's Vessel General Permit (VGP) (EPA 2013) issued under the National Pollutant Discharge Elimination System (NPDES) for discharges incidental to operation of such vessels, including ballast water discharges[11]. The Washington State ballast water requirements added to the VGP as 401 WQC conditions include the state requirements codified in Chapter 220-150 WAC, administered by WDFW. These requirements include technology-driven treatment requirements and management practices so that vessel discharges meet state water quality standards, Chapter 173-201A WAC.

Furthermore, ballast water discharges, if not treated, would be of saltwater to freshwater (because of the 401 WQC requirements to perform, at least, open sea ballast water exchange), which has less propensity to introduce invasive species than if the exchange is salt-to-salt or fresh-to-fresh water[12]. Because of this, only negligible impacts would be anticipated as a result of ballast water discharge. See also section 3.4.2.2.

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[11] See: http://www.epa.gov/npdes/vessels-incidental-discharge-permitting-2.
[12] See, for example, the discussion of the increasing risk for invasive introduction when the source and discharge waters share environmental similarity here:
http://www.reabic.net/journals/mbi/2016/Accepted/MBI_2016_Verna_etal_correctedproof.pdf.

With respect to Facility-owned and operated equipment, the skiff and mobile booms will be on a regular basis during vessel loading operations, as well as for spill response training and drills. The Applicant may enter into mutual aid agreements with other facilities; in the event of drills or incidents at such other facilities the skiff and booms could be dispatched to those locations to participate in response; it is anticipated that mutual aid agreements would primarily be entered into with facilities located along the Columbia River.

3.4.3.3 Mitigation Measures

The project will implement several minimization measures and BMPs to minimize the potential for impacts to fish and fish habitat as described below.

Construction

Direct Habitat Modification – Construction of the project will result in no net new direct, permanent impacts to fish habitat in the Columbia River. Design modification to the existing dock will only require temporary support pilings during construction. No new structures, no new permanent piles below the OHWM and no net increase in overwater structure will be installed. Fifteen existing piles will be removed from the river to mitigate for temporary support pilings. The removal of piles and existing overwater coverage will further minimized the extent of potential impacts.

All in-water construction activities, temporary pile installation, and removal activities below the OHWM will be conducted within the published in-water work period for the project (November 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 November 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations.

Following the installation of ground improvements, the shoreline where construction occurred will be returned to its previous condition.

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.

See section 1.4.1.11, Fish, Construction, for a complete description of the following BMPs and mitigation measures that will be implemented to further protect fish and fish habitat:

- Pile removal
- Pile installation
- Overwater concrete work
- Additional construction mitigation measures and BMPs
- Washington State Water Quality Standards (WAC 173-201A)

The impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project.

Construction Lighting Impacts – If ground improvement installation requires the use of temporary lighting at night, all lights will be shielded and directed away from the water to the extent practicable nstallation of jet grout columns directly adjacent to the shoreline will be scheduled for daylight hours to the extent practicable.

Temporary Water Quality Impacts – The project has the potential to result in temporary water quality impacts during pile removal, which could affect aquatic habitat by temporarily disturbing sediments and elevating levels of turbidity during construction. There is also the potential for construction related leaks or spills.

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 resuspend 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.

A WQPMP (Appendix F.2) has been developed and describes how the project will monitor and control releases of turbidity, suspended sediment, concrete, and other construction-related materials that may be generated during Facility construction activities in, over, and adjacent to the Columbia River and other adjacent water bodies. The plan describes water quality protection measures; monitoring parameters, methods, evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during such construction activities.

All in-water temporary pile installation and removal below the OHWM will be conducted within the published in-water work period for the project (November 1 to February 28). This work window has been established to minimize potential impacts to aquatic habitat and native fish species and avoids the peak migration timing for marine mammals in the Lower Columbia River.

In response the Advisory HPA dated April 16, 2015 (Howe, D. 2015), the Applicant is also providing the following mitigation during in-water construction to protect fish and fish habitat:

- Work below the OHWM shall only occur between November 1 to February 28[13].
- If at any time the stone column seismic stability work is expected to cause release of sediments below the high waterline, this work shall also adhere to the above-mentioned work window.
- The Region 5 Habitat Program Manager will be notified in writing (e-mail, FAX, or mail) from the agent/contractor no less than three working days prior to the start of construction activities. The notification will include the contractor's name, project location, and starting date for work.

[13] U.S. Army Corps of Engineers. (USACE). 2015. Approved Work Windows For Fish Protection For Waters Within National Park Boundaries, Columbia River, Snake River, And Lakes By Watercourse. Available at: http://www.nws.usace.army mil/Portals/27/docs/regulatory/ESA%20forms%20and%20templates/work_windows%20Waters_in_NPs_CR_SR_Lakes.pdf

- If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), immediate notification will be made to the Washington Military Department's Emergency Management Division at 1-800-258-5990, and to the Region 5 Habitat Program Manager.
- Work will be accomplished per plans and specifications entitled “Tesoro Savage Vancouver Energy Distribution Terminal – Dock Maintenance and Utility Infrastructure” project, dated February 2014, except as modified by these provisions. A copy of these plans will be available on site during construction.
- Extreme care will be taken to ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the stream.
- Equipment used for this project will operate stationed on a barge, boat, bank, or pier.
- All work operations will be conducted in a manner that causes little or no siltation to adjacent areas.
- Piling installation or removal in-water will be accomplished primarily by vibratory methods. If and where necessary, an impact hammer may be used for "proofing." Any use of an impact hammer for in-water proofing will occur only when sound attenuation devices, such as a "bubble curtain" are employed.
- Any impact hammer pile driving will be accomplished during daytime hours to avoid attracting fish to lights at night.
- The existing piling will be removed and disposed of in an upland location such that they do not enter waters of the state. In the event that the piles cannot be completely removed then the remainder of the piles will be removed with a clamshell bucket, chain, or similar means, OR cut off 2 feet below the mudline.
- All holes or depressions will be backfilled with clean native bed materials to reduce leaching of residual chemicals into the water column.
- Replacement grating for walkways will be designed to pass a minimum of 60 percent sunlight in areas over shallow-water habitat (less than 30 feet deep).

Construction at the site will be governed by an cSPCCP, which the Applicant has submitted to EFSEC for review (Appendix B.2). The cSPCCP will be implemented during construction and defines specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. The plan also outlines responsive actions in the event of a release, and notification and reporting procedures. See the Spill Containment and Control section in Habitat and Vegetation above for additional information.

Aquatic Invasive Species – WDFW hydraulic code rules require that the transportation and introduction of aquatic invasive species be prevented by thoroughly cleaning vessels, equipment, boots, waders, and other gear before removing the gear from a job site [WAC 660-120 (7)(j)]. Contractors would be required to provide documentation that all equipment and materials that will be used in- and over-water have be cleaned to comply with applicable aquatic invasive species statutes and rules, including WAC 660-120 (7)(j). This would include providing documentation that in-water equipment and construction materials have either not been in contact with waters containing state prohibited aquatic invasive species which could be potentially transferred to the Columbia River, or that equipment and materials have been

appropriately decontaminated from potentially transferrable aquatic invasive species prior to arrival at the project site.

Temporary Construction Noise – The proposed project has the potential to result in elevated underwater noise during in-water vibratory pile installation and removal, and impact pile driving of Area 400 improvements (i.e., shore-based mooring points, dolphin access points, and the trestle abutment), which can temporarily affect fish and fish habitat quality.

The dock modifications have been designed to require no in-water impact pile driving, which will greatly reduce the extent of underwater noise generated during construction. Temporary support piles for dock modifications will be installed and removed with vibratory methods. This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to fish.

In addition, all in-water work below the OHWM will be conducted within the published in-water work period for the project (November 1 to February 28). The upland impact pile driving for the mooring points and other elements within Area 400 located above the OHWM will also be conducted within the in-water work window to minimize the potential for effects from potential sound flanking. 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 completely absent from the project vicinity, the window between November 1 and February 28 avoids the peak migratory periods for adult fish and out-migrating juveniles of most populations. Upland impact pile driving for elements outside of Area 400 improvments are not subject to the in-water work window.

A MMMP will be implemented for vibratory installation and removal of temporary piles, and upland impact pile driving associated with Area 400 improvemens to minimize the exposure of fish to temporarily increased underwater noise levels. See the Temporary Construction Noise Impacts in section 3.4.2.2, Habitat and Vegetation for additional information.

Operation

Operational Water Quality – 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 Area 300 will be treated to enhanced water quality standards and discharged to the Terminal 4 stormwater system. Stormwater from Areas 200, 500, and 600 and the rail improvements will be treated to meet the water quality benchmarks established in the Industrial Stormwater General Permit and prior to its discharge 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. The following standard operational BMPs will be implemented to minimize potential impacts to fish and fish habitat during operation of the Facility.

- Location of crude oil unloading areas that ensure oil never comes into contact with unprotected ground surfaces that could runoff to aquatic systems. Use containment pans and berms would be used to capture unanticipated leaks.
- Construct transfer piping such that crude oil exposure to the ambient atmosphere is minimized. Design the transfer pipelines in conformance with applicable industry standards.
- Equip transfer pipelines and the associated pumping systems 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.
- Equip transfer pipelines with valves at the exit of and entry to the unloading area, the storage area, and the marine vessel loading area. These valves would 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.
- Install transfer piping aboveground when possible to facilitate inspections and maintenance. Where road or rail crossings occur, house the piping in underground steel casings or raised orraised a minimum of one foot aboveground. Design and install pipelines at each railroad, highway, or road crossing and to withstand the dynamic forces exerted by anticipated traffic or rail loads.
- Coat and cathodically protect transfer pipelines to prevent corrosion.
- Install sections of transfer pipelines constructed underground so that they are not in electrical contact with any metallic structures. This requirement would not preclude the use of electrical bonding to facilitate the application of cathodic protection. Tests would be carried out to determine the presence of stray currents and protective measures provided when stray currents are present.
- Equip transfer pipelines with leak detection systems meeting regulatory standards.
- Equip the trestle at Berth 13 with piping and hoses to transfer the crude oil from the transfer pipeline system to the receiving marine vessel. In accordance with 33 CFR § 154.530, a facility transferring oil or hazardous materials to or from a vessel with a capacity equal to or greater than 250 barrels (bbl) 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 would be coupled or uncoupled as part of the transfer operation. For the Facility, it is anticipated that the hose diameter would be between 6 and 12 inches, requiring that discharge containment capacity must be at least 3 bbl.
- Construct a catchment and sump at Berth 13, 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 would be discharged within 1 hour of completion of any transfer by pumping into the return line.

The following design elements will be used to prevent discharges of oil during conveyance, including:

- Design hoses and their supporting equipment to meet the applicable hose protection requirements of WAC 173-180 Part B and 33 CFR 156.
- Design vessel mooring systems to meet the applicable requirements of 40 CFR 156.

As described in section 2.10.3 plans will be prepared and implemented to comply with state and federal requirements, including:

- Operations oSPCCP, prepared under 40 CFR 112 and WAC 173-180, Part F
- Safe and effective threshold determination report, prepared under WAC 173 180 224
- Pre-loading Transfer Plan according to WAC 173-180-230
- Facility operations manual in compliance with WAC 173-180 400 to -435
- Oil transfer training program in compliance with WAC 173-180, Part E
- Certification program in compliance with WAC 173-180, Part E
- Spill Contingency Plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F

The Applicant has also committed to using using a self-healing biodegradable fire-fighting foam manufactured by Solberg to minimize impacts to surface water resources, as described in section 3.4.2.3 above.

These impact minimization measures and BMPs fully mitigate for the operational water quality impacts associated with the project.

Operational Lighting Impacts – Facility lighting impacts will be minimized with the use of the following mitigation measures:

- Provide directional lighting in areas adjacent to sensitive wildlife areas, including the north side of Area 300 to ensure lights are not pointed in the CRWMB and Area 400 to minimize the amount of light in aquatic habitats.
- Aim direction lighting away from sensitive habitats to the extent possible to minimize nightlight and glare.
- Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations.
- In the Marine Terminal loading area, use spot lighting only during loading operations if approved by the USCG in compliance with 33 CFR Part 105 and/or Part 154.

Shipping - The proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity. 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. During vessel berthing, temporary impacts to water quality (increased turbidity) could occur from sediment suspended by propeller wash. Temporary increases in turbidity are likely to be short in duration and dissipate naturally in response to river currents.

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 vessel wakes. Because shoreline erosion is a natural phenomenon at susceptible locations and vessel wakes from existing shipping activity also occur, the ESA-listed fish that use these habitats have typically adapted to the conditions that attend the erosion, primarily temporary, localized turbidity. Effects associated with bank erosion would be temporary and localized, and would result in only minor negative impacts to fish and fish habitat (Flint 2016).

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.

Vessels calling at the Facility will comply with state and federal requirments for ballast water treatment and discharge.

Furthermore, ballast water discharges, if not treated, would be of saltwater to freshwater (because of the 401 WQC requirements to perform, at least, open sea ballast water exchange), which has less propensity to introduce invasive species than if the exchange is salt-to-salt or fresh-to-fresh water[14]. Because of this, only negligible impacts would be anticipated as a result of ballast water discharge.

During operations, the Facility may source spill response equipment from other locations in the event of larger and more complex spill drills or response activities. In such cases, contractors and mutual aid providers will comply with applicable state statutes and rules aimed at preventing the introduction of such species, as identified above.

In accordance with federal regulations oil tankers and ATBs calling at the facility will be 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 are required to develop spill contingency plans in accordance with state and federal regulations (see Appendix B.1).

These impact minimization measures and BMPs fully mitigate for the increased shipping-related impacts associated with the project.

[14] See, for example, the discussion of the increasing risk for invasive introduction when the source and discharge waters share environmental similarity here: http://www.reabic.net/journals/mbi/2016/Accepted/MBI_2016_Verna_etal_correctedproof.pdf.

Cumulative Impacts

The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to fish and fish habitat resources to the extent practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself may affect, but is not likely to adversely affect fish or fish habitat resources.

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). WDFW PHS Management Recommendations (available at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations) have been reviewed, including recommended protection buffers. In general, the management recommendations focus on protecting nesting area and other important wildlife habitats.

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 3.4-7 for wildlife terrestrial species and in Table 3.4-8 for aquatic species.

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 3.4-7. Special Status Wildlife Terrestrial 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	Varies	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).

Table 3.4-8. Special Status Aquatic 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
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.
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.
Sea Turtles (Various species)	Varies	Varies	Varies	Varies	Varies	Varies	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

This section describes the direct and indirect impacts that could occur to wildlife or wildlife habitat associated with the proposed project. Due to the nature of the resource and the varying degree of use of the habitat by each species, it is not possible to meaningfully estimate the numbers of individuals that could potentially be affected. Instead, the extent of impacts to individuals of each species are established based on an interpretation of the extent of impact to suitable or potentially suitable habitat. WDFW PHS Management Recommendations (available at http://wdfw.wa.gov/conservation/phs/mgmt_recommendations) have been reviewed. Proposed project activities occur outside all recommended protection buffers for the species addressed in this Application.

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 42,000 square feet (0.96 acre) square feet of ruderal grass-forb and approximately 3,252 square feet (0.07 acre) square feet of upland cottonwood stands are expected to result in only minor potential impacts to bald eagle, peregrine falcon, and gray-tailed vole.

No purple martin or nest boxes would be directly affected by the construction of the proposed project. The construction activities do not include removal of any creosote-coated wood piling. All existing piles at the marine terminal are steel and do not contain cavities for nesting wildlife. Furthermore, purple martin have a low suspected occurrence within the Facility site as noted in DEIS Table 3.5-3.

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 marine mammals. 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 the proposed dock modification.

Construction Lighting Impacts – During the installation of ground improvements, construction may occur at night to complete required work during the applicable fish window and would require additional temporary lighting on the shoreline, increasing the amount of light on the water. Increased light levels may affect wildlife by attraction.

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 marine mammals.

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 marine mammals.

Similarly, temporarily elevated levels of turbidity that could result during pile installation 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 installation and removal activities. Pile installation and removal includes both in-water temporary piles that would be installed and removed with vibratory methods. Upland pile installation for shore-based mooring points, trestle abutment and movable walkways, building foundation/support at Area 200, and pipeline foundation supports within Area 500 would be completed with impact hammers.

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). Noise generating activities are expected to occur during all phases of construction between October and July.

Terrestrial noise levels will peak within the vicinity of the project site during impact pile installation, but these sound levels will be expected to decrease to ambient conditions within approximately 5,000 feet 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).

As stated above, the baseline noise levels associated with the project site and vicinity are relatively high, and this terrestrial noise attenuation analysis assumes baseline noise levels similar to those associated with a high density urban area (70 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 vibratory impact pile driving is expected to attenuate to ambient conditions between 3,200 and 6,400 feet from the location of project activities. The following equation was used to determine the distance at which terrestrial noise will attenuate to the baseline noise level of 70 dBA:

$TL = 20*Log(R_1/R_2)$

TL = amount of spreading loss (known noise level – ambient noise level)

R_1 = distance where noise attenuates

R_2 = range of known noise level (50 feet in this case)

$R_1 = (10^{(TL/20)})(R2) = (10^{(110-70/20)})(50) = 5{,}000$ feet

This indicates that terrestrial noise associated with impact pile driving would be expected to attenuate to baseline noise levels within a maximum of 5,000 feet from the location of project activities. Most of the terrestrial habitat within approximately 5,000 feet of the project site includes Urban/Mixed Environs and is of low quality and low suitability for terrestrial wildlife. 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 construction noise levels could extend beyond the project site onto portions of the CRWMB and associated wetlands and forested habitats on the Shillapoo NWR - Vancouver Lake Unit. Modeled noise levels in the vicinity of the CRWMB and Shillapoo Vancouver Lake Unit would range between 65 dB at the north end and 75 dB at the south end during impact pile driving. 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 periods of elevated terrestrial noise levels. Terrestrial noise from impact pile driving will have attenuated significantly by the time it reaches these habitats. These habitats also receive noise from other temporary sources not accounted for in the noise model, including

adjacent port activities at other terminals, SR 501 road noise, and seasonal hunting noise (firearms).

The modeled noise levels may potentially be of sufficient intensity to generate a behavioral responses, such as changes in alertness, 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.

Direct impacts to special status species have been minimized by locating all project activities within an existing industrial site. According to WDFW Priority Habitats and Species (PHS) data, there are no occurrences of special status species within the project site. Within the project vicinity, there are several occurrences of PHS points, including bald eagle nests (approximately 1.2 miles to the west), bald eagle concentration areas (approximately 1.2 miles northwest), sandhill crane concentrations (approximately 3,000 feet west), and great blue heron breeding (approximately 4,000 fee northeast). Waterfowl concentrations are also known to occur on Vancouver Lake, approximately 1 mile north of the project.

Temporary construction noise has been minimized to the extent practical through equipment selection and construction timing to reduce impacts to special status species using habitats (e.g., foraging and resting) within the project vicinity. Peak construction noise would be generated by impact pile driving for the shore-based mooring points and rail unloading facility and is located outside of WDFW- and USFWS-recommended management buffers for bald eagle nest (660 feet and 0.5 mile, respectively) and great blue heron rookeries (656 feet). Foraging or resting species may be temporarily displaced from habitats within the project vicinity during periods of construction noise. These impacts have been minimized during construction sequencing to complete the noise generating aspects of construction as efficiently as possible.

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 marine mammals. Shorebirds and waterfowl will avoid the area in the immediate vicinity of pile installation and removal 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. WSDOT recently published a memorandum reporting average root mean square (rms) values associated with vibratory installation of 30-inch steel piles as ranging from 164 to 176 dB_{RMS} with an overall average rms value of 171 dB_{RMS} (Laughlin 2010). WSDOT also published data in 2011 documenting average underwater sound pressure levels of 150 dB_{RMS} at a distance of 10 meters from the pile, during vibratory removal of timber piles (WSDOT 2011). For purposes of this analysis, therefore, it has been assumed that underwater noise associated with vibratory pile installation and removal will not exceed 176 dB_{RMS}.

Vibratory pile installation and removal is not expected to generate levels of underwater noise that will result in significant adverse effects to marine mammals. NMFS has established a disturbance threshold of 120 dB_{RMS} for pinnipeds. Vibratory pile installation and removal may result in underwater sound levels that meet or exceed this threshold throughout the project vicinity. Additionally, proposed upland impact pile driving for Area 400 improvements (shore-based mooring points, dolphin access points, and trestle abutment) would also generate underwater noise levels that exceed the disturbance threshold for pinnipeds. Any marine mammals that are

present within the project vicinity could be temporarily disturbed. The extent of effects associated with vibratory pile installation and removal and upland impact driving would not be expected to exceed mild disturbance. Marine mammals are also not expected to occur in great numbers within the portion of the project site and vicinity that could potentially receive elevated underwater noise levels during the in-water work period. For these reasons, marine mammals are not expected to be significantly affected by underwater construction noise.

Aquatic Invasive Species - During construction, small vessels, tugs, and work barges will be used in support of in-water construction activities. This equipment would be furnished and operated by contractors to Vancouver Energy. This equipment could be contaminated with aquatic invasive species if it was previously used in waterbodies outside the Columbia River where such species are present and if the equipment was not properly cleaned prior to arrival at the Vancouver Energy Terminal work location. Certain construction materials (e.g., temporary piles) could also have been previously employed at other locations and may transport invasive species if not properly cleaned.

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 accidental spills during unloading of rail cars, transfer to storage, or loading of vessels.

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.

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. As discussed above in section 3.4.2.2, the Applicant conducted a vessel traffic risk assessement to quantify the risk of incidents resulting in realeses of crude oil.

Impacts to special status wildlife species from water quality impacts related to normal operation of the Facility are expected to be minor.

Operational Lighting - 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.

- **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 project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity.Increased marine traffic on the Columbia River, from vessels calling at the Facility, has the potential to result in minor effects to wildlife through minor increases in the potential for shoreline erosion associated with propeller wash and wake, 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 a minor increase in erosion along unarmored sections of shoreline. See section 3.4.2.2, Operation, *Bank Erosion* for detailed information on bank erosion and minimal impacts.

  The fish and marine mammals that use these habitats have typically adapted to the existing conditions that include bank erosion, and temporary, localized turbidity. Benthic organisms could also be affected, as they are known to be more abundant in shallow water than in deep water. These organisms, however, typically recolonize disturbed areas very quickly.
- *Exotic Species* – Ships in transit could potentially import exotic and/or invasive species on their hulls and exterior equipment and/or in ballast water. Similarly, spill response equipment may be contaminated if it is brought from off-site locations where it may have contacted waters known to contain aquatic invasive species. See Fish Impacts, section 3.4.3.2, Operations, Exotic Species for more detailed information.
- *Ship Strikes* – The proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacity 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. The potential for vessel strikes to affect sea turtles, marine mammals, and/or cetaceans is relatively low. While sea turtles, marine mammals, and cetaceans all may be at risk for propeller or collision injuries, these injuries are most frequently caused by small, fast-moving vessels (FERC 2008). In contrast, because of their design and large displacement tonnage, the ships that will dock at the Facility produce a bow wave. This wave pushes in-water objects away from the vessel.

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.

Construction

Direct Wildlife Impacts – 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.

Tree removal will be performed outside of the nesting season (February 15 to September 1) to avoid potential impacts to active nests of protected migratory birds. If trees are to be removed during the nesting season, complete a preconstruction nesting survey no more than two weeks prior to removal to ensure that no active nests are present. If active nests of protected migratory birds are found, suspend tree removal activities until after nests have hatched and young have fledged.

The approximate 2.2 acres of landscape plantings will be monitored for two years after planting and all trees that do not become successfully established will be replaced.

The Applicant will include measures in the construction waste management plan to control and contain food waste, and educate workers on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife.

See the Direct Habitat Modification in sections 3.4.2.3 above and 1.4.1.11 Habitat and Vegetation for mitigation measures and BMPs.

Nuisance wildlife – As part of the construction waste management plan, measures will be implemented to control and contain food waste, including worker education on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife.

Construction Lighting Impacts– If ground improvement installation requires the use of temporary lighting at night, all lights will be shielded and directed away from the water to the extent practicable nstallation of jet grout columns directly adjacent to the shoreline will be scheduled for daylight hours to the extent practicable.

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. . The Applicant submitted a preliminary cSPCCP to EFSEC for Review (Appendix B.2), The plan defines 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.

A WQPMP (Appendix F.2) has been developed and describes how the project will monitor and control releases of turbidity, suspended sediment, concrete, and other construction-related materials that may be generated during Facility construction activities in, over, and adjacent to the Columbia River and other adjacent water bodies. The plan describes water quality protection measures; monitoring parameters, methods, evaluation criteria; and contingency response and notification procedures in the event a water quality criterion is exceeded during such construction activities.

In addition, all work below the OHWM will be conducted within the published in-water work period for the project (November 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 peak within the vicinity of the project site during impact pile driving of the shore-based mooring points and rail unloading facility, but these sound levels will be expected to decrease to ambient conditions within a distance maximum of approximately 5,000 feet from the immediate project site. Most of the terrestrial habitat within approximately 5,000 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.

Temporary construction noise has been minimized to the extent practical to reduce impacts to special status species using habitats (e.g., foraging and resting) within the project vicinity. Peak construction noise would be generated by impact pile driving for the rail unloading facility, pipeline foundations, and Area 400 improvements. These areas are located outside of WDFW- and USFWS-recommended management buffers for bald eagle nests (660 feet and 0.5 mile, respectively) and great blue heron rookeries (656 feet). Foraging or resting species may be temporarily displaced from habitats within the project vicinity during periods of construction noise. These impacts have been minimized during construction sequencing to complete the noise generating aspects of construction as efficiently as possible. See section 1.4.1.11, Habitat and Vegetation, Temporary Construction Noise, for additional detail on mitigation measures and BMPs.

A construction wildlife monitoring plan (Appendix H.4) has also been developed. It describes the means and methods to monitor noise levels during project upland pile-driving activities in order to demonstrate that noise levels attenuate to a level of non-disturbance to PHS species potentially present in the vicinity of the construction site. The PHS species of concern include the bald eagle, sandhill crane, great blue heron, and the Oregon spotted frog. The plan will be implemented during impact pile driving for Area 200 rail unloading facility foundation support and Area 400 upland mooring points, and during vibratory pile installation and removal for Area 400 marine terminal modifications. Wildlife monitoring will only occur in areas of potentially suitable habitat and construction noise monitoring will be conducted to determine what actual noise levels are observed.

The proposed project has the potential to result in temporarily elevated terrestrial and underwater noise levels at the project site and with the project vicinity during in-water pile installation and removal activities, and during impact pile driving of upland piles. These activities have the potential to temporarily affect marine mammals and the quality of their habitat within the project vicinity during construction. The project has been designed to minimize the likelihood of any impacts resulting from underwater noise during in-water pile installation and removal activities by using vibratory methods. The dock modifications have been designed so as to require no in-water impact pile driving, which will greatly reduce the extent of underwater noise generated during construction. This will reduce the intensity of underwater noise, and will limit the potential for adverse effects to marine mammals.

A MMMP has been developed and submitted to EFSEC for review. The MMMP describes procedures to identify the presence of marine mammals during construction activities, which may result in "take" and establishes actions that will be taken to minimize impacts to such marine mammals. The plan will be implemented during in-water construction activities related to Area 400 modifications, including removal of existing piles, temporary pile installation and removal, and pile strengthening; and upland work related to impact pile driving of shore-based mooring points. Monitoring will be conducted prior to and during the activities listed above with the potential to impact marine mammals. Work activities will be stopped when a marine mammal is detected within the monitoring area and will not restart until after the marine mammal has left the monitoring area.

In addition, all in-water work below the OHWM will be conducted within the published in-water work period for the project (November 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.

Aquatic Invasive Species - WDFW hydraulic code rules require that the transportation and introduction of aquatic invasive species be prevented by thoroughly cleaning vessels, equipment, boots, waders, and other gear before removing the gear from a job site [WAC 660-120 (7)(j)]. Contractors would be required to provide documentation that all equipment and materials that will be used in- and over-water have be cleaned to comply with applicable aquatic invasive species statutes and rules, including WAC 660-120 (7)(j). This would include providing documentation that in-water equipment and construction materials have either not been in contact with waters containing state prohibited aquatic invasive species which could be potentially transferred to the Columbia River, or that equipment and materials have been appropriately decontaminated from potentially transferrable aquatic invasive species prior to arrival at the project site.

Operation

Direct Wildlife Impacts – The Applicant will include measures in the operation waste management plan to control and contain food waste, and educate workers on the risk to native wildlife from supplemental feeding and the importance of disposing of all garbage in secured containers to prevent supplemental feeding of wildlife.

The Area 300 secondary containment berm will be designed to avoid permanent pooling of stormwater within the berm which can be an attractant to aquatic birds.

Operational Water Quality Impacts – The operation of the Facility could affect wildlife habitats 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.

As described in sections 2.11 and 3.4.2.3, a permanent stormwater collection, conveyance and treatment system will be established. The proposed stormwater treatment system will provide treatment to a level that is consistent with the discharge permits applicable to the Facility and and so that wildlife are not adversely affected by operational stormwater discharges.

As described in section 2.10, the Facility will include design measures aimed at avoiding releases, secondary containment measures to prevent releases from reaching terrestrial and aquatic habitats, and will implement a comprehensive suite of spill response planning and response plans.

As described in section 3.4.2.3, the Applicant has committed to using a self-healing biodegradable fire-fighting foam manufactured by Solberg. Use of this foam will reduce adverse impacts to wildlife in the event of a fire.

Operational Lighting Impacts – Facility lighting impacts will be minimized with the use of the following mitigation measures:

- Provide directional lighting in areas adjacent to sensitive wildlife areas, including the north side of Area 300 to ensure lights are not pointed in the CRWMB and Area 400 to minimize the amount of light in aquatic habitats.
- Aim direction lighting away from sensitive habitats to the extent possible to minimize nightlight and glare.
- Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations.
- In the Marine Terminal loading area, use spot lighting only during loading operations if approved by the USCG in compliance with 33 CFR Part 105 and/or Part 154.

Aquatic Invasive Species – During operations, the Facility may source spill response equipment from other locations in the event of larger and more complex spill drills or response activities. In such cases, contractors and mutual aid providers will comply with applicable state statutes and rules aimed at preventing the introduction of such species, as identified above.

Shipping – The proposed project will result in approximately 140 ship trips per year in the first full year of operations and up to 365 ship trips per year at full capacitythrough the project shipping prism. As discussed in the impacts section, increased marine traffic on the Columbia River has the potential to result in minor impacts to wildlife and wildlife habitat through increased potential for shoreline erosion. The Applicant does not control the operation of these vessels. As described below, vessel operators are either already required to comply with state and

federal regulations mitigating certain impacts. As has been demonstrated elsewhere, impacts related to vessel wakes caused by vessels calling at the Facility are not measurably different from those already occurring on the Columbia River navigational channel and will not cause any additional adverse impact (Flint 2016).

The risk of adverse effects to wildlife 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 marine mammal habitat.

As has been demonstrated elsewhere, impacts related to vessel wakes caused by vessels calling at the Facility are not measurably different from those already occurring on the Columbia River navigational channel and will not cause any additional adverse impact (Flint 2016).

As described in section 3.4.2.3 above, the USCG has developed mandatory practices for all vessels with ballast tanks in all waters of the United States. Washington has developed similar requirements. These practices include requirements 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. Vessels calling at the Facility are expected to be crude oil tankers and articulated tug barges operating within the Exclusive Economic Zone (EEZ). These vessels will be subject to the U.S. Environmental Protection Agency's Vessel General Permit (VGP) issued under the National Pollutant Discharge Elimination System (NPDES) for discharges incidental to operation of such vessels, including ballast water discharges. The Washington State ballast water requirements added to the VGP as 401 WQC conditions include the state requirements codified in Chapter 220-150 WAC, administered by WDFW. These requirements include technology-driven treatment requirements and management practices so that vessel discharges meet state water quality standards, Chapter 173-201A WAC.

Furthermore, ballast water discharges, if not treated, would be of saltwater to freshwater (because of the 401 WQC requirements to perform, at least, open sea ballast water exchange), which has less propensity to introduce invasive species than if the exchange is salt-to-salt or fresh-to-fresh water. Because of this, only negligible impacts would be anticipated as a result of ballast water discharge.

Finally loaded vessels departing from the Facility will be escorted by a suitably matched tug until the escorted vessel arrives in the vicinity of the river mouth. Once in the vicinity of the river mouth the tug will be released from the escorted vessel and will standby as a sentinel tug until the vessel crosses the Bar and is safely underway in the open ocean. Tug escort will further reduce the risk of vessel-traffic related incidents.

These impact minimization measures and BMPs fully mitigate for the increased shipping-related impacts associated with the project.

Cumulative Impacts

The impact minimization measures that have been incorporated into the design of the project are the same measures that will reduce the potential for cumulative impacts. The project has been designed to minimize the extent of impacts to wildlife and wildlife habitat resources to the extent

practicable, and this will reduce the potential for cumulative effects to these resources as well. The project itself will not result in any cumulative impacts to wildlife and wildlife habitat resources.

3.4.5 Federal Approvals

Federal approvals anticipated for the project are identified in section 2.23. As noted a permit or authorization 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 or authorization will require compliance with the ESA, NEPA, and NHPA. A Joint Aquatic Resource Permit Application (JARPA) (Appendix H.2) has been prepared for the project and was submitted on February 14, 2014 to the USACE for review and potential issuance of the Section 10[15] permit or acknowledgement that the work is authorized through one or more nationwide permits. The JARPA was submitted with applicable reports and studies completed for the project to demonstrate how the project complies with the permitting requirements. A revised JARPA was submitted to the USACE in July 2015.

The Applicant has developed and submitted to the USACE for review a MMMP (Appendix H.3) for vibratory installation and removal of temporary piles and upland impact pile driving. The MMMP was developed to minimize the exposure of marine mammals to temporarily increased underwater noise levels. The plan describes procedures to identify the presence of marine mammals during construction activities, which may result in “take” and establishes actions that will be taken to minimize impacts to such marine mammals. With these measures to avoid work in the presence of marine mammals a take permit under the MMPA is not required.

3.4.5.1 ESA Consultation

Throughout the development and design of this proposed action, the Applicant, has coordinated with the USFWS and NOAA Fisheries. A Biological Evaluation (BE) was prepared and initially submitted to the USACE in September 2014. The BE was revised in December 2014 to respond to comments received from the USACE in a Memorandum for the Record (MFR), dated November 19, 2014. A final August 2015 revision responds to comments received from the USACE, USFWS, and NMFS, in a letter from the USACE, dated May 28, 2015, regarding the effects analysis, effects determinations, and extent of the action area in which the impacts are evaluated. Federal agency concurrence with the BE was obtained from USFWS on March 16, 2016.

[15] The USACE issued public notice for review of an individual permit application in July 2015. The USACE Public Notice references review under Section 404 of the CWA for placement of fill inside existing piles. The Applicant has provided comments to the USACE that Section 404 does not apply in this situation (Carson 2015).

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. Areas within 300 feet of the project site were visually assessed for the presence of wetlands in accordance with the City of Vancouver's Critical Areas Protection Ordinance (VMC Chapter 20.740).

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. A series of shallow, linear, stormwater swales are located in the southwest corner of Parcel 1A. These features were excavated from uplands for the purpose of stormwater treatment, and would not be considered wetlands by the City code, which exempts artificial wetlands intentionally created from non-wetlands sites for stormwater treatment. 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 and within 300 feet 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 within 300 feet 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, but extend past the 300-foot limit specified in City code. 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 and removal.

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. 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.

While the mitigation bank wetlands are hydrologically connected to the Columbia River via the Vancouver Lake Flushing Channel, a spill that reaches the Columbia River would not reach those wetlands via the flushing channel. Specifically, the Vancouver Lake Flushing Channel is equipped with tidal gates to control flows and could be closed to block the flow of water and oil from a flooding event back into the lake and adjacent wetlands, further protecting them in the unlikely event of an oil spill.

Because the Facility includes secondary containment designed to prevent crude oil from leaving the area it is extremely unlikely that crude oil spills would reach wetlands. Portions of the facility

are located at a greater distance and downslope from these resources, making it extremely unlikely for crude oil to travel the distance needed uphill to impact them (Flint 2016). In the event of a spill to the Columbia River, spill response measures would be deployed at the Vancouver Lake flushing Channel to reduce the risk of crude oil spills reaching wetlands adjacent to Vancouver Lake during a flooding event. 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

Construction

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 direct impact wetlands.

These impact minimization measures and BMPs fully mitigate for the direct habitat modification impacts associated with the project construction.

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 will only occur within the marked construction boundaries at the Facility site and will be governed by a cSPCCPlan (Appendix B.2). The cSPCCP will define specific BMPs to minimize the potential for leaks and spills from construction equipment and the extent of damage from any unavoidable leaks or spills and related impacts to wetlands. BMPs 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 sensitive areas include wetlands and regulated wetland buffers that are present within 300 feet of the proposed Facility site as described above.

The cSPCCP will also outline responsive actions in the event of a release, and notification and reporting procedures. For additional information see section 2.10, Spill Prevention and Control, and Appendix B.2, cSPCCP.

The Applicant will also implement the following additional mitigation measures to address temporary water quality impacts to wetlands:

- Wick drains will be used between areas of ground improvement (stone columns, soil mixing, jet grouting, etc.) and surface waters and wetlands. At Area 300, wick drains will be installed at a minimum of 16 feet on center where ground improvements are within 150 feet of the adjacent wetlands to the north and east. At areas 400 and 500, wick drains will be installed along the top of bank at 8 feet on center for the entire bank area receiving ground improvement. Visual monitoring of turbidity within the wetlands will occur daily during ground improvement. If any turbidity is observed as a result of ground improvement, ground improvement activities will be stopped and additional mitigation measures will be installed, including additional wick drains, turbidity curtains, or change in ground improvement methods will be considered.
- Cutoff channels would be installed in Area 300 – Storage tanks along the downslope construction area to capture construction stormwater where existing site grading is insufficient to direct stormwater into conveyances for the construction stormwater. These channels would also be used to contain ground improvement runoff where necessary. Channel lining and check dams would be used to protect channel from erosion, and checkdams to assist in flow control.

These impact minimization measures and BMPs fully mitigate for the temporary water quality impacts associated with construction of the project.

Operation

Operational Water Quality – The 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 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.

As described in section 2.10, the Facility will include design measures aimed at avoiding releases, secondary containment measures to prevent releases from reaching terrestrial and aquatic habitats, and will implement a comprehensive suite of spill response planning and response plans.

Operations at the site will be governed by an oSPCCP (Appendix B.3), which will define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills. The oSPCCP will also outline responsive actions in the event of a release, and notification and reporting procedures.

In the event of a spill to the Columbia River, spill response measures would be deployed at the Vancouver Lake flushing Channel to reduce the risk of crude oil spills reaching wetlands adjacent to Vancouver Lake during a flooding event.

The Applicant has also committed to using using a self-healing biodegradable fire-fighting foam manufactured by Solberg to minimize impacts to surface water resources, as described in section 3.4.2.3 above.

Shipping – 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. See the Shipping section in Habitat and Vegetation, section 3.4.2.3 for additional information.

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 calling at the Facility 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 will 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[16].

- Electricity: Construction will consume electricity to provide temporary construction site lighting and heat buildings, and to power tools and equipment. The amount of electricity consumed would be similar to other medium-sized industrial construction projects, and would not be significant in terms of overall regional supply.
- 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. The amount of transportation-related petroleum products consumed would be similar to other medium-sized industrial construction projects, and would not be significant in terms of overall regional supply. Incidental use of propane during construction (for temporary space heating, powering of mobile construction equipment such as fork lifts, or heating of cooking grills for authorized construction staff events[17] (e.g., BBQ) is possible. Such use of propane would be in limited quantities, which will not be significant in terms of regional propane supply.

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, product and natural gas piping, operations access structures (catwalks and gangways), rail additions, and dock improvements.

[16] EFSEC's Draft Environmental Impact Statement, November 2015, provided estimates for construction electricity and fuel usage at Section 3.7.3.1, and made similar conclusions regarding the negligible impact to regional supplies.
[17] Such activities would be conducted at locations permitted under applicable fire codes, for example only in areas that are not rated Class 1 div-2 or Class 1 div-1 (i.e., office areas or parking lots).

- Aggregates[18]: Approximately 160,000 cubic yards of aggregate materials would be required for ground improvements (stone columns).
- 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.
- Cement: To supply an on-site batch plant, approximately 18,000 tons of cement would be required for ground improvements (grout for jet grouting and deep soil mixing)
- Rail Ballast: Shifting existing tracks 4106 and 4107 would require the placement of new track ballast, approximately 6,500 cubic yards. Additional materials for sub-ballast and site preparation may also be required. Construction of the new track (4101) would also require ballast, approximately 4,750 cubic yards.
- 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 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 suitable or permitted to be used for 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 1,000 cubic yards of asphalt will be required to construct new hard surfaces planned throughout the Facility for parking and ground stabilization.
- 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 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.
- 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.

[18] As used herein, aggregates are defined as coarse materials, including sand, gravel, and crushed rock. Weights by size class, which are typically specified in detailed construction plans, cannot be accurately established at the current level of Facility design.

3.6.1.2 Operation

Once constructed and commissioned, the Facility will use energy for day-to-day operations as follows.

- Natural Gas: Approximately 1,188,576 MMBtu/year or 1,189million 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, as well as in the dock safety skid and MVCU to ensure safe and appropriate operating conditions while marine vessels are being loaded. Gas service is expected to be interruptible; if gas supply is lost, operations where it is in use will be shut down.
- Fuel: Gasoline and diesel will be used in small amounts to fuel maintenance vehicles, and fuel-powered maintenance equipment, and portable power generators (emergency engines). Low sulfur diesel will be used for emergency firing and testing of fire pumps; it is estimated that normal maintenance and testing of fire pumps will consume approximately 1,250 gallons of ultra-low sulfur diesel per year total. The emergency engines would be fueled by ultra-low sulfur diesel or biodiesel.
- Electricity: Electricity will be used to heat and light indoor spaces and for outdoor lighting and to power facility equipment and control systems. Two of the storage tanks in Area 300 will be electrically heated. Facility load at full operation is estimated to be 231,100 kilowatt hours per day.
- Emergency Engines: in the event of a power failure, the Facility will have leased, portable power generators (emergency engines) available to operate critical safety, security, and environmental equipment. Maintenance of the emergency engines would be performed by the leasing company at an off-site location. The emergency engines would be subject to horsepower limitations, operational hour limitations, and other permit conditions to ensure operation does not cause an exceedance of applicable air quality standards.

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.
- Natural gas will be provided by and purchased from Northwest Natural Gas; Northwest Natural has the capacity to serve the Facility without affecting other purchasers and locally available natural gas supplies.
- Gasoline and diesel fuel will be purchased from local and regional distributors; and Electricity will be provided by and purchased from CPU.
- Portable power generators (emergency engines) will be leased and maintained by the leasing company.

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.

Clark County has 27,729 acres of identified gravel resources and 7,297 acres of bedrock resources (DNR 2005). While not all of these resources can necessarily be developed due to environmental and other constraints, available geologic data suggest rock aggregate resources are plentiful in the County. The most abundant gravel deposits lie in the southern portion of the county (Orchards, East Mill Plain) (Clark County 2012). In total, there are 34 entities with Sand and Gravel General Permits from Ecology in Clark County (Ecology 2014). Specific sand and/or gravel suppliers located in Clark County include the following:[19]

- Stone NW, Inc., located at State Route 14, Exit 10
- Pacific Rock Products, located at 18208 SE 1st Street
- East County Materials, located at 913 NE 172nd Avenue
- Fazio Brothers Sand Co Inc., located at 12112 NW Lower River Road

The amount of electricity consumed during construction and operations will not affect other users or locally available electricity supplies. Electricity for industrial consumers at the Port is provided by CPU. The major fuel sources for electricity generation by the utility in 2012 were hydroelectric (76 percent) and natural gas (15 percent). Coal accounted for approximately 1 percent of electricity generation and nuclear accounted for 7 percent (Washington Department of Commerce 2013a). Hydropower is obtained through purchase agreements with Bonneville Power Administration, and the River Road Generating Plant in Vancouver is the main source of energy produced from natural gas. Total energy supplied by CPU in 2012 was 4,568,431 megawatt hours (Washington Department of Commerce 2013). CPU's base case forecast of future energy demand assumes an average annual rate of growth of 1.5 percent over the next 20 years (consistent with the forecasted rate of population growth for the state). This translates to an increase in demand of 183 MW between 2013 and 2032 (Clark Public Utilities 2012). The utility has sufficient capacity to meet this demand on an annual average basis, but will need to incorporate additional conservation measures and new supplies to meet peak demand in the future (Clark Public Utilities 2012).

[19] Based on Google maps search, February 27, 2014, and presence of recent mining confirmed by aerial photography.

The amount of natural gas consumed during operations will not affect other users or locally available natural gas supplies. Northwest Natural Gas' 2014 Integrated Resource Plan (IRP), identifies annual base case firm load (including residential, commercial, and industrial users, but excluding firm transportation users) for the period 2013-2014 is estimated at 7,380.33 MMDT at the Vancouver hub, and 76.865.03 MMDT system wide (NW Natural 2013). Industrial usage for the same forecast period is 308.91 MMDT at the Vancouver hub and 3,282.86 system-wide. Thus the Facility usage would represent approximately 0.4 percent of Northwest Natural's industrial-based consumption at the Vancouver hub, 0.04 percent industrial-based, system-wide, and 0.0015 percent of all firm consumption (excluding transportation-related) system-wide. Northwest Natural's IRP identifies long-term load and supply forecasts; the percentage use by the Facility is negligible in comparison with other areas of anticipated growth, including residential, commercial, industrial transportation and emerging markets. As a regulated utility in the state of Washington, Northwest Natural is required to provide cost-effective service, and would implement the necessary supply solutions to serve its customer base, including the Facility.

The amount of water to be used at the Facility (to be provided by the City) will not affect other users or locally available water supplies; the City is sourcing its water under the requirements of its water rights.

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

Construction

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

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.

The Applicant will construct buildings compliant with the 2012 Washington State Energy Code (or current version at the time the project is permitted).

3.6.5 Scenic Resources

A scenic resource can generally be defined as a unique combination of visual elements yielding exceptionally high aesthetic values (Sacamano, D. 2014). 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.

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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 within the published ranged of guidelines suggested to protect against low frequency vibrations and rattles.

4.1.1.1 Affected Environment

Introduction to Noise Terminology

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

Noise Source at a Given Distance	Sound Level (dBA)	Typical Noise Environments	Subjective Impression
Civil defense siren (100 feet)	130		Pain threshold
Jet takeoff (200 feet)	120	Rock music concert	
Loud rock music	110		
Pile driver (50 feet)	100		Very loud
Ambulance siren (100 feet)		Boiler room	
Freight cars (50 feet)	90	Printing press plant	
Freeway (100 feet)	80	Noisy restaurant	
Busy traffic, hair dryer	70		Moderately loud
Vacuum cleaner (10 feet)	60	Data processing center Private business office	
Light traffic (100 feet)	50		
Large transformer (200 feet)	40		Quiet
Soft whisper (5 feet)	30	Quiet bedroom Recording studio	
	20		
Normal breathing	10		
	0		Hearing threshold

Source: Beranek (1988)

Environmental noise is usually described in terms of certain "metrics" that allow comparison of sound levels at different locations or in different time periods. Federal regulatory agencies often use the equivalent sound level (L_{eq}) or the day-night sound level (L_{dn}) to characterize sound levels and to evaluate noise impacts. The L_{eq} is the level that if held constant over the same period of time would have the same sound energy as the actual, fluctuating sound. As such, the L_{eq} can be considered an energy-average sound level. Because the L_{eq} considers sound levels over time, this metric accounts for the number and levels of noise events during an interval (e.g., 1 hour), as well as the cumulative duration of these events. The L_{dn} is like a 24-hour L_{eq},

except that the calculation of the L_{dn} adds 10 dBA to the sound levels between 10 p.m. and 7 a.m. to account for possible sleep disturbance. The L_{dn} is used to describe the noise environment in areas where there are both nighttime and daytime uses, such as residences.

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 Washington Administrative Code (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 will 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

Because "sounds from surface carriers engaged in interstate commerce by railroad" are identified as exempt from the WAC noise limits, the noise analysis assumes that noise from the train is exempt from the noise limits until delivery of the train to the unloading area.

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.

Existing Sound Levels

The existing noise environment in the project vicinity was previously characterized by sound level measurements (SLMs) taken on nearby parcels for another project. These sound levels were taken with Type I sound level meters over a week-long period from March 25-31, 2011. 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.

- *SLM1* – Sound level measurements were taken in the Fruit Valley residential area northeast of the proposed Facility. Contributing noise sources included local and distant traffic, trains, and occasional aircraft. The measured levels are typical for many urban residential areas.
- *SLM2* – Sound level measurements were taken on the western boundary of the Jail Work Center (JWC). The lowest measured sound levels are not unexpected since the adjacent industrial sites were unoccupied during the measurement period, but the levels are lower than would be expected for a busy industrial area.
- *SLM3* – Sound level measurements were captured on the property boundary of the Tidewater office building site, on the west side of Terminal 5 site. The measured levels are representative of fairly remote locations, far from continuous noise sources, with occasional

events due to train passbys or activities. The low measured sound levels are not unexpected since the adjacent industrial site is currently unoccupied, but the levels are lower than would be expected for a busy industrial area, except during those hours with nearby train activity.

Table 4.1-3. Range of Measured Sound Levels in Project Vicinity (dBA)

SLM Location	Daytime Leqs	Nighttime Leqs	Ldn
SLM1 – Fruit Valley Residential Area	52-64	46-63	61
SLM2 – Jail Work Center	51-63	47-59	62
SLM3 – West Side of T5	50-73	42-57	60

Source: Wilson Ihrig & Associates, 2011.

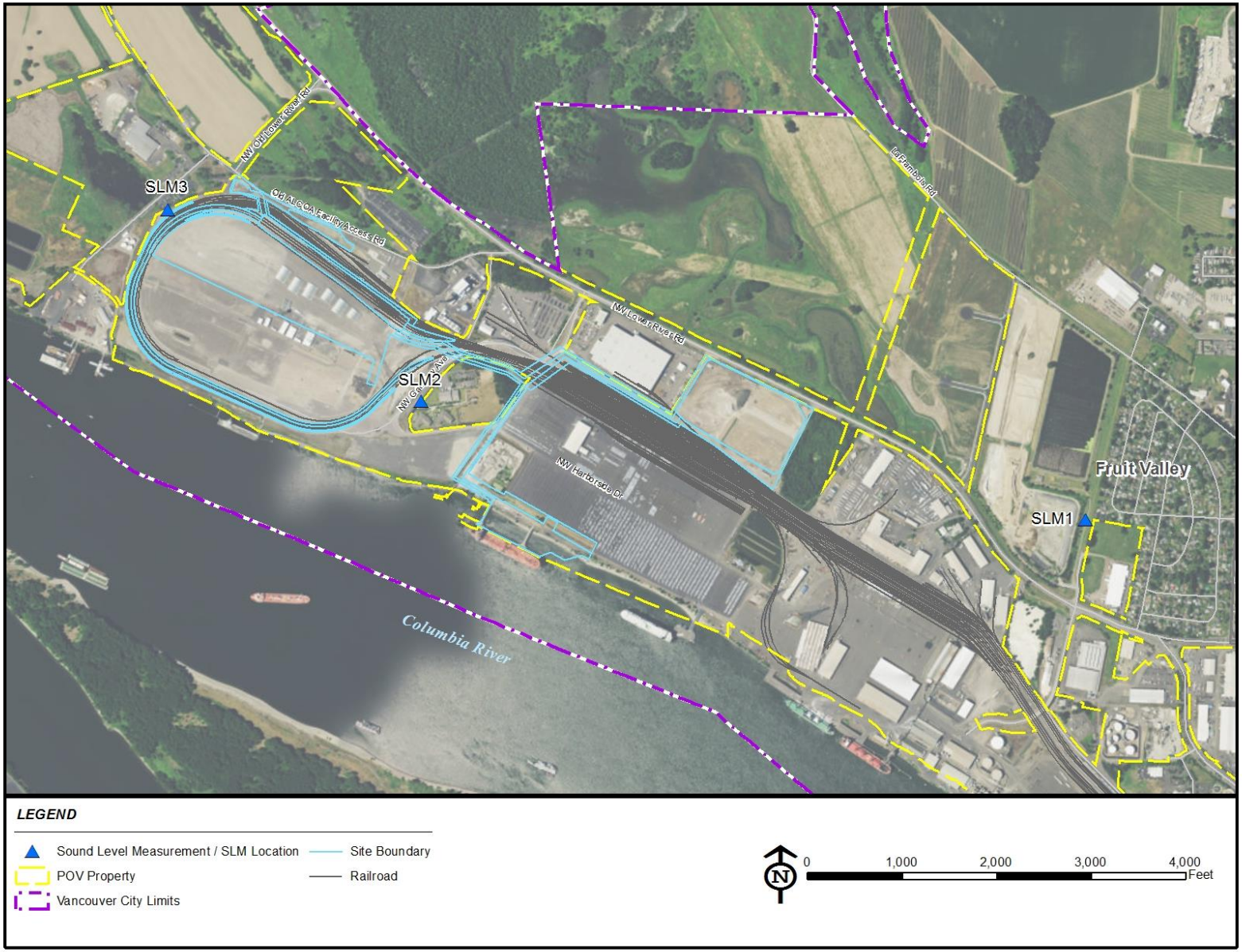
4.1.1.2 Environmental Noise Impacts

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. For the purposes of this analysis, construction activities are separated into "typical" construction activities and impact pile-driving activities.

"Typical" Construction Activities

The noise sensitive use that will be nearest to most construction activities associated with the proposed Facility is the eastern housing unit of the JWC. This facility, which includes dormitories, 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. Although not specifically characterized as a sensitive receiver, tenants of the Tidewater office building could be affected by noise from the proposed project and are included in this analysis. Typical sound levels associated with construction activities at these distances are displayed in Table 4.1-4.



BergerABAM

Figure 4.1-1. Background Noise Measurement Location and Receptors (Revised)

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 construction-related hourly L_{eqs} at the nearest residences (more than 3,000 feet away) are below the noise level limit of 60 dBA that would apply to long-term operational noise. The calculated construction sound levels at the housing units of the JWC (the nearest sensitive receivers to the site at approximately 400 feet from the nearest construction area) would be higher than the existing range of measured hourly L_{eqs} shown in Table 4.1-3, but the elevated levels would be temporary and would occur only during daytime hours. Noise emissions at locations farther removed from the Facility construction activities will be even lower than the estimated hourly L_{eqs} presented in Table 4.1-4 due to natural attenuation.

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.

Impact Pile-Driving Activities

The proposed project is expected to require at least some impact pile driving during construction of upland dock structures, foundations of the rail unloading structure, and potentially at various locations along the pipeline. The nearest portions of these elements of the project are

approximately 450 feet from the nearest occupied structures of the JWC and over 3,000 feet from the nearest residences east and west of the site.

Previous sound level measurement data of impact pile driving activities indicate that the hourly average sound level (L_{eq}) of pile driving is approximately 86 dBA at a distance of 100 feet. Using this sound level information and the CadnaA noise model described later in this section, impact pile driving sound levels were estimated at the JWC and the nearest residences to the site.

Assuming impact pile driving were to occur at the portion of the pipeline that will be nearest the occupied structures of the JWC, the model-calculated hourly L_{eq} is 70 dBA. Although a level of 70 dBA may be considered intrusive to occupants or employees of the JWC, this level is not atypical of sound levels in industrial areas similar to where the JWC is located. Furthermore, the pile driving activities at this location would be short-lived and restricted to daytime hours, which would reduce the potential for impacts.

At the residences east and west of the site, model-calculated impact pile driving L_{eq}s range from 41 to 49 dBA from the pile driving activities nearest the residences. These levels are lower than the existing L_{eq}s at these residences. However, even with fairly low levels of pile driving noise, the unique nature of pile driving impact noise could result in the sounds being audible at and within the residences nearest this activity. This noise could be perceived by some people as intrusive and possibly annoying, but the low overall levels would minimize the potential for impacts.

Operation

Noise Sources – The Facility will 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 Marine Vapor Combustion Unit (MVCU). Equipment that will 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 4.1-5 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	40
Transformer	2	3	54
Storage (Area 300)			
Pumps	2	5	66
Transformer	2	1	54

Source	Data Source	No. of Units	Approximate Sound Pressure Level at 100 ft (dBA)
Marine Terminal (Area 400)			
Marine Vapor Combustion Unit			
MVCU Blower	1	8	49
MVCU Exhaust Stack	1	8	36
Vapor Blower Staging Unit Blowers	2	2	60
Train Sources			
Locomotives (10 mph)	3	3	54 (Hourly L_{eq})
Rail Cars (10 mph)	3	100-120 cars per train	52 (Hourly L_{eq})
Idling Locomotives	4	3	65
Switch Engine	2	1[a]	66
Locomotive Horn	3	1	81 (Hourly L_{eq})

Sources:

(1) Based on vendor-provided equipment sound levels

(2) Based on equipment sound levels from previous ENVIRON noise analyses

(3) CadnaA v4.1. DataKustik GmbH. FRA/FTA module.

(4) Assessment of Railway Activity and Train Noise Exposure: A Teaneck, New Jersey, Case Study. Craig B. Anderson. October 2009

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.

[a] Although two switch engines may be on the site, only one switch engine will operate in the northern area of the site at any one time.

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 7,800 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 4.1-2 and described in more detail below.

- R1 – The southwest corner of the JWC representing the western housing unit, which is nearest the rail line. The housing units of the JWC are considered Class A EDNAs when applying the WAC noise limits.
- R2 – The southeast corner of the JWC 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 River Road generating 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.
- R8 – The nearest residence to the rail line in the southeast portion of the Port, near the intersection of West 20th Street and Thompson Avenue. It is a Class A receiving property.
- R9 – The Subaru facility parking area, adjacent to the MVCU. This is a Class C (Industrial) receiving property.

Predicted A-weighted Sound Levels at Nearby Receiving Properties – Modeled-calculated A-weighted sound levels with the equipment above are presented in Table 4.1-6. The modeled levels include locomotives idling during train unloading, a single train movement during the unloading process, and noise from a switch engine, but do not include noise from off-site trains arriving or departing (i.e., while trains are exempt from WAC noise limits).

As Table 4.1-6 shows, the model-calculated sound levels comply with the most restrictive nighttime noise limits at all off-site receivers nearest the Facility. Furthermore, the modeled sound levels at the nearest residences to the site are well below even the nighttime noise limit. Operation-related noise levels at locations further removed from the Facility will be even lower than the estimated hourly L_{eqs} presented in Table 4.1-6 due to natural attenuation.

Table 4.1-6. Modeled A-Weighted Model-Calculated Hourly Facility Sound Levels (Hourly Leq, dBA)

Receptor	Project Level [a]	EDNA	WAC Noise Limit [b, c]	Comply?
R1 – SW Jail Work Center	45	Class A	50	Y
R2 – SE Jail Work Center	38	Class A	50	Y
R3 – Tidewater	52	Class B	65	Y
R4 – CPU	61	Class C	70	Y
R5 – NW Residence	27	Class A	50	Y
R6 – Fruit Valley Residence	26	Class A	50	Y
R7 – Fruit Valley Residence	25	Class A	50	Y
R8 – SE Residence	23	Class A	50	Y
R9 – Subaru Parking Area	70	Class C	70	Y

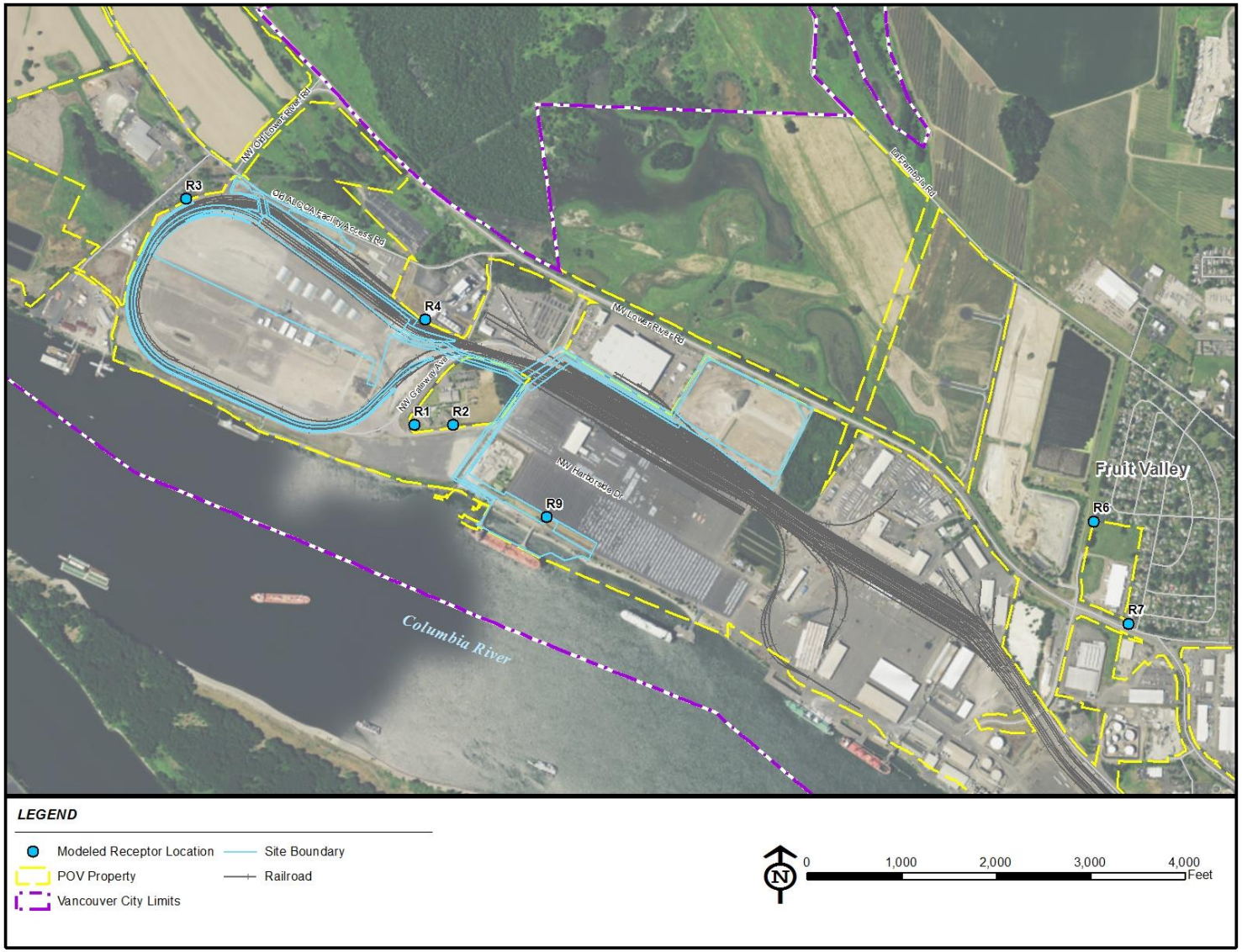
[a] The model-calculated sound levels are hourly Leqs. Although the actual noise limits are based on the hourly L25s, the on-site noise sources were assumed to operate continuously over an hour period, so the hourly Leq and L25 would be expected to be very similar. Therefore, the Leq can be used to estimate the potential L25 from on-site sources.

[b] The noise limits do not apply to off-site rail noise or on-site train delivery noise because surface carriers engaged in interstate commerce by railroad are exempt from the WAC noise limits (WAC 173-60-050).

[c] The limit shown for Class A EDNAs is for nighttime hours (i.e., 10:00 p.m. to 7:00 a.m.). The daytime noise limit at Class A EDNAs is 10 dBA higher. However, because peak hourly operations could occur anytime day or night, the more limiting 50 dBA was used for considering potential compliance.

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
Locomotive	117	121	109	101	102	97	96	96	97	123	105	122
Switch Engine	125	116	110	104	108	99	91	81	71	125	106	123
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	96	95	94	96	85	81	74	70	68	101	90	101
MVCU stack	91	93	82	72	72	71	74	71	66	95	79	94
Vapor Blower Staging Unit Blowers	106	106	105	106	96	91	84	80	79	112	100	111



BergerABAM

Figure 4.1-2. Noise Model Receptor Locations (New)

As shown the modeled sound levels would comply with the most restrictive nighttime noise limits at all off-site receivers nearest the Facility. Furthermore, the modeled sound levels at the nearest residences to the site are well below even the nighttime noise limit.

Predicted C-weighted Sound Levels at Nearby Receiving Properties – Energy facilities seeking permits from EFSEC are required to identify potential low frequency noise impacts in their permit applications (WAC 463-60-352). 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, several sources were reviewed to identify appropriate guidelines for characterizing the potential effects of low frequency noise. 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 (Colorado Oil and Gas Conservation Commission 2013; Hessler Associates, Inc. 2006; and Hodgdon, K. et al. 2007).

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 on-site switch engine and idling locomotives, when present.

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	63	70-80
R2 – SE Jail Work Center	58	70-80
R3 – Tidewater	54	70-80
R4 – CPU	75	70-80
R5 – NW Residence	45	70-80
R6 – Fruit Valley Residence	44	70-80
R7 - Fruit Valley Residence	44	70-80

[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 4.1-8, the estimated C-weighted sound levels at most locations are much lower than 70 dBC from the Facility, which would protect against undue impacts from low frequency noise. At the CPU River Road generating plant, the estimated C-weighted level of 75 dBC is above 70 dBC but falls below the limit of 80 dBC identified in the ANSI standard as protective against structural vibrations and rattling. Because this location represents an industrial use with no sensitive receivers, the likelihood of impact from low frequency noise is minimal.

4.1.1.3 Mitigation Measures

Construction

Construction will 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.

The Applicant will also conduct noise monitoring in accordance with the construction wildlife monitoring plan (Appendix H.4).

Operation

The model-calculated sound levels indicate that the Facility would comply with the WAC noise limits at all nearby receiving properties. Therefore, no noise mitigation is proposed. However, in association with the final design of the Facility, the procurement process for equipment contributing to noise emissions will take into consideration the estimates used in the analyses presented above so as to ensure the overall noise emissions from the Facility do not exceed Washington State noise thresholds.

4.1.2 Risk of Fire or Explosion

This section addresses 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, National Fire Protection Association

(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 Code of Federal Regulations (CFR) 1926; WISHA standards are implemented through WAC 296.

Although the risk for construction fires to spread beyond the construction boundary is possible, the nature of the construction materials primarily used at the site (e.g., metals, soils, aggregates, versus lumber) would minimize the potential for a fire to extend beyond the construction area, especially if fire control and response is quickly coordinated in accordance with a pre-established fire protection plan. 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.

A preliminary construction fire prevention plan, part of the Construction Safety and Health Manual (Appendix D.2, Section 19, Fire Protection), has been submitted to EFSEC for review and approval. The Applicant will develop a construction emergency response plan, modelled on the operations emergency response plan presented in the Operations Facility Safety Program (Appendix D.3, Section 3.1, Emergency Response Plan). Final versions of the plans will be prepared and submitted to EFSEC prior to the beginning of construction.

These plans will establish the minimum requirements for the construction contractor and its subcontractors for developing and implementing their plans to address the prevention of and protection from fire hazards and emergency response procedures to ensure compliance with WISHA WAC 296-155-260 and NFPA requirements.

The following provides a summary of the main elements of the preliminary construction fire prevention plan presented in Appendix D.3.

(a) Section 19.3 of the plan establishes responsibilities for establishing the plan, verifying compliance with the plan's procedures, monitoring activities associated with the plan, and

documenting and reporting incidents, investigations, reports, and corrective actions relative to the plan.

(b) Section 19.4 of the plan establishes general requirements, including the responsibility for:

1. Establishing and maintaining a list of locations for which the Contractor has fire protection equipment and the type of equipment.
2. Having available engineering drawings or up-to-date descriptions of each fire protection system under the Contractor's control.
3. Developing procedures and schedules for implementing fire equipment inspection and testing requirements.
4. Promptly identifying and reporting fires, fire protection impairments, and instituting interim precautions, such as a fire watch, during the impairment, if conditions warrant.
5. Conducting and reporting investigations.

(c) Section 19.5 of the plan describes plan implementation activities, including:

1. Preparing a pre-fire plan for each the Contractor's activities at the Facility Construction site, and submitting the plan to the Safety Health Environmental & Quality (SHEQ) Manager.
2. Locating portable fire extinguishers will be located throughout facilities in accordance with NFPA requirements and WAC 296-155-260.
3. Conducting and documenting monthly fire prevention inspections, and tracking implementation of corrective actions.
4. Installing special extinguishing systems, if needed, only with advance approval by Vancouver Energy, and using, inspecting, maintaining such systems in accordance with manufacturers, OSHA and NFPA requirements.
5. When applicable, providing a means of controlling liquid run-off from a credible fire so that contaminated or polluted liquids will not escape the site, and documenting such control measures in the pre-fire plan.
6. Preparing a fire prevention plan in consideration of the requirements of WAC 296-155-265, and providing this plan to the SHE&Q Manager.
7. Maintaining a fire prevention program to address the following areas:
    - Ignition hazards
    - Temporary buildings
    - Open yard and indoor storage
    - Housekeeping
    - Electrical components
    - Flammable liquids use
8. Identifying operations that require special emphasis, and providing safety inspections and walkthroughs to ensure compliance with applicable requirements.
9. Providing life safety provisions and an adequate means of safe exit for all facilities in accordance with NFPA 101, Life Safety Code.

10. Providing special fire protection requirements such as adequate fire lanes, measures for work areas with the potential for accumulation of flammable vapors, and control of flammable and combustible materials.
11. Adequate fire lanes will be maintained to permit fire department access to buildings or equipment.
12. Providing training.
13. Establishing exceptions for welding, cutting, or heating is being conducted in fabrication/maintenance shop areas designated for that purpose.

4.1.2.2 Operations

Flammability Characteristics of Crude Oil

As noted in the introduction in section 2.10, the Applicant proposes to handle light, medium, and heavy crude oils with an American Petroleum Institute (API) gravity ranging from 15 to 45 degrees.

Across and within this spectrum, crude oils contain a variable mixture of relatively lighter to relatively heavier hydrocarbons. Crude oil is a heterogeneous mixture of hydrocarbons, including solids, liquids, and gases. The composition of crude oil varies depending on the source, extraction methods, and at-well processing. Most crude oils are more than 95 percent hydrocarbons, with small amounts of water, nitrogen, oxygen, varying amounts of sulfur, and traces of other elements. After completing at-well or infield processing, it is common for many crude oils to be near 99 to essentially 100 percent hydrocarbons.

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 and are not reactive with water, 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. Materials, which in themselves are normally stable, even under fire exposure conditions and which are not reactive with water.
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 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. Materials that readily undergo violent chemical change at

Degree of Hazard	Definition
	elevated temperatures and pressures or which react violently with water or which may form explosive mixtures with water.
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. Materials that in themselves are capable of detonation or explosive decomposition or reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
4	Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or are readily dispersed in air and burn readily. Materials that in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.

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.

Other organizations have identified additional parameters that may influence the flammability of any specific crude oil. The U.S. Department of Energy conducted a literature review of crude oil

properties relevant to handling and fire safety of crude oil in transportation (Sandia National Laboratories 2015). The report states:

> *"There is no single parameter that defines the degree of flammability of a fuel, rather several parameters are relevant. They include:*
>
> – ***Flashpoint:*** *Temperature that results in a vapor concentration in air corresponding to the lower flammability limit. When this temperature is reached there will be a flash of flame without sustained burning. The fire point is the temperature at which sustained burning occurs and is higher than the flashpoint.*
> – ***Flammability limits:*** *Range of vapor concentration in the air that will support combustion. These are termed lower flammability limit (LFL) and upper flammability limit (UFL).*
> – ***Auto-ignition temperature:*** *Minimum temperature at which a fuel-air mixture ignites.*
> – ***Minimum ignition energy:*** *Minimum energy required to ignite a flammable fuel-air mixture.*
> – ***Burning velocity:*** *Velocity at which a fuel-air mixture issuing from a burner burns back to the burner.*
>
> *A fuel with a lower flashpoint, wider range of flammability limits, lower auto-ignition temperature, lower minimum ignition energy, and higher maximum burning velocity is considered more flammable. From a fuel classification and regulation standpoint, the main parameter considered relevant is the flashpoint. For operational handling, the above parameters are useful".*

Among a very large and much wider number of physical and chemical properties, as noted above, crude oils are in part also characterized by vapor pressure or volatility. Reid vapor pressure (measured by ASTM Method D 323, historically, and now more commonly by ASTM Method D 6377) is the absolute vapor pressure exerted by a liquid at 100°F, and is used in order to quantitatively characterize vapor pressure when comparing crude oils to each other. The higher the Reid vapor pressure, the more volatile the oil and the more readily it vaporizes. Light crude oils typically contain a relatively higher proportion of lower molecular weight ("light") hydrocarbons, often resulting in an overall higher vapor pressure, i.e., they vaporize more easily at ambient temperature and pressure. Heavier crude oils typically contain a relatively smaller proportion of light hydrocarbons, usually resulting in lower vapor pressures – i.e., they vaporize less easily at ambient temperature and pressure.

Current governmental and industry focus has not been on reducing vapor pressure. More detailed technical study work suggests that the probability of igniting a fire is only slightly reduced by lowering vapor pressure. Notwithstanding such potential reduction in vapor pressure, for example, Bakken crude would still be in the same Guide 128 for Flammable Liquid in the Emergency Response Guide (ERG) and called "highly flammable" in the ERG, and would still be a Hazard Class 3 Flammable Liquid per US DOT transportation regulations and likely still be Packing Group I or borderline Packing Groups I/II. Crude oil as a Hazard Class 3 Flammable Liquid does not present all the same hazards as a Hazard Class 1 Explosive or a Hazard Class 2 (Division 2.1) Flammable Gas. The description of potential explosion from crude oil, set forth in Guide 128 of the ERG (PHMSA 2016), differs significantly from the protocols for potential explosions from Explosives in Guides 112 and 114 and Flammable Gas in Guide 115. While it is

possible that vapor from crude oil may form explosive mixtures with air, this situation is relatively unlikely, and if it were to occur, all the crude oil itself does not explode. This limits the hazards of potential vapor-air mixture explosion (as compared to Explosives or Flammable Gases), unless there are exceptional conditions or circumstances.

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 extreme or very 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 substantially very much higher than the personal exposure limit (see section 4.1.4) and would be a very remote possibility due to the crude oil properties and facility operations (even prior to any controls discussed below). The amount of H_2S that exists or could develop in the crude oil transported to the Facility would be nowhere near the level required to qualify as a UN1053 Hydrogen Sulfide shipment or a UN3494 Petroleum Sour Crude Oil, Flammable, Toxic shipment[1]. Proper facility design and operating practices would prevent H_2S exposure on site and off site as described in section 4.1.4.4 below.

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.

The Applicant commissioned qualitative and quantitative risk assessments relative to fires and explosions potentially occurring at the Facility (respectively, Flint 2014, and Appendix P.3 to this ASC). The following provides a summary of the types of fire and explosion events that have the potential to occur at the Facility as a result of crude oil handling and storage activities.

As described above, a fire or explosion event may occur in the presence of a release of crude oil exposed to the atmosphere and an ignition source. The type of fire event depends on numerous factors, including but not limited to:

- The rate and size of release
- Whether the crude oil is released under pressure
- The rate of hydrocarbon vaporization resulting in formation of a flammable plume, and plume dispersion
- The presence of a pooled flammable liquid

[1] Thus, the H_2S associated with UN1267 Petroleum Crude Oil (or equivalent shipments) received at the Facility is managed as an OSHA workplace health hazard, not as part of transportation hazard classification for either flammability or toxicity.

- If and how the surroundings confine the flammable plume
- Whether ignition of the plume occurs early after the release, or after a delayed period of time

In combination, the above factors can lead to several types of fire events:

- Pool fires resulting from the presence of a pool of a flammable liquid at atmospheric pressure, ignited soon after the release; pool fires represent the majority type of potential fires based on the activities occurring at the Facility, i.e. handling of pipeline quality crude oil with minimum exposure to the atmosphere and storage at atmospheric pressure.
- Jet fires resulting from early ignition and combustion of pressurized flammable vapors and two phase materials released under pressure into air.
- Flash fires resulting from late ignition of a mixture of air and dispersed flammable substance (i.e., flammable plume), in absence of congestion/confinement.
- Deflagrations resulting when a flammable plume intersects an area of congestion, such as process equipment or vegetation, before igniting, provided that deflagrations inside the storage tanks are highly unlikely.
- Fires can also result in confined spaces (e.g., buildings and control rooms) when a flammable plume is present.

The intrinsic purpose of the Area 600 boilers and MVCUs is to combust fuel to provide heat or to destroy volatile organic compounds (VOCs) exhausted from vessel cargo compartments during loading for safety reasons. As a result, they can be the source of internal explosions from combustion zones or fireboxes present in the equipment. A leak from the natural gas supply line in the Area 600 Boiler Building can also cause a fire or explosion.

As described above, the concentrations of H_2S present in the crude oil are well below the threshold to cause the crude oil to be classified as an explosive material, and explosions resulting from the presence of H_2S in the crude oil are remote.

Given the non-explosive nature of crude oil, an “explosion” event involving crude oil being handled in the manner as proposed for the Facility, is property defined as a “deflagration”, not a “detonation.” Deflagrations are very rare under the handling conditions at the Facility as they would require a large release to occur, meteorological and climatic conditions such that a large vapor plume is created, and a delayed ignition source. The risk for occurrence of a deflagration is therefore minimized by designing a Facility to avoid unintentional releases of product that can create hydrocarbon vapors, and through the application of fire protection and prevention measures to avoid ignition of such vapors should they be created.

As described in Appendix P.3, the risk to populations resulting from potential fire and explosion events was evaluated based on methodology established by the American Institute of Chemical Engineers (Center for Chemical Process Safety), which is endorsed by the Hazardous Materials Cooperative Research Program sponsored by the Pipeline and Hazardous Materials Safety Administration. The U.S. government does not have applicable standard risk tolerance criteria, so risk was charted against the UK standard risk tolerance criteria (HSE 2001). The study specifically assessed potential explosion incidents, flash fire, and jet or pool fires. The study concluded that the risk to offsite populations is within the range that is typically considered negligible and risk to onsite populations is within the range that is typically considered tolerable, presenting a total risk that is within typical industry risk tolerance criteria.

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.

For all of quality, commercial, regulatory classification, and safety purpose, the Applicant will manage and monitor the properties of crude oil being shipped by rail into the Facility. The Applicant will require all shippers of crude oil trains to the Facility to adhere to ANSI/API Recommended Practice 3000 for the Classifying and Loading of Crude Oil into Rail Tank Cars ("API RP 3000") (Straessle 2014). This recommended practice was developed in 2014 with focused and significant involvement of all parties involved in the crude by rail supply chain, and with the input and support of national regulators from both the United States and Canada. Furthermore, API RP 3000 was favorably referenced by the USDOT/PHMSA in its final crude by rail regulations released on May 1, 2015 (USDOT 2015) and also technically referenced in the oil preconditioning order from Industrial Commission of the State of North Dakota.

Following API RP 3000 ensures that, based on a written sampling and testing program, all crude oil shipped by rail has the proper classification as a Hazard Class 3 Flammable Liquid and the proper associated packing group assignment (including additional labeling or information as relevant and needed for the shipment), along with a proper rail tank car fill (so as not to have overfills) and that loaded railcars are properly inspected and sealed prior to shipment. In addition, The Applicant will effectively verify all shipping terminals' compliance by sampling and testing inbound crude oil and by checking the inbound condition and loading of rail tank cars.

Similar to the requirements of API RP 3000, with all shippers the Applicant will contractually require certain crude oil quality and specifications in order to manage the integrity of the crude oil received at the Facility. These requirements would cover the full range of relevant hazard classification, safety, and commercial needs for the crude oil. The Applicant will require all terminals shipping crude oil trains to the Facility to regularly demonstrate their compliance with the crude oil quality and specifications. In addition, the Applicant will effectively verify all terminals' compliance by sampling and testing received crude oil.

Crude oil quality and specifications will include, but not be limited to:

- Hazard Class 3 Flammable Liquid in Packing Group I, II, or III (or Combustible Liquid) per 49 CFR Part 173 (A Hazard Class 3 Flammable Liquid classification, with UN ID number UN1267 for Petroleum Crude Oil, is based on a number of parameters, such as being within regulatory requirements for Initial Boiling Point, Flash Point, Vapor Pressure, Light Ends Content, H_2S, Corrosivity, etc.)
- API gravity (density)
- Sediment and water content
- Sulphur content
- H_2S content
- Vapor pressure
- No unusual characteristics or content that would make the crude oil not as readily and as typically marketable and handle-able as expected

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; and
  - 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.
- Installing stationary H_2S detectors in relevant locations around the facility to detect H_2S concentrations that could be unsafe to personal health (which is substantially very well below the levels at which flammability is possible).
- 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 to personal health (which is substantially very well below the levels at which flammability is possible).
- 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.
- Monitoring for fugitive emissions from pipes, valves, seals, tanks, and other components with vapor detection equipment and maintaining and/or replacing components as needed.
- Using environmentally friendly firefighting foam, such as Universal Gold Foam (National Foam, 2015) or Solberg self-healing biodegradable foam.

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. The foam-water sprinkler system will be activated when the linear heat detection signals a fire or when a manual release station has been activated. The linear heat detection cables will be installed at the roof level, connected to the sprinkler piping and at the pump level in the near vicinity of the pump. Manual release stations will be provided at the base of the stairs or ladders and also at grade all egress points out of the structure. Upon either activation, the respective pre-action suppression valve for that zone will be tripped and the closed-head foam water pre-action sprinkler system will be flooded/filled with foam-water solution. Also, the zones on either side of the zone activated will also be flooded/filled with foam-water solution. Upon the operation of a sprinkler, the foam-water solution will begin discharging to control the fire.

The design of fire suppression systems for specific proposed project elements is discussed below. See Appendix N.1 for additional details on the systems in each area.

Area 200 – Unloading and Office. The rail car unloading area will be served with a closed-head foam-water pre-action sprinkler system installed inside the rail car unloading building at the roof level, under walkways (as required by code) and in the pump basin areas. The structure will be divided in to five zones, each zone will be activated either manually from the foam manual release stations or automatically from the linear heat detection that will be installed at the roof level and at the pump basin level for that associated zone. 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. Note that this system is a closed-head foam-water pre-action sprinkler system. Foam-water solution will only be discharged once the fire is large enough to activate the linear heat detection, trip the valve and then activate the sprinklers above the fire. Foam will be used to control and extinguish the crude oil pool fire and will also provide cooling to the rail cars (DOT 117 or better, which include a thermal jacket) and any adjacent equipment or building elements.

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.

A closed-head wet-pipe sprinkler system will be provided for the Fire Pump and Foam Building in accordance with NFPA 20, Section 4.12.1.1.2. The fire foam water system installed in Area 200 (and in Areas 300 and 400 as described below) will utilize foam that is flourosurfactant free. This type of foam does not contain surfactants that persist and bioaccumulate in the environment (Scheffey and Hanauska 2002). The foam system and fire pump systems will be tested and inspected before operations and regularly during operations. The foam will be tested by discharging foam at a test port to a confined area approximately 10’x30’ in size for testing. The foam is discharged until a consistent foam supply is achieved and then stopped. After samples are taken the foam will be collected and disposed of at an off-site facility. The pumps will be operated weekly to ensure they work properly, but no water or foam will be discharged. The testing requirements will also require discharge of water from the system on a more infrequent basis. On a similar time frame, the foam concentrate will be tested by retrieving a

small sample of the concentrate for testing, but no foam or foam solution will be discharged to the land or water during the event.

Area 300 – Storage. The storage tank area will be served by six foam water sprinkler zones, one per storage tank. An automatic fixed foam system will be placed inside each tank to protect the seal area of the internal floating roof. This system will be a pre-action system activated by the linear heat detection system installed at the foam dam of the floating roof or by the manual foam release stations associated with that tank[2]. 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.

In addition, fire hydrants will be located on the dike spaced every 300 feet along with two fire hydrants located inside the dike area near the intersection of the intermediate dikes. Each hydrant will be equipped with a monitor nozzle and foam eductor capable of reaching the neighboring tank of the one in incident.

A monitor nozzle supplied with foam-water from the Fire Pump and Foam Building will be located near the crude oil pump basin with the primary purpose of providing manual fire suppression to the pump basin. A closed-head wet-pipe sprinkler system will be provided for the Fire Pump and Foam Building in accordance with NFPA 20, Section 4.12.1.1.2.

All systems will interface with the tank Area 200 control room. The storage 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 storage 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 storage building.

Area 400 – Marine Terminal. There is a manual fire suppression system at the existing dock loading area that will be removed and replaced with a new fire main supply line. A fire pump located in the combination fire pump/foam building shore side will supply the fire main.

Two remote-controlled elevated monitor nozzles will be provided on the dock for firefighting purposes. Spacing of the monitor nozzles takes into account the limited space available on the dock. The monitor nozzles will be strategically located, taking into consideration the spacing requirements of NFPA 307, Section 7.2.

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[2] The use of an internal floating roof, a covered tank, and foam application for fire response also minimize the risk of boilover resulting from fire. Boilovers, very rare under typical handling condition, are caused when three key elements are present: 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 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.

The monitor nozzles will be supplied from the Fire Pump and Foam Building with foam-water. Activation of the foam-water monitor nozzles will be by manual foam release stations. The controller for the nozzles will be located in the E-house, located shore side. A hydrant will also be connected to the existing water system. 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). A universal firewater connection will be installed at Berth 13. Vessels moored at the dock will be able to connect to this connection and will thus be able to use the water for fire suppression. This system is redundant with respect to a vessel's capability to use river water for fire suppression.

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 – 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 Texas A&M Engineering Extension Service Emergency Training Services Institute on a biannual basis. Such training would include crude oil train derailment response, crude oil transshipment response at a marine terminal, industrial rescue, industrial fire suppression, flammable liquids handling and fire suppression, and foam application. Participants would also obtain NFPA 1081 certification.

These measures will be documented in the Operations Safety Program and the fire protection 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). A preliminary fire protection plan (Appendix D.3, Operations Safety Program, 16.0 Fire Protection) has been developed in compliance with WAC 296-24-567, and addresses 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

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;
- Implementing spill containment measures, and spill preparedness and planning measures described in section 2.10 above; and
- Equipping the facility with stationary H_2S monitors and personnel with wearable H_2S detectors, which will trigger alarms at personal safety levels substantially very well below the explosive concentrations of emitted H_2S gases.

In addition to the Fire Protection Response Plan, a licensed Fire Protection Engineer from the state of Washington will be responsible for the 100 percent design documents, shop drawings, system installation, and final commissioning/acceptance testing of the fire suppression and detection systems for these facilities. The respective Fire Protection Engineer will work closely with the fire department and local code enforcement agencies to ensure the systems are code compliant and within the limitations of the codes and standards adopted by the local jurisdiction applicable to these facilities.

The gas-fired Area 600 boilers will be designed, installed, and operated in accordance with the applicable provisions of Labor and Industry's Boiler and Unfired Pressure Vessel laws (RCW 70.79) and rules (WAC 296-104).

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 2.3.9. The Applicant anticipates that fire and explosion prevention measures similar to those implemented during construction will be implemented during decommissioning and site restoration. Prior to beginning decommissioning the Applicant will submit a detailed facility decommissioning plan, and such plan will 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. Spill prevention and control are addressed in section 2.10.

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.

Six locations within the boundary of the proposed Facility are subject to the Ecology consent decree and the environmental restrictive covenants discussed below. Figure 4.1-3 illustrates the location of the portions of Terminal 5 where restrictive covenants are in place. 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.

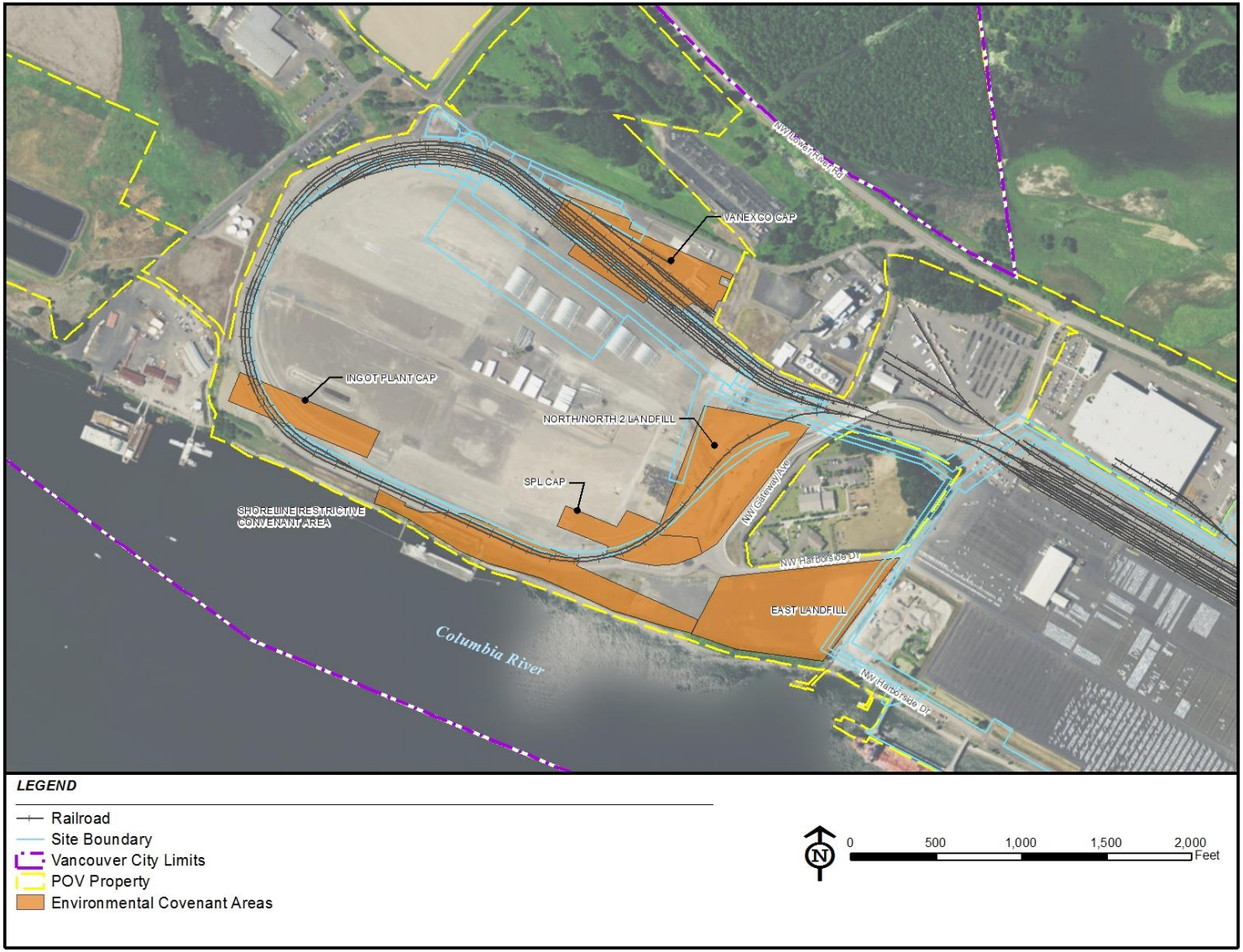

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Figure 4.1-3. Ecology Consent Decree (Revised)

- In April 2010, with Ecology approval, as part of its West Vancouver Freight Access (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.
- **East Landfill -** A multi-layer impermeable cap consisting of a geosynthetic liner and a clay layer covered with HDPE, a synthetic drainage net, a 19-inch layer of compacted fill soil, a 6-inch layer of soil, and vegetation was placed over the east landfill area as part of Consent decree 09-2-00247-2 to address lead, cyanide, fluoride, PCBs, petroleum hydrocarbons, VOCs, and polynuclear aromatic hydrocarbons (PAHs).
- **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.

- **Section 1** 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, MTCA, RCRA, 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 2.3-6). 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 one additional rail loop 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 one additional rail loop 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 2008).
  The Facility will construct one additional rail loop 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 one additional rail loop 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.

- **East Landfill –** The east landfill area contains contaminated material from the South Bank and North/North 2 landfills. A multi-layer impermeable cap consisting of a geosynthetic liner and a clay layer covered with HDPE, a synthetic drainage net, a 19-inch layer of compacted fill soil, a 6-inch layer of soil and vegetation was placed over the east landfill area. Construction within the east landfill cap area consists of grading a suitable level bench within the area to construction foundations for the aboveground crude oil pipeline. Improvements in this area are designed to not impact the engineered 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.
- In Shoreline Restrictive Covenant Areas, excess materials will be tested and disposed of in accordance with Ecology-approved Port procedures.
- Clean fill or back fill will be used.
- 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 would substitute for 1 foot of clean fill to prevent a future direct contact hazard.
- Soils that are excavated will either be:
  - Direct loaded or stockpiled, sampled and analyzed for PAHs and total petroleum hydrocarbons and other parameters based on the anticipated contaminants, and disposed of off site, or
  - Reused on site in accordance with applicable regulations and covenant restrictions.
- 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.
- Construction workers will employ appropriate health and safety measures during the handling of contaminated soils.

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 other parameters based on the anticipated contaminants, and disposed of off site 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 the National Pollutant Discharge Elimination System Construction Stormwater 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.3 and C.2 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.

Generally, small spills or releases of oil that remain within secondary containment systems will be managed via the Facility's oil-water separators and stormwater treatment systems, as outlined in the operations stormwater pollution prevention plan (oSWPPP) (Appendix C.2). Management procedures of wastes generated from releases to surface water, or larger releases that do not remain within secondary containment will be addressed in accordance with the oSPCCP and oil spill contingency plan (Appendices B.3 and B.4 (Section 7.5) respectively).

The Applicant will work closely with Ecology to develop a plan for the disposal of oily waste. Recovered oil and oily debris will be recycled and reused to the extent feasible to reduce the amount of oily waste that must be incinerated or taken to landfill. This plan 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 > 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.

The Applicant will use only licensed transporters and approved (or permitted) treatment and disposal facilities for waste handling and disposition, unless otherwise directed by Ecology. Permanent disposal of oil recovered and oily waste generated during response and cleanup operations will be conducted in accordance to guidelines provided in the Northwest ACP, Washington State Disposal Guidance, Section 9620.

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 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. As described in additional detail in section 4.1.4.4, the Applicant has prepared preliminary safety programs that implement the requirements of the regulations summarized below.

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 potentially 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 loading hoses into the cargo tank of the vessel. During this loading, vapors inside the vessel cargo compartments are displaced. Vapors displaced from vessels 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 2.3.7, 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 BNSF
- 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

Fire and explosion hazards may result from the presence of flammable or combustible gases and liquids in the presence of ignition sources during construction activities. Mobile equipment fuel and oils and solvents would be present at the proposed Facility location in small quantities. Welding would be conducted during assembly of Facility components and transfer pipelines,

resulting in the use and storage of flammable gases. Blasting would not be required to assist with excavation, and no explosives would be used or stored at the construction site.

If potentially flammable materials are improperly handled or stored, or welding activities are improperly conducted, ignition of flammable materials could occur, leading to fire. The proposed Facility would be located in a developed industrial area; the majority of the locations proposed for the Facility are devoid of vegetation thereby limiting the potential for fire propagation due to combustible vegetation.

Exposure of other Port tenants or the public to a potential construction-related fire could occur if the fire has the possibility to spread beyond Facility construction boundaries.

The Applicant will prepare and implement a cSPCCP, a construction fire protection plan, and a construction emergency response plan (see sections 2.10.3 and 4.1.2.1). An objective of these plans is to control the hazards at the location of their occurrence to avoid off-site impacts altogether.

Hazardous waste would be removed by licensed disposal operators and disposed of in accordance with applicable federal, state, and local regulations; the public would not have access to the activities associated with the handling of such wastes.

Chemicals, fuels, and industrial gases used during construction would be stored in containers specifically designed for their individual characteristics. In accordance with the Port lease, the Facility would not use, store, or handle chlorinated solvents onsite. Small quantity chemicals would be stored in their original containers to minimize risk of upset. Construction personnel working with chemicals would be trained in proper handling technique and in emergency response procedures for chemical spills or accidental releases. Personal protective equipment would be provided in compliance with WISHA requirements; material safety data sheets would be provided and maintained onsite as required by WISHA regulations.

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[3]. H_2S and LEL monitors are located at each unloading station. H_2S, LEL, and oxygen (O_2) monitors are located in each pump basin. 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. The action levels for the monitors are: LEL (10 percent of LEL), H_2S (10 ppm), and O_2 (19 percent). Similarly, sub-area-wide detectors will trigger evacuation alarms. LELs used in below grade locations and confined spaces will also detect oxygen levels to ensure safety of personnel in confined spaces. See Appendix D.3, Operations Facility Safety Program, for additional information on these and other safety systems that will be included in 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.1 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.

As described in section 2.16, the Applicant has developed a construction health and safety manual (CHSM) (Appendix D.2) and will require construction contractors to prepare their own plans aligned with the CHSM.

The Applicant has prepared a preliminary operations facility safety program (OFSP) (Appendix D.3). This OFSP describes how the Applicant will provide necessary instruction and guidance for the health and well-being of Facility staff, contractors, and visitors. The program is written as a guide to address the broadly applicable health and safety requirements of WAC Title 296, as administered by the Washington Department of Labor and Industries. Where applicable, federal regulations of OSHA found in Chapter 29 of the CFR are also cited. This program includes

- Operations Rail Operating Safety and Maintenance Program
- Emergency Response Plan and Security Plan
- Distributed Power Training
- Locomotive Daily Inspection

[3] The potential hazards of any acute H_2S exposure would be quite localized to the immediate worker or working area. H_2S, while fatal at elevated concentrations, rapidly dissipates in the open air. OSHA provides clear guidance and standards on H_2S exposure (OSHA 2016a-c).

- Cardinal Rule Training
- Managing Fatigue
- Procedures
- Crude Oil Transfer Rail Car to Manifold Procedure
- Tank Car Inbound Inspection Procedure
- Tank Car Outbound Inspection Procedure
- Baseline Procedures
- Hot Work Permit (Site Specific Rules)
- Site Specific H_2S Detection
- Genie Z45/25 Aerial Lift Certification
- Train Air Brake Tests and Inspections
- SHAPS
- Safety Topic of the Week
- Rail Bulletins
- Ergonomics and Back Safety
- Misc. Forms
- Waste Management and Disposal
- Lockout_Tagout Procedure
- Fire Protection Plan

Prior to beginning of operations, the Applicant will prepare a final OFSP for submittal for review by EFSEC. This final version will include revisions and refinements based on actual Facility design and resulting operation practices. In addition, the final OFSP will incorporate the revisions to address EFSEC's review of the preliminary plans as presented in Appendix M.

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 protection by the VFD. 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 vessel was commissioned in March 2014 (City of Vancouver 2016). 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

WAC 118-40, implements the provisions of the federal Emergency Planning and Community Right-to-Know Act. Under the requirements of these state and federal regulations, local governments are required to form Local Emergency Planning Committees, and in coordination with other local, state and tribal agencies, and industries, plan for potential emergency events related to the release of hazardous materials. Clark County, the City of Vancouver, and other local jurisdictions located within Clark County conduct this planning exercise through the Clark County Local Emergency Planning Committee (LEPC). The LEPC supports preparedness for chemical emergencies and facilitates communication and coordination among those who have a stake in hazardous materials response and recovery. The LEPC is involved in: maintenance of the Clark County Hazardous Materials Response Plan; making information about chemical inventories available to the public; assessment of industrial and transportation-related chemical hazards; coordinating training and exercises; supporting public-private partnerships for preparedness; and educating the public about chemical hazards and how they should prepare and respond (Clark County LEPC, 2013).

The LEPC is responsible for developing and maintaining the Clark County Hazardous Materials Emergency Response Plan (Clark County, April 2012) which describes the procedures and responsibilities for responding to emergencies caused by releases of hazardous materials within the County. The plan provides direction related to incident notification and response procedures as required by federal regulations. This plan is activated and followed if the release of a hazardous material results in the following; casualties or injuries, evacuations, request from a

facility and/or transporter operator for response, required notifications under EPCRA or CERCLA, and when a release may involve multiple jurisdictions or agencies.

Facilities that are required to plan under WAC 118-40-300 and EPCRA are required to coordinate with the LEPC to ensure the LEPC's planning for emergencies is up-to-date. The Applicant will conduct this coordination as required under WAC 118-40-300.

4.1.6.2 Facility Emergency Plans

The Applicant has developed preliminary emergency response plans (Appendix D.3, Operations Facility Safety Program, Section 3.1 Emergency Response Plan) 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 accidental release, flood, medical emergency, major power loss, fire, extreme weather, earthquake, volcano eruption, and security threat. The purpose of this plan is to minimize hazards to human health, the environment and property, and to protect the work force, the surrounding community, the environment and property from fire, explosion, or any unplanned sudden or non-sudden accidental release of hazardous or flammable commodities at the Facility, or other natural disasters.

The operational emergency response plan is a component of the operations facility safety program (Appendix D.3) that was 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), 29 CFR 1910.38 (Emergency Action Plan), CFR 1910.120(q) (Hazardous Waste Operations and Emergency Response), and 40 CFR 355 (Emergency Planning and Notification). The emergency response plan covers the designated actions employers and employees must take to ensure employee safety from fire and other emergencies and addresses 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. A copy of this emergency response plan will be provided to the City (for the reference of the Fire Department and Police Department) and the Clark Regional Emergency Services Agency (CRESA), which is the designated LEPC. See Appendix D.3, Section 3.1, for additional plan details, procedures, and coordination.

In addition to Facility-specific emergency plans, the Applicant will coordinate with local emergency responders to ensure that major incidents or natural disasters that have the potential to affect the public and the environment off-site will be planned for. For example, the Facility site is located within the Clark County LEPC area of response. The LEPC is required to plan for a variety of emergency situations, including the risk of hazardous materials release under WAC 118-40. The LEPC has prepared and implemented a Hazardous Materials Response Plan to provide guidance for hazardous materials incident notification and response, including events from facilities, such as Vancouver Energy Terminal (Clark County, 2012). Emergency planning will also be coordinated with the Port of Vancouver. It is anticipated that emergency plans coordinated with public responders will include processes to implement an incident command structure to ensure orderly coordination of all response activities.

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

Vancouver Energy 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 47.4-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 has recently completed a new entrance 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. The WVFA project relieves congestion, improves operational efficiencies, and ensures 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 WVFA project removed a significant chokepoint from the regional rail system, freeing up tracks for both freight and passenger rail, and allows full unit trains carrying a single product to be handled within the port. The project increases the port's internal track miles from 16 to over 50, providing more efficient rail access to port marine terminals.

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 was constructed along the Columbia River shoreline, effectively creating a grade-separated new entrance into the southeast side of the Port. Completed in 2015, this element of the WVFA project allows 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. 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 February 5, 2016. 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	Complete
Malting Facility Relocation – Phase B	Complete
Malting Drumhouse Demolition	Complete
Schedule 2 Rail Trench Upland Work	Complete
Schedule 2 Rail Trench In-Water Work Phase B	Complete
Gateway Avenue Overpass	Complete
BNSF C&M Commitments	In Progress
Bulk Unloading Facility	Future Improvements
Bulk Unloading Facility Track Work	Future Improvements
Bulk Facility/Subaru Track Relocation	Complete
Grain Track Unit Train Improvements Phase B	In Progress
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 State Environmental Policy Act (SEPA) by the Port;
- Reviews under National Environmental Policy Act (NEPA) by Federal Highway Administration (FHWA) in coordination with Washington State Department of Transportation (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 U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (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 SEPA Addendum was issued by the Port in 2014; however, the project refinements addressed in the addendum were not applicable to the rail loop at Terminal 5. 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

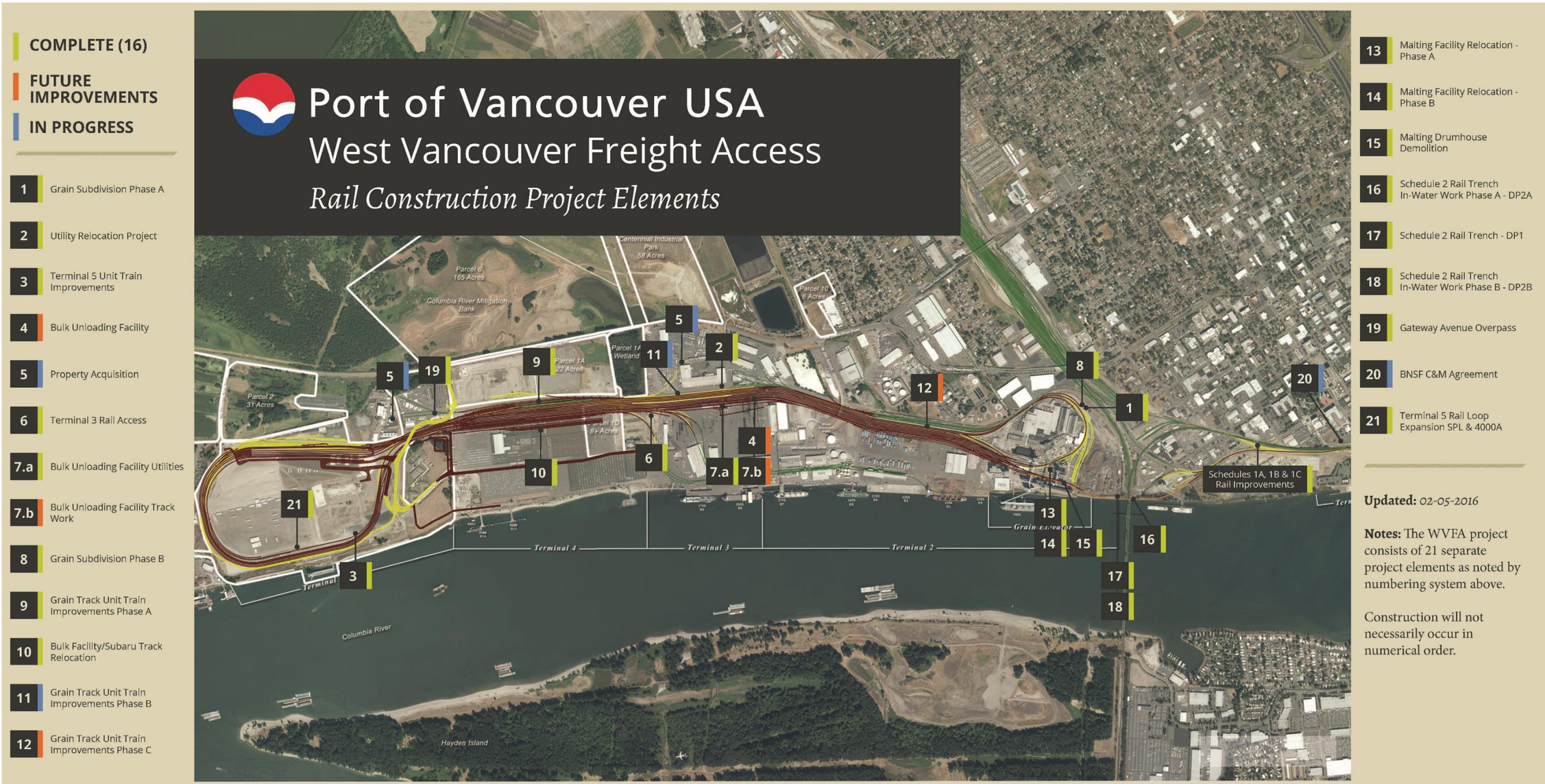
July 2009 – City post-decision review of the WVFA allowing project modifications that included the Terminal 5 rail loop

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



BergerABAM	**Figure 4.2-1. WVFA Rail Construction Project Elements (Revised)**

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 had planned to construct a potash export facility on portions of Terminal 5 (Figure 4.2-2). 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 (City of Vancouver 2011b). The BHP Billiton project was cancelled in 2014; however, the Port is maintaining permit approvals for the proposed work. Initial grading and ground improvements for the BHP Billiton project had 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 in the early 1990s for short- and/or long-term moorage of ocean-going government and commercial vessels.

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 project will require the construction of approximately 1,500 feet of tracks 4106 and 4107 to be shifted by the Applicant for Vancouver Energy Terminal exclusive use at the north end of the Terminal 5 loop to allow for track tie-ins into the Area 200 unloading facility, release of cars back to the main track from the unloading facility, and for bad order tracks. Tracks 4106 and 4107 consisting of approximately 18,000 linear feet of new rail located on approximately 5.4 acres at Terminal 5 will be constructed by the Port, independent of this 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. In the future, the Applicant will construct an approximately 4,900-foot-long additional track (to be permitted as part of the EFSEC Site Certification Agreement) that will be located on the outside of the Terminal 5 loop (Track 4101). A third rail loop (Track 4105) is permitted for general Port use. When Facility unloading volumes reach and exceed 120,000 bpd, Vancouver Energy will take over Track 4105 from the

Port for exclusive use. The newly constructed Track 4101 will then be transferred to Port general use and will not be used by the Applicant.

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

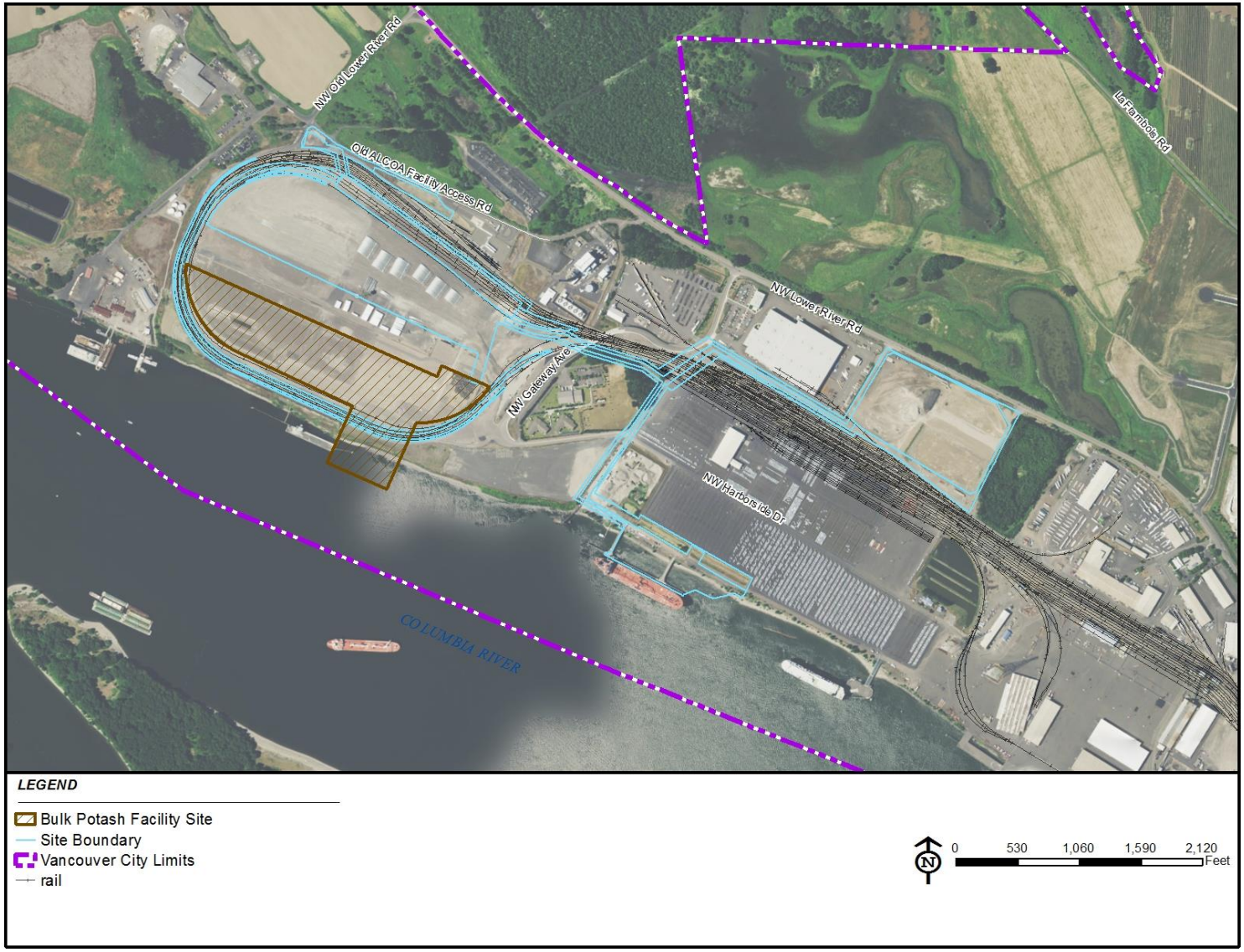


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Figure 4.2-2. BHP Billiton Proposed Site (Revised)

- East: NGL Supply Terminal Co. propane distribution facility, JWC (approximately 600 feet to the east), and the CPU River Road Generating Plant (100 feet to the northeast)
- South: Cargo laydown
- West: Tidewater Barge Lines and Tidewater Terminal Company (Tidewater)

The NGL Supply Terminal Co. propane facility is located on an approximately 4-acre parcel consisting of rail unloading, two 80,000-gallon propane storage tanks, truck loading racks, and a small office building. The JWC 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.

Tidewater Terminal Company occupies approximately 23 acres, including an office building for the corporate headquarters and a marine terminal operated by Tidewater Barge Lines. 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 4.2-3)

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.

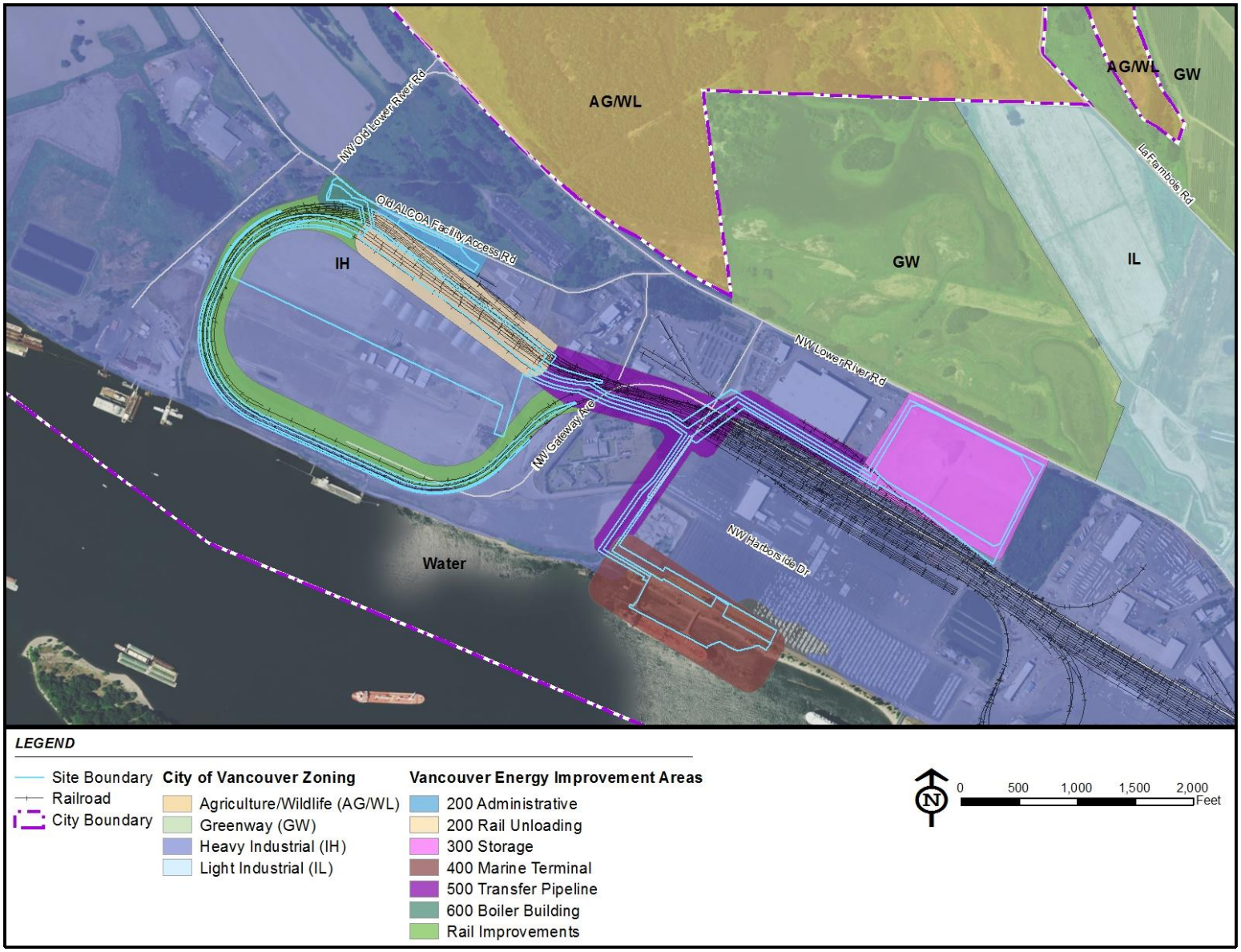

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Figure 4.2-3. City of Vancouver Zoning in Site Vicinity (Revised)

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 4.2-3). 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 4.2-3).

Area 500 – Properties adjacent to the pipeline routes are all industrial, with the exception of the JWC, previously described above, which is located south and west of the pipeline routes.

The surrounding properties are all zoned IH (see Figure 4.2-3).

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 4.2-3).

Rail Infrastructure – The rail infrastructure improvements are located on Terminal 5. Surrounding land uses are industrial with the exception of the JWC located to the east of the existing rail loop.

The surrounding properties are all zoned IH (see Figure 4.2-3).

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, 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 of Vancouver USA, 2015a). 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 4.2-4.

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 4.2-5). 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, 2011a). 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 NeighborhoodAssociation, 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, 2011a).

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 JWC 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.

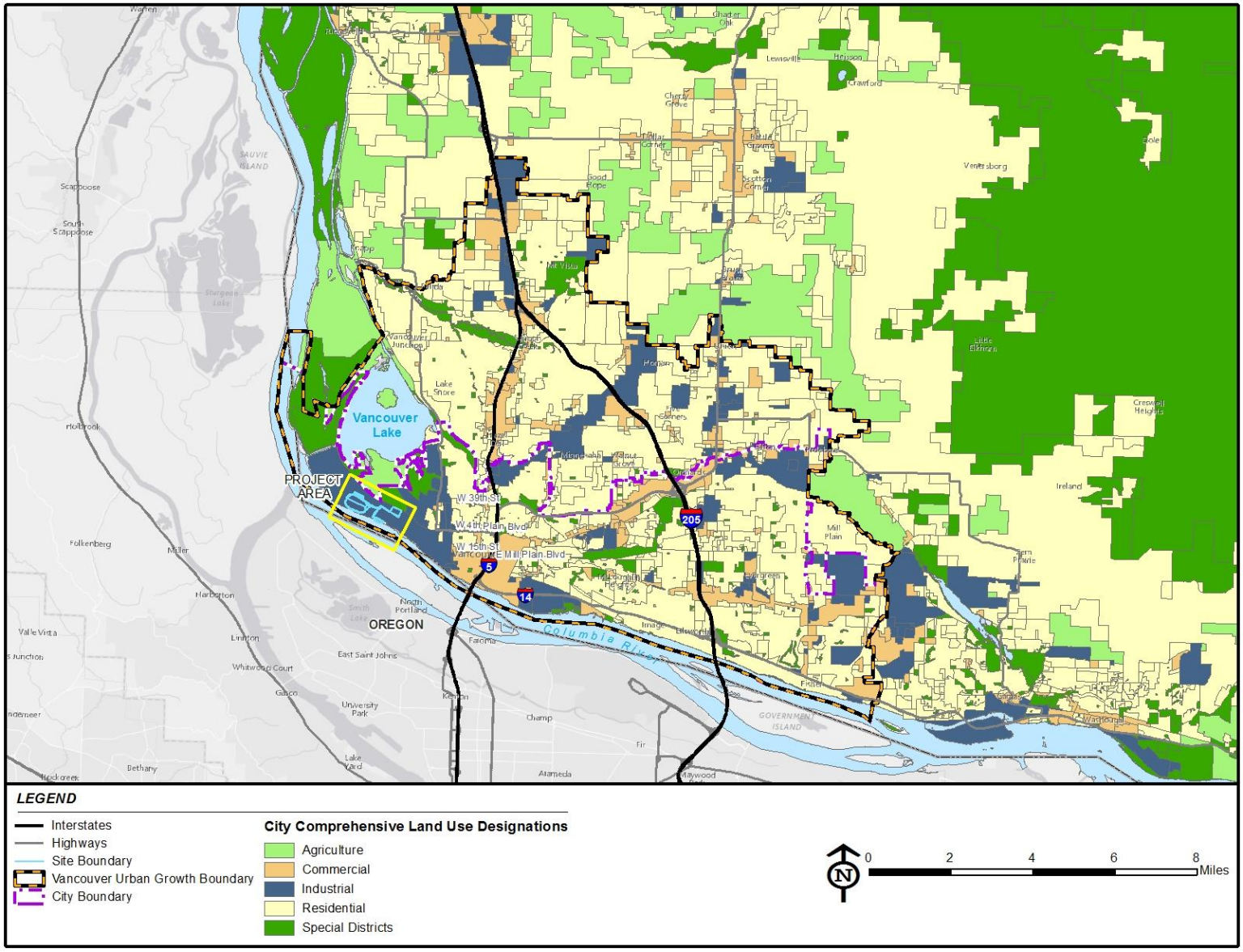

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Figure 4.2-4. General Comprehensive Land Use Designations (Revised)

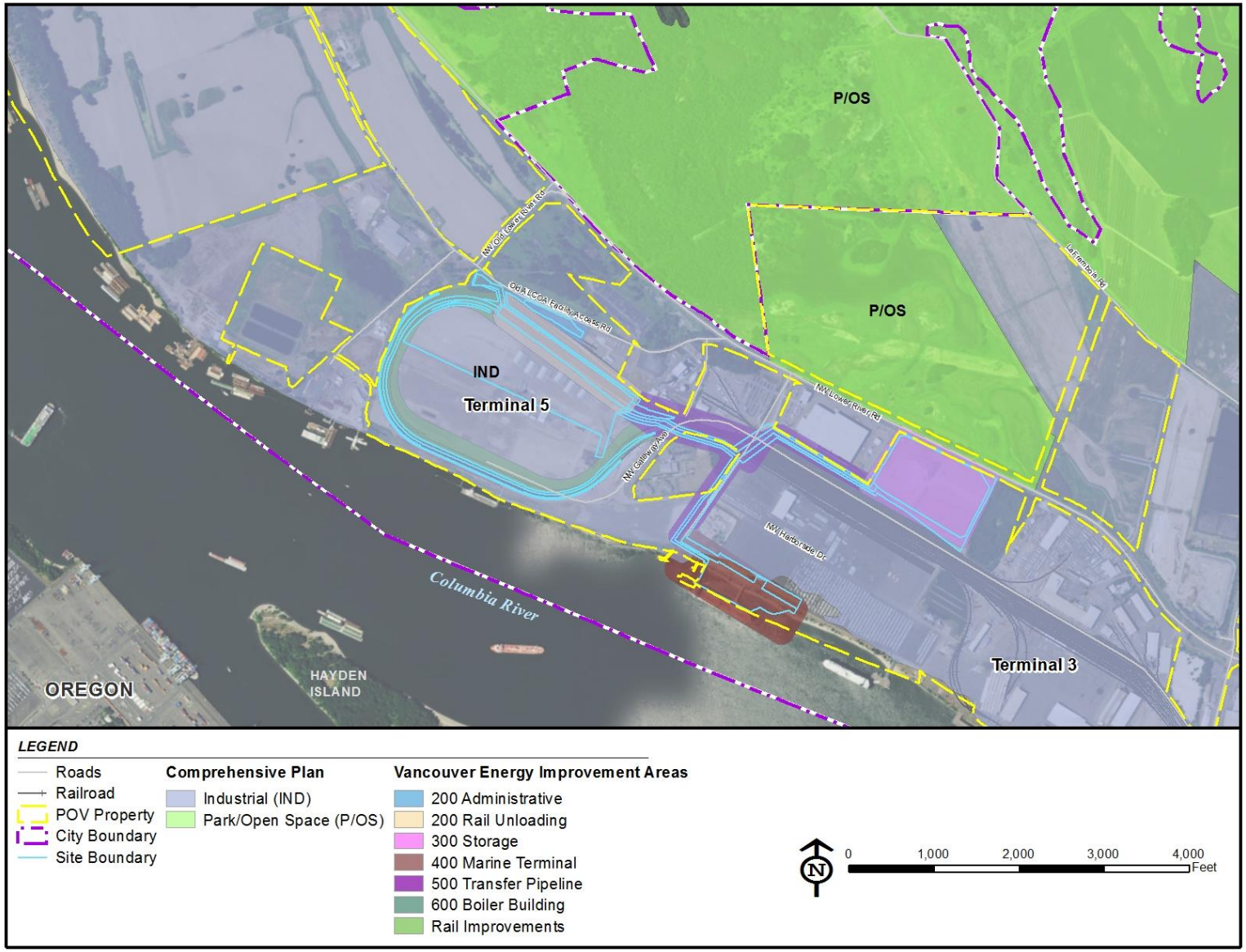

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Figure 4.2-5. Comprehensive Plan (Revised)

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 (2016–2025)*

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 4.2-4). The area of the proposed project is designated as Industrial (IND) by the plan as shown in Figure 4.2-5 (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 4.2-5). 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 4.2-5 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 section 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 construction of a new rail loop, 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 **Error! Reference source not ound.**.

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 4.2-3). 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 geotechnical investigation 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 (2016–2025)* 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, create a destination waterfront, 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.

4.2.1.4 Mitigation

As stated above, there are no impacts to existing land uses; therefore, no mitigation measures are 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 JWC, 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 (1,000 feet or greater) 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). The American Petroleum Institute (API) 540 – Electrical Installations in Petroleum Process Plants, Section 7 – Lighting, and Illuminating Engineering Society (IES) codes and standards will be used for the basis of design for Facility lighting. Light fixtures will

be selected during final project design to achieve the levels of illuminance established by the above-listed standards.

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. There is the potential that ground improvements will occur during nighttime hours. 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

Construction

Most construction will occur during the day. If construction activities require night lighting, lights will be directed towards the site and will be the minimum wattage required for safety and operations. Temporary construction lighting will be adjusted and/or shielded to minimize light spillover or direct glare.

Operation

The storage tanks will be painted with nonreflective white paint to reduce surface glare from direct sunlight during the day and headlights at night. Other development elements will be painted with earth tones.

As described in section 3.4.4.3, Facility lighting impacts will be minimized with the use of the following mitigation measures:

- Provide directional lighting in areas adjacent to sensitive wildlife areas, including the north side of Area 300 to ensure lights are not pointed in the CRWMB and Area 400 to minimize the amount of light in aquatic habitats.
- Aim direction lighting away from sensitive habitats to the extent possible to minimize nightlight and glare.
- Incorporate LED bulbs that fall within optimum wavelengths in area lighting to reduce light pollution impacts where practicable and within safety regulations.
- In the Marine Terminal loading area use spot lighting only during loading operations if approved by the USCG in compliance with 33 CFR Part 105 and/or Part 154.

These measures will also serve to minimize light and glare impacts.

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 JWC, 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 4.2-6. Alcoa operated the facility through the early 2000s. As indicated in section 2.1.1.1, the Port completed the purchase of the 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 Ecology approvals (see Figure 4.2-7 for a current aerial photo of the site).

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. Figure 4.2-8 illustrates the location of Facility elements relative to the current configuration of Port Terminals 4 and 5.

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 4.2-9.

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 4.2-10).
- **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 4.2-11).
  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 boaters are likely to be viewing the Facility from a distance of at least 0.3 miles, recreational viewers have been assigned moderate viewer sensitivity rather than the high sensitivity typically associated with this viewer type (see Figure 4.2-12).
- **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 4.2-13).

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.

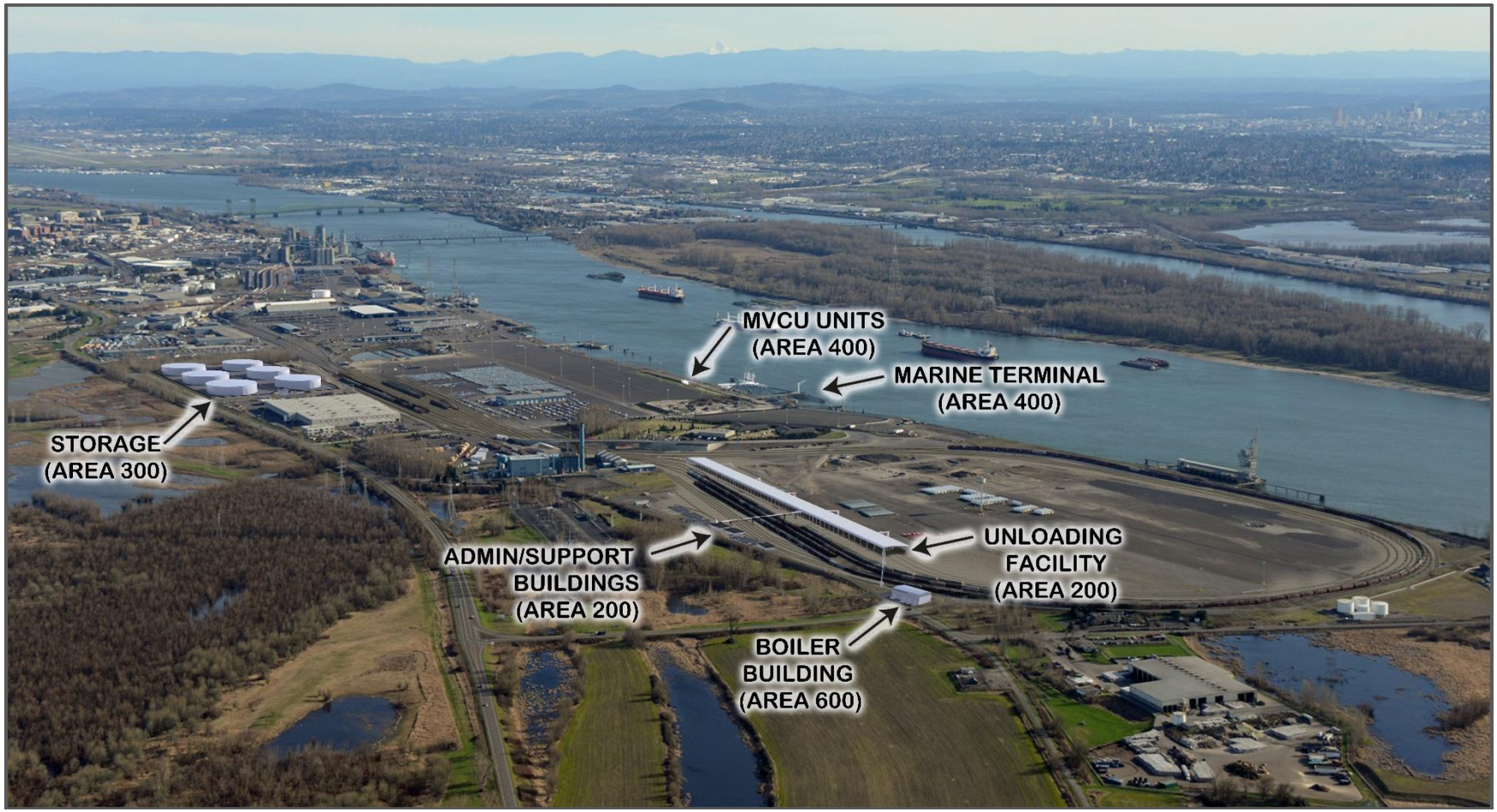
Table 4.2-4. Viewpoints, Sensitive Viewers, Existing Visual Quality

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

BergerABAM	**Figure 4.2-6. Historical Aerial Photo**

BergerABAM	**Figure 4.2-7. Current Aerial Photo (New)**



BergerABAM	**Figure 4.2-8. Bird's Eye Photo Simulation (Revised)**

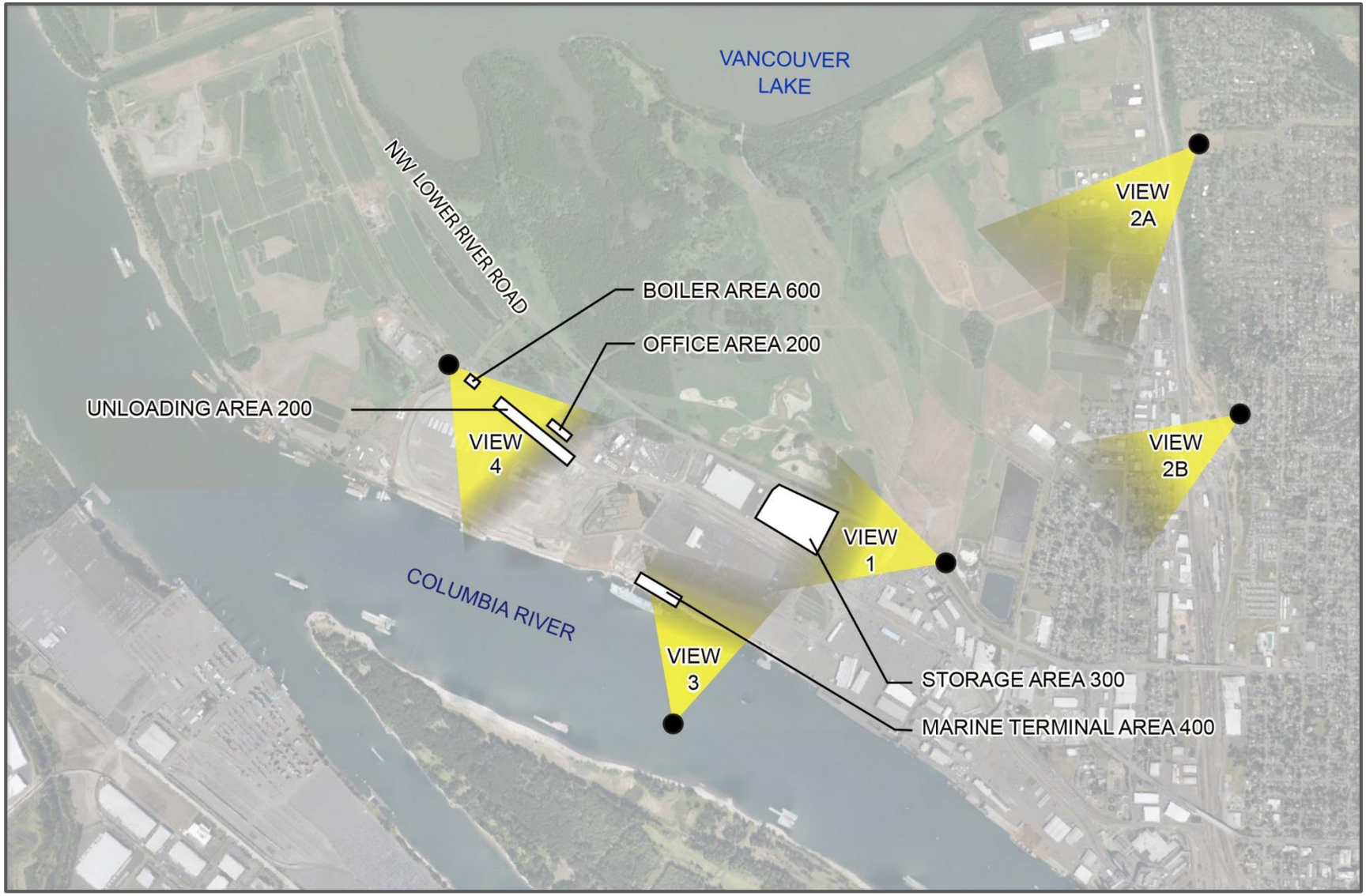


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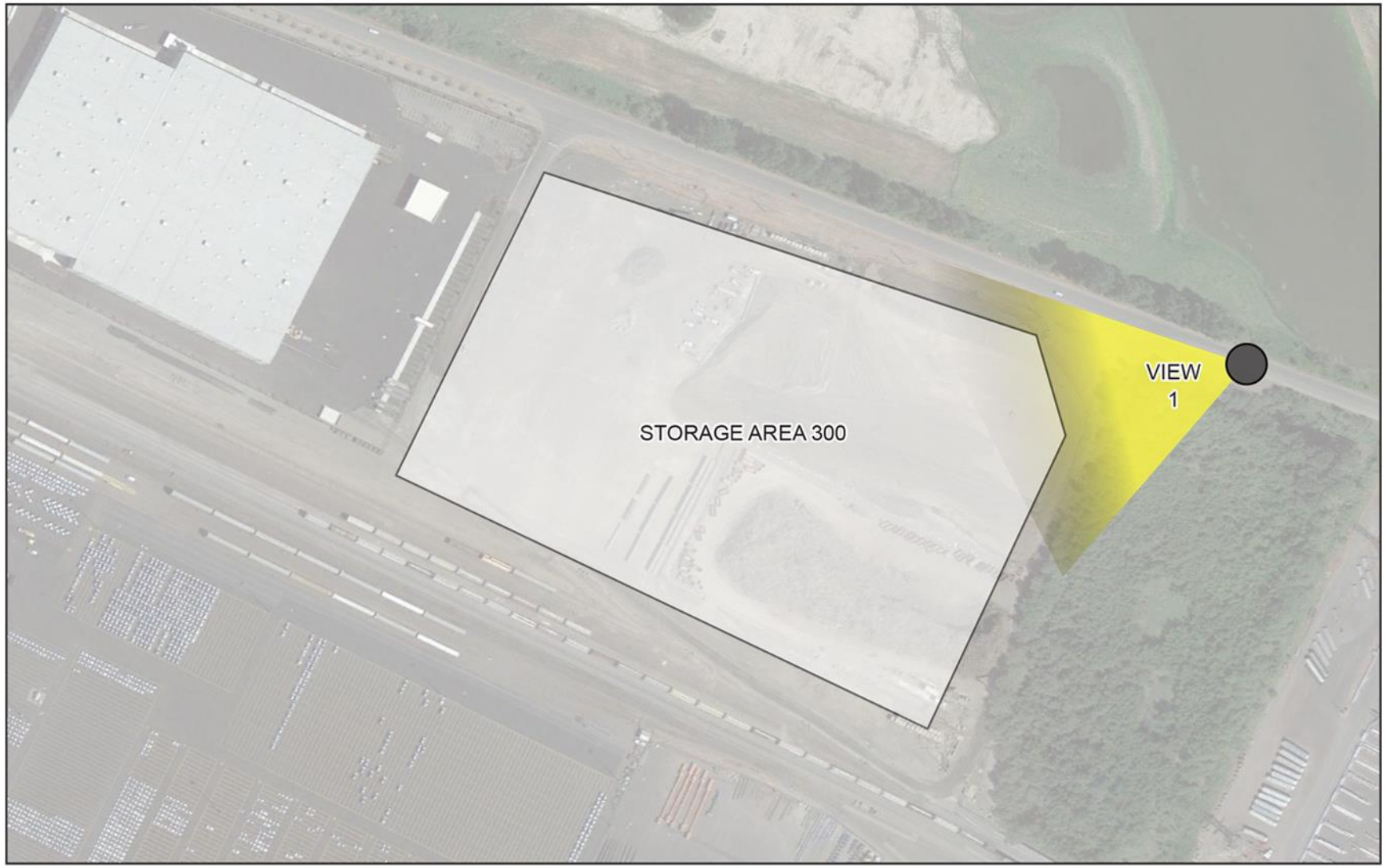
Figure 4.2-9. Viewpoints and Vicinity (Revised)



BergerABAM	**Figure 4.2-10. Viewpoint 1**

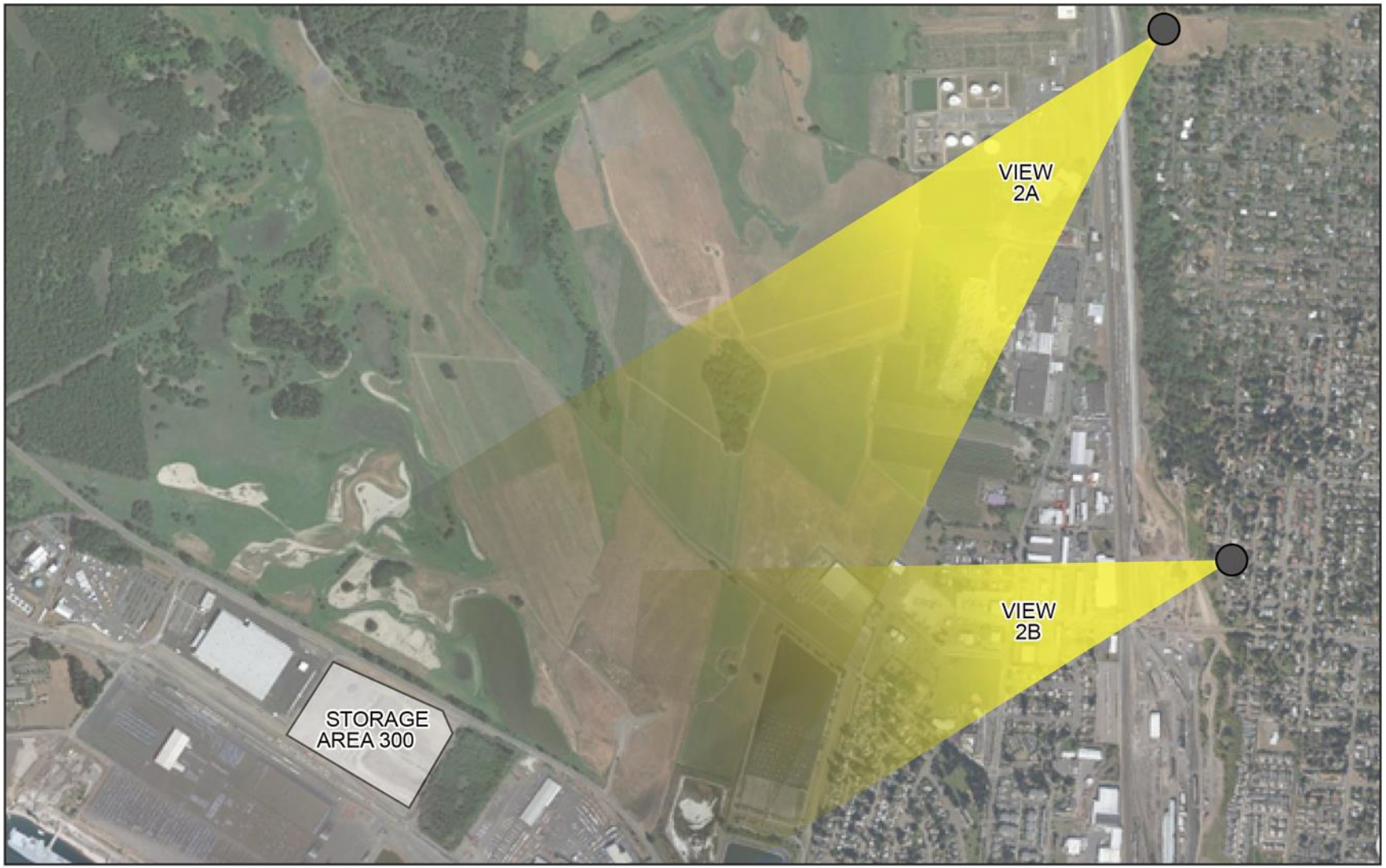


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Figure 4.2-11. Viewpoint 2

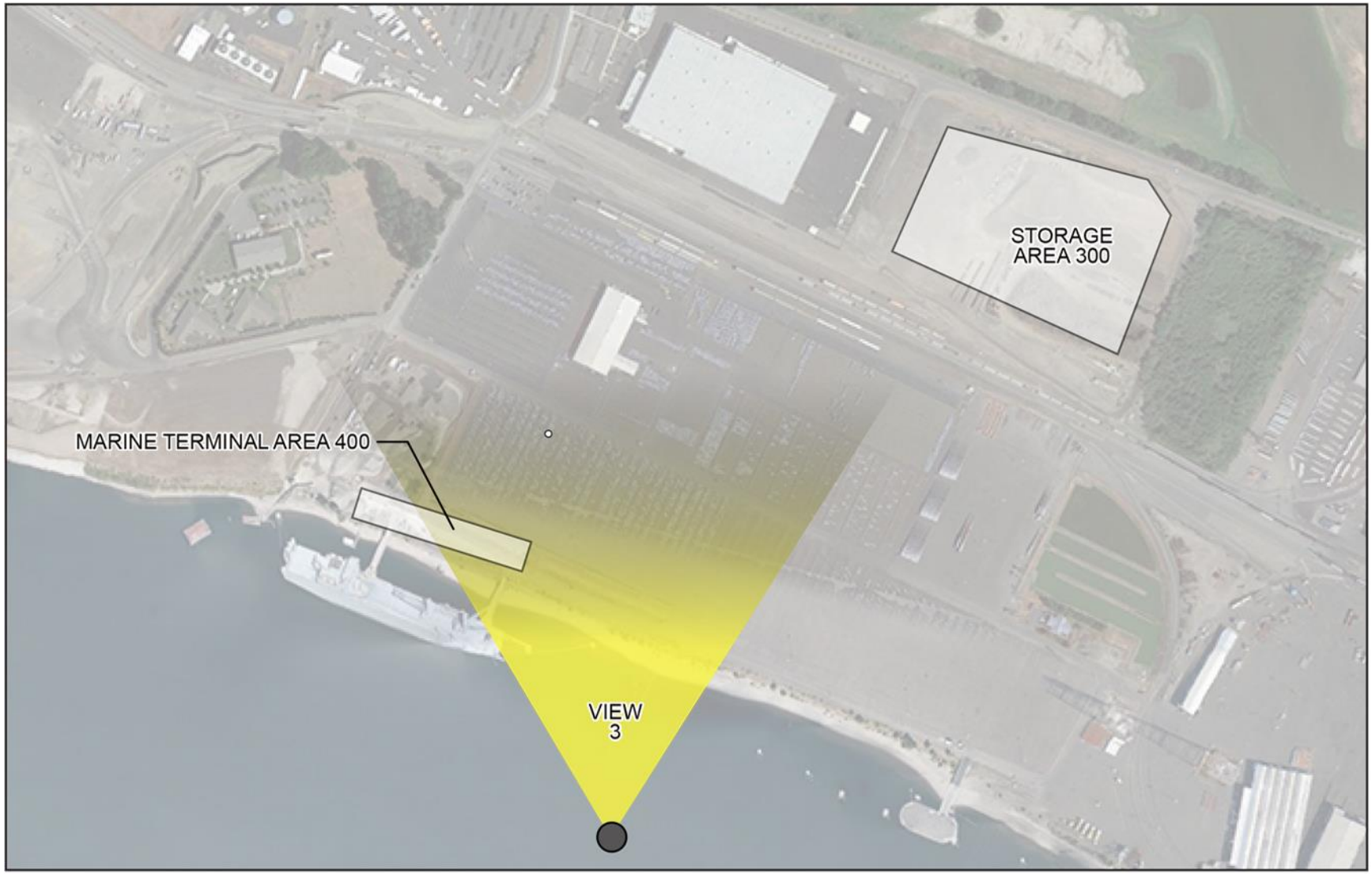

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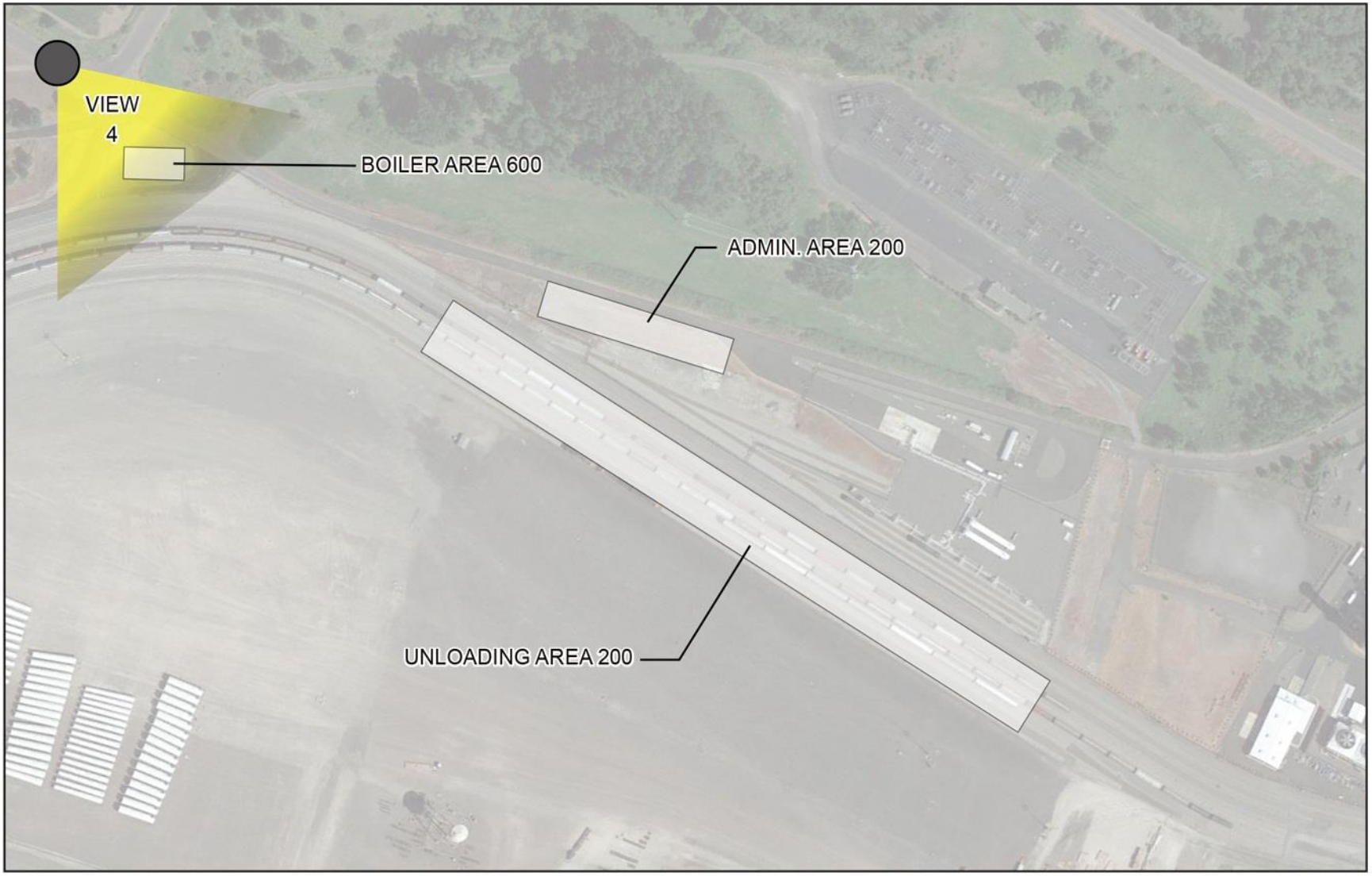
Figure 4.2-12. Viewpoint 3



BergerABAM	**Figure 4.2-13. 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	50
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 4.2-14 and 4.2-15). 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 4.2-14. Viewpoint 1 Existing**

BergerABAM	**Figure 4.2-15. Viewpoint 1 Simulation**

Franklin Park and Northwest Neighborhood
This viewpoint (see Figures 4.2-16 and 4.2-17) 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 4.2-18 and 4.2-19) 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 4.2-20 and 4.2-21). 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 4.2-22 and 4.2-23) 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 4.2-16. Viewpoint 2a Existing**

BergerABAM	**Figure 4.2-17. Viewpoint 2a Simulation**

BergerABAM	**Figure 4.2-18. Viewpoint 2b Existing**

BergerABAM	**Figure 4.2-19. Viewpoint 2b Simulation**

BergerABAM	**Figure 4.2-20. Viewpoint 3 Existing**

BergerABAM	**Figure 4.2-21. Viewpoint 3 Simulation**

BergerABAM	**Figure 4.2-22. Viewpoint 4 Existing**

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Figure 4.2-23. 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.

Construction
During construction, the majority of construction activities will be conducted during daylight hours to avoid light and glare on adjacent communities. At night, lights will be directed towards the Facility location and be limited to the minimum wattage required for safety and operations.

Operation
The following mitigation measures are required by the City as 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.

During the operation, developed elements of the Facility, including all building features except for storage tanks, will be painted with earth tones. The storage tanks will be painted with non-reflective white paint to reduce surface glare from direct sunlight during the day, area lighting and headlights at night. Covered and directional area lighting will reduce impacts from spillover and glare on adjacent lands. Screening requirements for industrial facilities under Vancouver municipal code Section 20.925.070 will further reduce visual impacts to adjacent lands and roadways from any new open storage facilities that are part of the Facility. As a result of these measures, adverse impacts on visual resources and aesthetics occurring during the operational lifetime of the Facility will not be significant.

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 4.2-24.

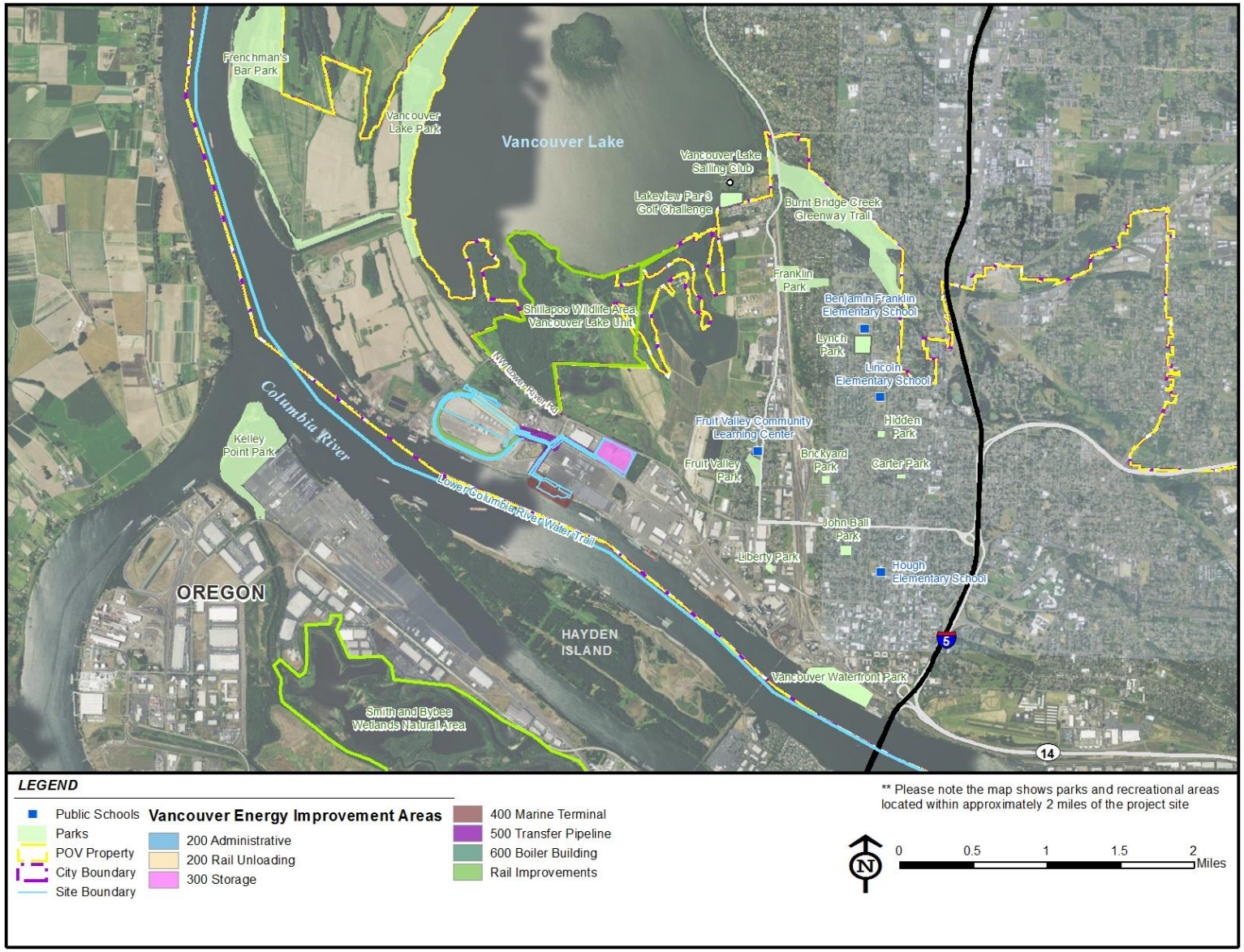
Table 4.2-7. Public Park and Recreation Facilities in the Immediate Vicinity of Project

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	Clark County (County)

Name of Park/Facility	Facilities	Owner
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	County
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)
Burnt Bridge Creek Greenway Trail	• 8-mile hard-surfaced shared-use trail	City of Vancouver (City)
Franklin Park	• 12-acre neighborhood park • Play equipment • Sports fields • Picnic tables	City
Fruit Valley Park	• 6-acre neighborhood park • Play equipment • Paved pathways • Picnic tables	City
Liberty Park	• 0.2-acre park developed in conjunction with the completion of the Mill Plain Blvd. Extension • Play equipment	City
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	City
Kelley 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

Name of Park/Facility	Facilities	Owner
Vancouver Lake Sailing Club	• Private sailing facility • Boat launch • Facilities	Vancouver Lake Sailing Club
Lakeview Par 3 Golf Challenge	• Par 3 Golf Course	Lakeview Par 3
Vancouver Waterfront Park	• 7.3 acre waterfront park • Columbia River Access • Picnic tables • Paved trails	City of Vancouver

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. While schools are not designated recreation facilities, many schools offer play equipment and soccer fields for public use. 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.



BergerABAM

Figure 4.2-24. Recreational Facilities (Revised)

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 (City of Vancouver 2011). 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 during the construction phase. Mitigation measures specifically related to noise and air quality will minimize potential impacts during construction.

The Applicant will participate in Lower Columbia River Harbor Safety Committee efforts to develop additional boater safety educational outreach through programs such as the PTP (Prevention Through People) model used by the San Francisco Harbor Safety Committee.

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.1. 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 (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 4.2-25).

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 Moore 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 4.2-26 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	• 45CL408 (outside the study area)

Author	Date	Area Investigated	Findings
		(north of 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
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 will 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 JWC 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. The remnants consisted of a foundation from a former concrete storage bunker that was built in the early 1970s, concrete silo foundations (late 1960s-early 1970s), a concrete block storage shed (circa 1970), and a log raft remnant on the shoreline (date unknown). The concrete foundations are no longer on-site. A dock that remains offshore was built circa 1967. Construction monitoring was recommended for areas of proposed excavation below the fill level and into native soils (Chapman and Blaser 2010).

A 1941 Alcoa aluminum smelting plant water tower was previously recorded (Hetzel et al. 2009) for another study and was determined not eligible for listing in the NRHP in 2011 by the DAHP. The water tower still stands but is not within the Facility study area footprint. It was not within the project APE for the Terminal 5 bulk potash handling facility, mentioned above.

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.

DAHP provided SEPA scoping comments noting the possibility that construction impacts may reach native soils and the potential for these soils to retain evidence of an archaeological site (Kaehler 2013). DAHP's recommendations included a subsurface sampling plan to observe the buried soils. AINW performed a geoarchaeological survey of the Facility APE study area in November 2014. A total of 39 geoprobe borings were collected using a Geoprobe direct-push hydraulic drill rig that collected continuous cores in intact 1.5-m segments. The borings were collected continuously to coarse Pleistocene gravels, or a depth of 1.5 m below the surface of river channel sands, or to the maximum depth of construction impact in the area, whichever was shallower. The depth of construction impacts include the use of stone columns to a maximum depth of 21.3 m (70 feet) below the surface.

No pre-contact or historic-period artifacts or archaeological features were found during the geoarchaeological investigation. Wetland, channel margin, and river channel sediments were present below the surface layer of sandy fill, and showed no signs of historic or modern disturbance, other than grading prior to filling. The sediments were dated using radiocarbon analysis of well-preserved plant and wood fragments, and tephra composition matching known

volcanic eruptions. These dates show that the initial shift from river channel to shallow floodplain wetland took place shortly before the Mount St Helens (MSH) set Ye tephra was deposited between 4,436 and 2,965 years before present (B.P.). Human occupation earlier than this would be precluded by the river channel setting. The river channel continued its gradual westward migration across the area through at least 1,290 cal years B.P., leaving behind a wetland landscape marked by low sandy ridges and numerous small ponds subject to seasonal flooding. The late Holocene wetland would have been a productive environment for hunting and gathering by Native peoples, but frequent flooding of the low-lying terrain would have prevented people from establishing enduring villages. The terrain documented in this study resembles that just to the north of the project APE, south of Vancouver Lake, where the only recorded traces of human settlement are the remnants of discarded tools and cooking fires on ridges near marshes and farmsteads on high ground. The best-preserved buried remnants of this type of sandy ridge were found in the Area 500 borings, although no indicators of human activity were present in the borings.

No monitoring of construction activities is needed in areas 200, 300, and 400 because the sediments show no evidence of stable soils, only of frequently flooded, low-lying land dominated by small ponds, marshes, and shallow floodplain channels. The dune ridge present in Area 500 north of the CalPortland facility may have been suitable for a seasonal camp. If the depth of impact will exceed 3.05 m (10 feet) below surface, which would be a change from the current plan, monitoring during construction in this portion of Area 500 would be appropriate.

Impacts

All of the study area and the surrounding area have been studied extensively for cultural resources through previous surveys and the project-specific survey completed in 2014.

Cultural resources includes both prehistoric and historic-period archaeological resources and historic resources of the built environment (buildings, structures, and districts). Cultural resources that are eligible for listing in the NRHP are referred to as historic properties. No archaeological or historic resources have been recorded in the Facility study area. No recorded historic buildings or structures from the 1940 Alcoa aluminum smelting plant or from previous industries remain in the Facility study area.

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 the 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. Prior to filling of the Facility study area, the land was a marshy floodplain. While buried features have been found in saturated soils, most archaeological sites are generally found on higher land than the study area. These sites are outside of the study area and will not be impacted.

Based on the results of the geoarcheological investigations, no monitoring of construction activities is needed in areas 200, 300, and 400 because the sediments show no evidence of stable soils, only of frequently flooded, low-lying land dominated by small ponds, marshes, and shallow floodplain channels. The dune ridge present in Area 500 north of the CalPortland facility may have been suitable for a seasonal camp. The current impacts will be no deeper than 3.05 m (10 feet) below surface for the placement of the pipelines, which will largely be aboveground, not buried. If the depth of impact will exceed 3.05 m (10 feet) below surface in the vicinity of the

dune ridge in Area 500, which would be a change from the current design plan, monitoring during construction in this portion of Area 500 would be appropriate.

4.2.5.7 Mitigation Measures

Construction

While findings from previous studies and the geoarchaeological investigation indicate a low likelihood for encountering cultural material during construction, the Applicant has submitted a preliminary Cultural Resources Inadvertent Discovery Plan (CRIDP) (Flint 2015) to EFSEC for review (Appendix A.3), The inadvertent discovery plan describes the procedures to be implemented in the event of the discovery of previously unidentified archaeological resources during construction of the Facility, and in the event ground disturbing activities are required in response to an emergency event during operations. The plan also describes procedures to be implemented in the event of the discovery of human remains.

The protection measures described in the inadvertent discovery plan include the following elements:

- Should any archaeological resources be found, all work adjacent to the discovery will stop 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 the Port, EFSEC, USACE, DAHP, and the consulting tribes will be notified to define a course of action.
- If human remains are suspected, the Facility senior project manager will contact the Clark County coroner, EFSEC, and USACE. All work must stop in the area where human remains are found or suspected, and the area is to be safe-guarded; work may continue after all consultation regarding the human remains has been completed and required procedures have been completed.
- An archaeologist will prepare a summary report detailing any inadvertent discoveries and procedures that followed as a result of a discovery. The report will identify any artifacts or features found, describe the findings, and summarize the results of data analysis. The report will be provided to the Port, EFSEC, USACE, DAHP, and the affected tribes.
- Construction staging and laydown activities would only occur in areas that have been previously disturbed and developed. Although in some locations light surface levelling might be required to provide safe access to construction employees and equipment, deep surface disturbance in these areas is not anticipated. If the depth of impact will exceed 3.05 m (10 feet) below surface in the vicinity of the dune ridge in Area 500, which would be a change from the current design plan, monitoring of soil disturbance activities during construction in this portion of Area 500 would be conducted.

Operations

The inadvertent discovery plan described above for construction will also be used in the event ground disturbing activities are required in response to an emergency event during operations.

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Figure 4.2-25. Historical Shoreline Configuration (Revised)

LEGEND

- Project APE
- Port of Vancouver's Terminal 4 Pond Reconstruction Project - Reese 2009b
- Port of Vancouver Terminal 4 Improvements Project - Reese 2009a
- Predetermination Clark Public Utilities Substation at Jail Work Center - Fuld and Reese 2012
- Clark County Jail Work Center - Moore et. al 1997; Ellis and Mills 1998
- Port of Vancouver Alcoa/Evergreen Development Project - Fagan and Zehendner 2009
- Alcoa Remediation Project - Becker and Roulette 2003
- West Vancouver Freight Access Project - Hetzel et al. 2009
- Aloca Vancouver Sediment Remediation Project - Zehendner and Fagan 2008
- Port of Vancouver Proposed WRI Coal Terminal - Thomas and Welch 1982
- Port of Vancouver Parcel 1 Project - Forgeng and Reese 1993
- Cogentrix Power's Proposed Gas-Fired Turbine Electric Generation Facility - Thomas 1995
- Port of Vancouver Parcel 2 Project - Davis and Ozbun 2011
- Predetermination 3101 NW Lower River Road - Jenkins and Davis 2012
- Port of Vancouver Terminal 5 Bulk Potash Project - Chapman and Blaser 2010
- Port of Vancouver Trail et al. 2014
- NWP River Road Relocation Project - Fuld and Tisdale 2015

Date: April 2015

Map Notes: Basemap -Aerial photo dated July 2010, courtesy of ESRI World Imagery service

N

0 250 500 Meters

0 500 1,000 2,000 Feet

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Figure 4.2-26. Previous Cultural Resource Studies (Revised)

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 section 4.2.5.4, 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 be constructed primarily on previously developed areas located at the Port. The site does not contain any areas currently being used for agriculture. While there are agricultural lands within the vicinity of the project area, the Facility will not impact these areas because they fall outside of the boundary of the proposed project. The proposed Facility will not result in any impacts to agricultural crops or animals.

4.2.6.3 Mitigation Measures

No impacts are anticipated and, therefore, 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).

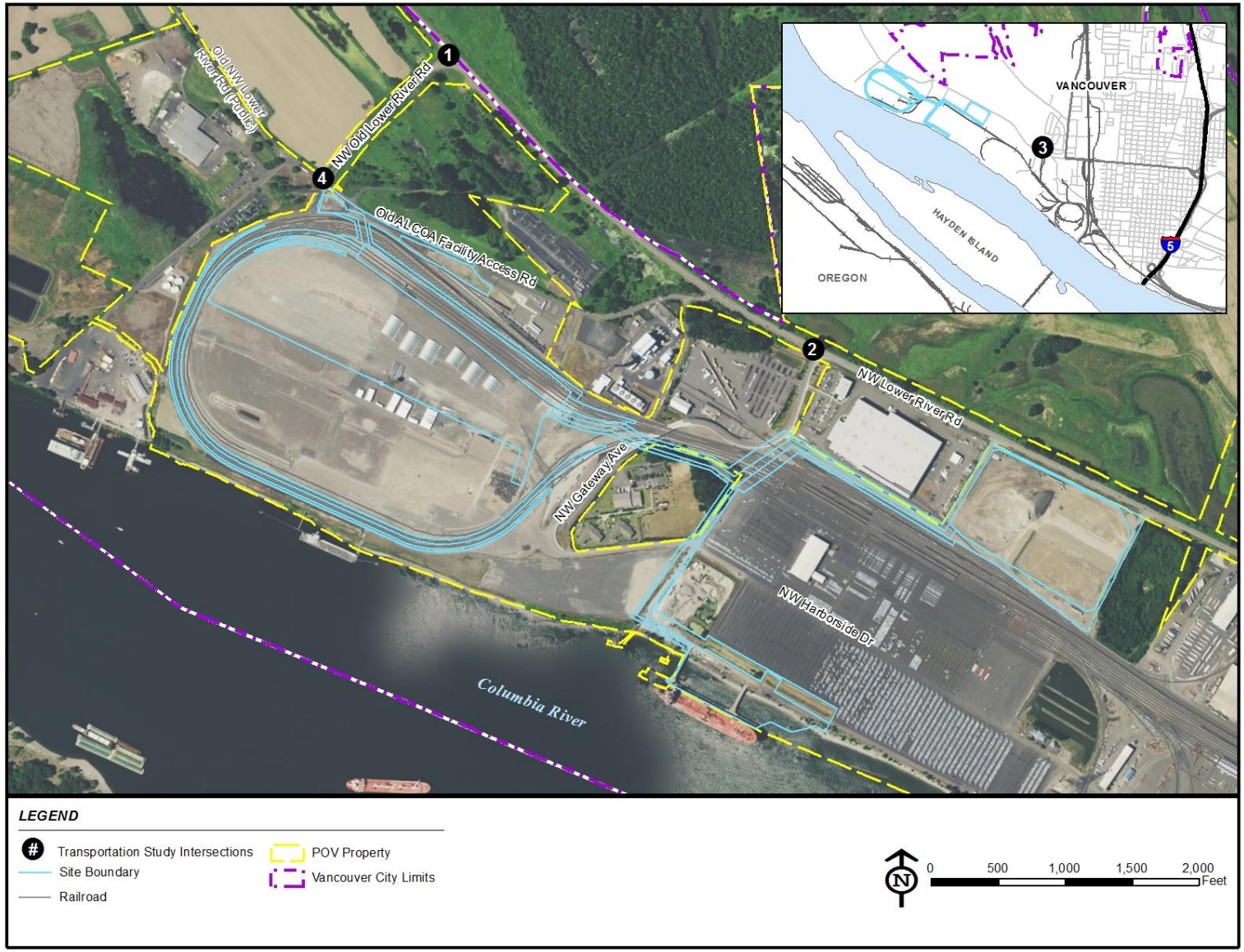

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Figure 4.3-1. Existing Roadway Transportation System (Revised)

- **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 NGL Supply Terminal Company 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 truck entrance to Terminal 5 at the Port. This private roadway is under Port jurisdiction, and it has two travel lanes, a posted speed of 25 mph, and a continuous sidewalk on the east side of the road from SR 501 linking to NW Harborside Drive. The Port recently completed a grade-separation project on NW Gateway Avenue that resulted in an elevated structure over the BNSF rail line that feeds into the loop track around Terminal 5. With this project complete, NW Gateway Avenue now operates independently from the Terminal 5 loop track operation and the BNSF rail line, except for minor at-grade crossing that still exists just north of the overpass structure. This at-grade crossing leads to a rail car loading area for the Tristar business. It leads east to a propane facility run by NGL Supply Terminal Company. Further to the east is a locked security gate that prevents any public travel beyond. This roadway provides direct access to the administration and office support buildings of Area 200 and the boiler building of Area 600.
- **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	25 mph	Partial (east side)	No	No	Yes
Old NW Lower River Road	Local Street	2-lane	Not Posted	No	No	No	No

Roadway	Classification	Cross Section	Speed Limit	Side-walks?	Bicycle Lanes?	Median?	On-Street Parking?
Old Alcoa Facility Access Road	Private Street	2-lane	15	No	No	No	No

[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.1. 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 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

In addition to applying LOS as a measure of effectiveness, the City prescribes a volume-to-capacity (v/c) threshold for both signalized and unsignalized intersections. The v/c ratio represents the sufficiency of an intersection to accommodate the vehicular demand. As the v/c ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur. Once the demand exceeds the capacity (a v/c ratio greater than 1.0), traffic flow is unstable and excessive delay and queuing is expected.

The study intersections along SR 501 are subject to WSDOT operational standards that prescribe an LOS D or better for signalized and unsignalized intersections. All other study intersections are under the jurisdiction of the City and must maintain an LOS E or better and a v/c ratio less than 0.95 for signalized intersections and a v/c ratio less than 0.95 for the critical movement and/or approach for unsignalized intersections.

As Table 4.3-3 shows, all study intersections currently operate within acceptable operational thresholds during the weekday a.m. and p.m. peak hours.

Table 4.3-3. Existing Intersection Traffic Conditions Summary

Intersection	Peak Hour	LOS	V/C	Standard	Meets Standard?
Old Lower River Rd/NW Lower River Rd (SR 501)	AM	B	0.08	LOS D	Yes
	PM	A	0.08		Yes
NW Gateway Ave/NW Lower River Rd (SR 501)	AM	A	0.06	LOS D	Yes
	PM	A	0.07		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	B	0.55	LOS D	Yes
	PM	B	0.28		Yes
Old Lower River Rd/Old Alcoa Facility Access Rd	AM	B	NA	LOS E & v/c ≤ 0.95	Yes
	PM	A	NA		Yes

NA = Not available for this intersection.

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 has constructed 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[4] between 1995 and 2000; consisting of 1,930 cargo and passenger vessels (92 percent of total vessel entries) and

[4] A transit is a single trip on the river. One ship-call requires two transits.

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. Appendix P.2 provides a traffic analysis of the Columbia River from the bar to/from the Port for the calendar year 2014.

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 Columbia River Datum which was completed in November 2010.

With the proposed project, ship and barge loading will occur at existing berths 13 on the Columbia River south of the current Subaru facility.

Berths 13 and 14 were permitted by the USACE in 1993 "to provide berthing for up to (2) oceangoing vessels for short and/or long-term moorage." See Permit No. 93-25 (Department of the Army Permit). The permit anticipated and expressly authorized use of these berths by both governmental and commercial (cargo-handling) vessels.

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 2013). 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.

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 (C-TRAN 2013). 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 will 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 7.63 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 to improve safety and to strengthen structures to meet current seismic design criteria and mooring loads. Modifications will be made to the Berth 13 trestle and platform, access catwalks, and mooring structures. Piping, cranes, support structures, and other equipment necessary to load the vessels (see section 2.3.7) will be added. 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 that are not intended for public access and use. 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 with applicable industry standards.

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 –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

As described in section 2.3, the project will require the construction of one additional rail loop by Vancouver Energy at Terminal 5. The additional line, which will begin and end near the Gateway Avenue overcrossing, will form one complete loop outside the existing rail loops. Figure 2.3-5, illustrates the location of the new loop. . As part of Facility construction, the Applicant will also relocate approximately 1,500 feet of tracks 4106 and 4107 to allow for track tie-ins into the Area 200 unloading structure.

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 development was identified and included in the 2020 baseline traffic volumes – the Terminal 5 bulk potash handling facility, which has since been cancelled. That facility is permitted to be located west/southwest of the proposed site. While the bulk potash handling facility is no longer proposed, the Port is maintaining the approved permits for potential future development. The vehicle trips generated by this development were assigned to the study intersections based on the trip generation and assignment contained in the transportation impact analysis completed for that project (Parametrix, 2011). At this time, it is assumed the trip generation for a similar project would be similar to that of the bulk potash handling facility.

4.3.2.3 Estimated Future Level of Service

Tables 4.3-4 and 4.3-5 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 4.3-4. 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 4.3-5. 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 4.3-6 shows the estimated trip generation for the proposed industrial use.

Table 4.3-6. 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	176 Employees	532	77	64	13	74	16	58

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 4.3-7 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 4.3-7. 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	0.11	LOS "D"	Yes
	PM	A	0.15		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	0.72	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

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 4.3-8 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 4.3-8. 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	0.11	LOS "D"	Yes
	PM	A	0.15		Yes
Gateway Ave/Lower River Rd (SR 501)	AM	A	0.08	LOS "D"	Yes
	PM	B	0.24		Yes
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	AM	C	0.69	LOS "D"	Yes
	PM	B	0.42		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.1. 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 4.3-9, 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 4.3-9. 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
	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

Corridor	Corridor Limits	PM Peak Hour Trips to Corridor
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 approximately 1-2 train arrivals per day and 331-661 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.

Most trains will arrive from the east on the BNSF Pasco to Vancouver line, entering Washington near Spokane. Control of the trains arriving at the Facility will be handed off from BNSF to the Applicant. After unloading is complete, 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 (Kalb Jr., S. 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 has been completed and is expected to reduce delays in rail traffic by as much as 40 percent (see section 4.2). In addition, the City has completed a number of improvements associated with the street and rail system in downtown Vancouver; these changes closed two at-grade rail crossings permanently thus improving the efficiency of train operations in the area. WVFA operations are anticipated to accommodate up to 10 trains per day (resulting in 10 trains inbound and 10 trains outbound on average) on the section of the BNSF rail lines that serve the Port (Edberg, M. 2013).

4.3.3.3 Ship

As described in section 2.3.7.1, the Facility is designed to accommodate ships from 46,000 to 165,000 Deadweight Tonnage[5]. The Facility will also be able to accommodate articulated tug barges (ATBs) of up to 27,500 DWT. ATBs are expected to only be used during the initial start-up of the Facility before sufficient Area 300 tankage is available to stage a full load for a Handymax-size vessel. On a regular basis, once the Facility is fully operational and storage tanks have been constructed as proposed, ATBs will not likely be used, and an estimated 365 vessel trips per year occur, primarily of the Veteran class (i.e., 45 MDWT) size.

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 total number of inbound vessels on the Columbia River (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. In addition, Table 4.3-10 summarizes historical vessel calls (each call includes 2 transits) to the Port from 2000 to 2012.

[5] Deadweight Tonnage represents the number of metric tons (1 metric ton equaling 2,240 pounds) that a vessel can transport of cargo, stores, and bunker fuel.

At maximum capacity, the Facility could increase this number by 365 vessels per year, a lower volume than the recent peak year of 2000 for overall river traffic; no impacts to river traffic are anticipated. For vessel traffic, the increase in vessels associated with the Facility are within the historic range of vessel traffic on the Columbia River and are part of the typical fluctuation in vessel traffic on the river (see for example Appendix P.2). Both the Applicant's Preliminary Draft Environmental Statement (DEIS) and EFSEC's DEIS quantified the vessel calls anticipated at the Facility in the context of existing vessel traffic on the Columbia River (BergerABAM 2014, EFSEC, 2015). See also Appendix C to Appendix P.3. All of these analyses also attempted to quantify future levels of vessel calls based on proposals pending at the time which had the potential to increase vessel traffic. However vessel traffic fluctuates based on market conditions (Flint 2016). For example container service at the Port of Portland has been entirely discontinued as of May 2016 (Phillips 2016). Since January 2016 several additional proposals have also been cancelled, for example Oregon LNG and Haven Energy (House 2016, Luck et al 2016).

In the context of this historical transit data, current and historical practices to handle vessel traffic in the Lower Columbia River reach will continue to be sufficient to manage the additional transits due to Facility operations.

Table 4.3-10. 2000-2012 Summary of Vessel Calls at the Port of Vancouver

VESSELS CALLS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
VANC LANDING/TERMINAL 1	2	1		3	0	0	0						
TERMINALS 2, 3, & 4	159	227	183										
BERTH 1				24	14	29	26	26	19	13	5	2	
BERTH 2				26	36	39	29	29	26	23	16	24	19
BERTH 3				1	4	14	23	23	25	25	39	83	33
BERTH 4				5	6	48	12	15	22	11	11	2	1
BERTH 5	43	76	153	152	151	122	126	111	102	91	96	79	73
BERTH 7				29	33	44	52	53	52	37	38	41	42
BERTH 8				40	48	40	47	44	47	30	28	27	32
BERTH 9				9	18	27	39	43	17	29	14	31	14
BERTH 10				25	38	66	42	68	61	37	42	54	64
BERTH 13				4	8	14	20	33	15	1	1	2	1
BERTH 14				10	8	2							0
ELEVATOR	148	171	146	122	138	82	110	123	117	107	115	111	72
TOTAL VESSEL CALLS	352	475	482	450	502	527	526	568	503	404	405	456	351

Source: Port of Vancouver, 2013

4.3.3.4 Parking

The project will provide parking for employees, visitors, deliveries, and maintenance for all project elements as indicated in section 2.3. 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 149 construction workers could be working at a single time in the various areas that are part of the project site are expected to be on the site on a typical workday (i.e., half of the 298 estimated total workers). In addition, approximately 172 daily round trip truck deliveries are estimated expected to be made over during the peak construction period. Using these metrics and conservative assumptions for construction staging schedule, peak construction activities are estimated to result in 642 daily trips (321 in, 321 out), 181 weekday a.m. peak hour trips (165 in, 16 out), and 181 weekday p.m. peak hour trips (16 in, 165 out). Almost all construction worker traffic is expected to use NW Old Lower River Road from SR 501 to travel to and from the administration and office support buildings in the northwest corner of Area 200. Truck deliveries to all Facility areas will occur from several intersecting roads along SR 501, including NW Old Lower River Road, NW Gateway Avenue, and the two private access roads fronting Parcel 1A.

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 4.3-11 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 4.3-11. Full Facility Construction Traffic Conditions Summary (Scenario 1)

Intersection	Peak Hour	2014 Traffic Conditions				Standard
		Without Project		With Project		
		LOS	V/C	LOS	V/C	
Old Lower River Rd/NW Lower River Road (SR 501)	AM	B	0.09	B	0.10	LOS D
	PM	B	0.31	B	0.32	
NW Gateway Ave/NW Lower River Road (SR 501)	AM	A	0.06	A	0.06	LOS D
	PM	B	0.09	B	0.40	
	AM	B	0.65	B	0.72	LOS D

Intersection	Peak Hour	2014 Traffic Conditions				Standard
		Without Project		With Project		
		LOS	V/C	LOS	V/C	
Fourth Plain Blvd/Mill Plain Blvd (SR 501)	PM	B	0.32	B	0.39	
Old Lower River Road/Old Alcoa Facility Access Road	AM	C	NA	C	NA	LOS E and V/C ≤ 0.95
	PM	B	NA	B	NA	

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 Area 600 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 a project at the formerly proposed BHP Billiton project site and the Facility occur concurrently (Edberg, M. 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 Figure 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 JWC 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.1. Impacts to the circulation of goods have been addressed through the analysis of impacts to road, rail, and vessel traffic systems, also addressed above.

Completion of the WVFA Gateway Avenue Grade Separation ("Gateway overpass") in 2013 addressed 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 allows 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 JWC.

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).

The Facility will only receive crude oil by rail; crude oil will not be delivered to the Facility by truck. Small amounts of hazardous materials (greases, cleaners, diesel fuel for fire pumps, etc.), necessary for use during construction and operation, will be received by truck. These materials will be shipped by others in compliance with state and federal requirements for the safe transport of hazardous materials. As identified in sections 4.1.3.2 and 4.1.3.3, any wastes produced at the Facility that classify as hazardous will be collected, handled, stored and disposed of in accordance with applicable federal, state, and local regulations, including regulations relating to its transportation on surface roads.

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.

Construction

The Applicant has prepared a preliminary Construction Transportation Management Plan (Appendix J.2). The Applicant will prepare a final version of this plan based on final construction design drawings and anticipated construction schedule. The Applicant will coordinate preparation of the final plan with the City, the Port, and WSDOT.

During construction the use of construction-related barges will be coordinated to have barge movements at the berths conducted outside of the Columbia River navigation channel.

Operation

- 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.
- Based on a review of existing turn movement patterns, existing intersection configuration, and the Manual on Uniform Traffic Control Devices, the Applicant will coordinate 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. A YIELD sign is appropriate given that northbound right-turn drivers have sufficient sight distance to make a decision to enter and merge with the highway traffic stream, and the ability to enter the highway without stopping reduces the time and distance drivers need to fully merge into the through lane, benefiting both side street and highway traffic.
- The Applicant will 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.
- The Applicant will coordinate Facility design activities with the Port and future Terminal 5 tenants to ensure that the location of Facility-related tracks does not interfere with the rail operations of other Terminal 5 users.

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 Facility. These include Clark, Skamania, and Cowlitz counties in Washington, and Multnomah, Clackamas, Columbia, Hood River, 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 Facility (depending on traffic conditions), but these small areas are sparsely populated and workers associated with the Facility 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. The combined population of these two counties is approximately one-quarter that of Clark 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.

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 by County and City in Study Area

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010 Census	2011	2012
Clark County	363,400	372,300	383,300	391,500	403,500	415,000	424,200	431,200	425,363	428,000	431,250
Unincorporated Clark County	175,710	179,825	184,650	188,955	196,090	201,135	206,830	210,415	203,339	204,610	205,885
Incorporated Clark County	187,690	192,475	198,650	202,545	207,410	213,865	217,370	220,785	222,024	223,390	225,365
Battle Ground	11,110	12,560	14,220	14,960	15,810	16,240	16,710	17,150	17,571	17,780	17,920

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010 Census	2011	2012
Camas	13,540	14,200	15,360	15,460	15,880	16,280	16,700	16,950	19,355	19,620	20,020
La Center	1,805	1,855	1,990	2,095	2,315	2,440	2,510	2,545	2,800	2,835	2,985
Ridgefield	2,145	2,185	2,195	2,630	3,225	3,680	4,015	4,215	4,763	4,975	5,210
Vancouver	148,800	150,700	152,900	154,800	156,600	160,800	162,400	164,500	161,791	162,300	163,200
Washougal	9,100	9,775	10,770	11,350	12,270	12,980	13,480	13,870	14,095	14,210	14,340
Woodland (part)	85	85	80	90	90	75	85	85	83	85	85
Yacolt	1,105	1,115	1,135	1,160	1,220	1,370	1,470	1,470	1,566	1,585	1,605
Cowlitz County	94,400	94,900	95,300	95,900	96,800	97,800	99,000	99,600	102,410	102,700	103,050
Unincorporated Cowlitz County	39,485	39,745	40,000	40,290	40,590	41,125	41,550	41,990	44,085	44,225	44,180
Incorporated Cowlitz County	54,915	55,155	55,300	55,610	56,210	56,675	57,450	57,610	58,325	58,475	58,870
Castle Rock	2,120	2,140	2,150	2,140	2,135	2,135	2,145	2,145	1,982	1,995	2,135
Kalama	1,870	1,935	1,950	1,980	2,025	2,105	2,475	2,505	2,344	2,365	2,390
Kelso	11,770	11,830	11,800	11,820	11,840	11,840	11,900	11,840	11,925	11,920	11,930
Longview	35,310	35,290	35,340	35,430	35,570	35,710	35,880	36,010	36,648	36,730	36,910
Woodland (part)	3,845	3,960	4,060	4,240	4,640	4,885	5,050	5,110	5,426	5,465	5,505
Skamania County	9,900	9,900	10,100	10,300	10,600	10,700	10,700	10,800	11,066	11,150	11,275
Unincorporated Skamania County	8,063	8,075	8,205	8,299	8,457	8,448	8,383	8,465	8,645	8,685	8,755
Incorporated Skamania County	1,837	1,825	1,895	2,001	2,143	2,252	2,317	2,335	2,421	2,465	2,520
North Bonneville	627	615	685	741	828	882	877	880	956	965	1,000
Stevenson	1,210	1,210	1,210	1,260	1,315	1,370	1,440	1,455	1,465	1,500	1,520
Oregon Cities											
Clackamas County	381,775	379,845	376,660	372,270	367,040	361,300	356,250	353,450	345,150	340,000	338,391
Barlow	140	140	140	140	140	140	140	140	140	140	140
Canby	15,230	15,230	15,165	15,140	14,705	14,385	14,110	13,910	12,790	12,910	12,790
Damascus	9,990	9,985	9,975	9,775	9,670	9,670	0	0	0	0	0
Estacada	2,880	2,865	2,820	2,695	2,580	2,480	2,450	2,440	2,460	2,380	2,371
Gladstone	12,215	12,215	12,215	12,200	12,210	12,170	12,140	11,790	11,450	11,470	11,438
Happy Valley	11,865	11,465	11,455	10,380	9,210	7,275	6,640	6,370	4,930	4,650	4,519
Johnson City	680	680	675	675	675	630	630	630	630	635	634
Lake Oswego (part)*	34,496	34,412	34,255	34,010	34,015	33,740	33,595	33,530	33,270	33,115	32,989
Milwaukie	20,930	20,920	20,915	20,920	20,835	20,655	20,590	20,580	20,550	20,540	20,490
Molalla	7,935	7,800	7,590	7,195	6,830	6,395	5,930	5,800	5,690	5,710	5,647
Oregon City	30,995	30,710	30,405	30,060	29,540	28,965	28,370	28,100	26,680	26,200	25,754
Portland (part)*	822	820	804	793	785	785	780	770	760	750	747
Rivergrove (part)*	315	315	315	315	315	315	310	290	290	290	287

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010 Census	2011	2012
Sandy	8,420	8,205	8,005	7,595	7,070	6,680	6,360	6,200	5,380	5,425	5,385
Tualatin (part)*	3,061	3,065	3,065	3,065	3,065	3,065	2,895	2,820	2,725	2,695	2,664
West Linn	24,455	24,400	24,400	24,180	24,180	24,075	23,970	23,820	23,090	22,440	22,261
Wilsonville (part)*	16,433	16,365	16,285	15,750	15,230	14,855	14,595	14,225	14,165	14,360	13,987
Unincorporated	180,912	180,253	178,176	177,382	175,985	175,020	182,745	182,035	180,150	176,290	176,288
Columbia County	44,600	45,000	45,650	46,220	46,965	47,565	48,095	48,410	49,351	49,625	49,680
Clatskanie	1,610	1,650	1,650	1,660	1,675	1,710	1,740	1,735	1,737	1,740	1,740
Columbia City	1,650	1,720	1,760	1,785	1,890	1,955	1,975	1,990	1,946	1,950	1,950
Prescott	60	60	60	60	60	60	60	60	55	55	55
Rainier	1,690	1,750	1,750	1,760	1,705	1,775	1,810	1,825	1,895	1,895	1,895
St. Helens	10,780	11,250	11,370	11,795	11,940	12,075	12,325	12,380	12,883	12,890	12,920
Scappoose	5,260	5,480	5,590	5,700	5,840	6,090	6,580	6,605	6,592	6,665	6,685
Vernonia	2,260	2,260	2,260	2,275	2,340	2,365	2,365	2,370	2,151	2,110	2,080
Unincorporated	21,290	20,830	21,210	21,185	21,515	21,535	21,240	21,445	22,092	22,320	22,355
Hood River County	20,450	20,500	21,050	21,180	21,335	21,470	21,625	21,725	22,346	22,625	22,875
Cascade Locks	1,140	1,140	1,150	1,155	1,155	1,075	1,050	1,055	1,144	1,165	1,190
Hood River	6,210	6,230	6,230	6,450	6,580	6,710	6,850	6,925	7,167	7,320	7,375
Unincorporated	13,100	13,130	13,670	13,575	13,600	13,685	13,725	13,745	14,035	14,140	14,310
Marion County	291,000	295,900	298,450	302,135	306,665	311,070	314,865	318,170	315,335	318,150	320,495
Aumsville	2,980	3,050	3,080	3,130	3,205	3,300	3,535	3,560	3,584	3,680	3,700
Aurora	660	660	660	785	920	955	970	980	918	920	930
Detroit	250	250	250	255	260	265	265	275	202	205	205
Donald	630	640	660	750	895	995	1,025	1,030	979	980	980
Gates (part)*	435	445	445	450	455	460	455	455	431	433	442
Gervais	2,070	2,110	2,130	2,240	2,250	2,250	2,260	2,260	2,464	2,520	2,520
Hubbard	2,560	2,700	2,750	2,855	2,960	3,095	3,125	3,140	3,173	3,180	3,185
Idanha (part)*	145	145	145	145	145	145	145	145	77	78	78
Jefferson	2,470	2,480	2,490	2,515	2,590	2,590	2,655	2,655	3,098	3,135	3,140
Keizer	33,100	34,010	34,380	34,735	34,880	35,435	36,150	36,220	36,478	36,715	36,735
Mill City (part)*	295	310	310	315	325	328	329	330	324	326	327
Mt. Angel	3,660	3,700	3,600	3,630	3,665	3,755	3,785	3,790	3,286	3,285	3,285
St. Paul	380	390	400	415	420	410	415	415	421	420	420
Salem (part)*	122,290	123,410	123,890	126,525	127,720	129,830	132,033	133,477	130,398	131,306	131,989
Scotts Mills	300	300	300	300	300	300	300	300	357	360	365
Silverton	7,680	7,980	8,060	8,230	8,915	9,205	9,540	9,585	9,222	9,265	9,290
Stayton	7,200	7,300	7,360	7,505	7,700	7,765	7,815	7,820	7,644	7,660	7,660

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010 Census	2011	2012
Sublimity	2,120	2,160	2,160	2,225	2,225	2,255	2,285	2,255	2,681	2,680	2,680
Turner	1,400	1,480	1,480	1,570	1,645	1,690	1,730	1,750	1,854	1,860	1,865
Woodburn	20,860	21,560	21,790	22,110	22,615	22,875	23,355	23,350	24,080	24,090	24,090
Unincorporated	79,515	80,820	82,110	81,450	82,575	83,168	82,693	84,378	83,664	85,053	86,609
Multnomah County	670,250	677,850	685,950	692,825	701,545	710,025	717,880	724,680	735,334	741,925	748,445
Fairview	8,400	8,590	9,250	9,425	9,585	9,695	9,735	9,740	8,920	8,920	8,920
Gresham	92,620	93,660	94,250	95,900	97,745	99,225	100,655	101,015	105,594	105,795	105,970
Lake Oswego (part)*	2,305	2,310	2,315	2,315	2,315	2,315	2,315	2,323	2,544	2,551	2,554
Maywood Park	750	750	750	750	750	750	750	750	752	750	750
Portland (part)*	536,010	542,940	548,340	554,130	560,405	566,072	573,592	579,745	581,485	583,546	585,558
Troutdale	14,240	14,300	14,380	14,880	15,110	15,430	15,465	15,535	15,962	16,000	16,005
Wood Village	2,850	2,870	2,870	2,880	2,965	3,100	3,100	3,130	3,878	3,885	3,890
Unincorporated	13,075	12,430	13,795	12,545	12,670	13,438	12,268	12,442	16,199	20,478	24,798
Po k County	63,450	64,000	64,950	65,670	66,670	67,505	68,235	68,785	75,403	75,965	76,625
Dallas	12,850	13,270	13,500	14,040	14,585	15,065	15,360	15,445	14,583	14,620	14,670
Falls City	960	960	960	980	965	965	965	965	947	945	945
Independence	6,580	6,850	7,170	7,515	7,715	7,905	8,030	8,240	8,590	8,600	8,585
Monmouth	8,110	8,080	8,590	8,795	9,125	9,335	9,565	9,630	9,534	9,720	9,755
Salem (part)*	18,860	19,530	19,810	20,725	21,585	22,460	22,477	23,478	24,239	24,404	24,466
Willamina (part)*	710	710	710	710	720	720	720	720	845	845	845
Unincorporated	16,090	15,310	14,920	12,905	11,975	11,055	11,118	10,307	16,665	16,831	17,359
Washington County	463,050	472,600	480,200	489,785	500,585	511,075	519,925	527,140	529,710	536,370	542,845
Banks	1,420	1,430	1,430	1,430	1,435	1,435	1,435	1,435	1,777	1,775	1,775
Beaverton	77,990	79,010	79,350	83,095	84,270	85,560	86,205	86,860	89,803	90,835	91,205
Cornelius	9,930	10,150	10,150	10,585	10,785	10,895	10,955	10,985	11,869	11,915	11,915
Durham	1,390	1,400	1,400	1,390	1,400	1,395	1,395	1,400	1,351	1,360	1,365
Forest Grove	18,750	19,130	19,200	19,565	20,380	20,775	21,465	21,500	21,083	21,275	21,460
Gaston	610	620	620	630	630	650	660	665	637	640	640
Hillsboro	74,840	79,340	79,940	82,025	84,445	88,300	89,285	90,380	91,611	92,350	92,550
King City	2,110	2,100	2,100	2,130	2,350	2,700	2,775	2,785	3,111	3,135	3,225
Lake Oswego (part)*	17	20	20	20	20	20	20	20	9	9	9
North Plains	1,660	1,640	1,650	1,700	1,755	1,890	1,905	1,910	1,947	1,990	1,990
Portland (part)*	1,411	1,430	1,440	1,455	1,500	1,515	1,535	1,565	1,547	1,552	1,558
Rivergrove (part)*	30	30	30	35	35	35	35	35	32	31	34
Sherwood	13,680	14,050	14,190	14,940	16,115	16,365	16,420	16,640	18,194	18,255	18,265
Tigard	44,070	45,130	44,650	45,500	46,300	46,715	47,150	47,460	48,035	48,415	48,695

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010 Census	2011	2012
Tualatin (part)*	21,360	21,970	22,045	22,400	22,585	22,960	22,975	23,065	23,192	23,251	23,215
Wilsonville (part)*	5	1,655	1,655	1,655	1,655	1,655	1,655	1,655	2,138	2,144	2,248
Unincorporated	193,778	193,495	200,330	201,230	204,925	208,210	214,055	218,780	213,374	217,437	222,696
Yamhill County	87,500	88,150	89,200	90,310	91,675	93,085	94,325	95,250	99,193	99,850	100,550
Amity	1,480	1,480	1,480	1,480	1,480	1,480	1,480	1,670	1,614	1,615	1,610
Carlton	1,520	1,550	1,560	1,585	1,670	1,755	1,755	1,790	2,007	2,035	2,035
Dayton	2,210	2,230	2,230	2,280	2,305	2,495	2,500	2,495	2,534	2,530	2,535
Dundee	2,770	2,860	2,900	2,965	3,010	3,040	3,050	3,060	3,162	3,175	3,175
Lafayette	2,820	3,010	3,060	3,105	3,440	3,730	3,925	3,925	3,742	3,740	3,735
McMinnville	28,200	28,890	29,200	30,020	30,950	31,665	32,400	32,760	32,187	32,270	32,435
Newberg	18,750	19,530	19,910	20,565	20,570	21,675	22,645	23,150	22,068	22,230	22,300
Sheridan	5,580	5,620	5,620	5,785	5,785	5,865	6,020	6,020	6,127	6,125	6,180
Willamina (part)*	1,130	1,130	1,140	1,150	1,165	1,165	1,165	1,165	1,180	1,180	1,180
Yamhill	820	820	820	820	820	820	855	860	1,024	1,020	1,020
Unincorporated	22,220	21,030	21,280	20,555	20,480	19,395	18,530	18,355	23,548	23,930	24,345

Source: Washington Office of Financial Management, Portland State University Population Research Center

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

	Total		Under 18 Years		18 Years to 61 Years		62 Years and Older	
County Name	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

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
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 the 2007-2011 American Community Survey, the ethnic mix of the study area population is primarily white, with white residents accounting for 86.6 percent of the total. Residents of Asian ethnicity accounted for 5.1 percent of the population, African-American accounted for 2.6 percent, American Indian and Alaska Natives accounted for 1.3 percent, Hawaiian and other Pacific Islanders accounted for 0.5 percent, and two or more races accounted for 3.9 percent of the population. Residents of Hispanic origin (of all races) accounted for 12.8 percent of the study area population.

In Clark County, non-white residents account for a smaller share of the population, although the shares of Native Hawaiian/Pacific Islander and two or more races are slightly higher than in the study area as a whole. Hispanic residents (of all races) account for 7.5 percent of Clark County's population.

Table 4.4-4. Race Composition by County and City in Study Area

County / City	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								
Clark County	88.6%	2.0%	0.7%	4.0%	0.6%	4.2%	100.0%	7.5%
Battle Ground	92.7%	1.9%	0.3%	3.3%	0.3%	1.6%	100.0%	6.5%
Camas	89.5%	1.3%	0.3%	6.0%	0.1%	2.8%	100.0%	3.9%
La Center	90.0%	0.0%	6.7%	0.0%	1.3%	2.0%	100.0%	9.2%
Ridgefield	92.8%	0.0%	0.2%	2.6%	0.0%	4.4%	100.0%	4.1%
Vancouver	84.9%	3.3%	1.0%	5.1%	0.6%	5.1%	100.0%	9.9%
Washougal	93.6%	0.5%	0.5%	2.8%	0.4%	2.3%	100.0%	5.0%
Yacolt	97.8%	0.0%	0.3%	0.0%	0.0%	1.9%	100.0%	4.0%
Cowlitz County	92.4%	0.5%	1.6%	1.4%	0.2%	4.0%	100.0%	7.7%
Castle Rock	86.2%	1.5%	2.8%	1.4%	0.0%	8.0%	100.0%	3.5%
Kalama	94.4%	0.3%	0.1%	2.3%	0.4%	2.5%	100.0%	3.2%
Kelso	91.9%	0.7%	1.4%	1.4%	0.1%	4.5%	100.0%	11.8%
Longview	90.4%	0.7%	1.4%	2.0%	0.0%	5.5%	100.0%	9.6%
Woodland (part)	94.9%	0.2%	0.0%	1.4%	1.0%	2.6%	100.0%	13.4%

County / City	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)
Skamania County	94.7%	0.1%	2.3%	1.0%	0.3%	1.6%	100.0%	5.5%
North Bonneville	94.0%	0.0%	0.0%	1.2%	2.5%	2.3%	100.0%	5.9%
Stevenson	93.2%	0.4%	1.1%	1.9%	0.0%	3.4%	100.0%	12.4%
Oregon								
Clackamas County	91.3%	0.9%	0.5%	3.5%	0.2%	3.6%	100.0%	7.6%
Barlow	91.6%	0.0%	0.0%	0.0%	8.4%	0.0%	100.0%	29.5%
Canby	93.0%	0.1%	0.3%	2.4%	0.2%	4.0%	100.0%	24.7%
Damascus	91.7%	0.4%	0.5%	5.1%	0.0%	2.3%	100.0%	3.8%
Estacada	89.7%	1.9%	0.7%	1.6%	0.0%	6.0%	100.0%	9.6%
Gladstone	91.3%	1.5%	1.5%	2.6%	0.0%	3.1%	100.0%	9.8%
Happy Valley	79.0%	2.0%	0.3%	13.2%	0.0%	5.5%	100.0%	3.7%
Johnson City	93.3%	0.4%	0.0%	4.2%	0.0%	2.0%	100.0%	35.4%
Milwaukie	89.9%	2.6%	0.3%	2.8%	0.6%	3.8%	100.0%	3.7%
Molalla	94.3%	3.0%	0.9%	0.0%	0.0%	1.8%	100.0%	11.8%
Oregon City	91.5%	0.7%	0.7%	2.4%	0.1%	4.6%	100.0%	6.5%
Rivergrove (part)*	92.8%	0.0%	0.0%	6.0%	0.0%	1.2%	100.0%	0.0%
Sandy	94.6%	0.1%	0.0%	1.6%	0.3%	3.4%	100.0%	5.8%
West Linn	92.7%	0.4%	0.1%	3.6%	0.2%	3.0%	100.0%	3.7%
Wilsonville (part)*	90.5%	1.1%	1.1%	2.5%	0.6%	4.1%	100.0%	12.1%
Columbia County	94.3%	0.3%	1.7%	1.0%	0.1%	2.6%	100.0%	4.1%
Clatskanie	95.9%	0.0%	3.3%	0.0%	0.0%	0.9%	100.0%	4.3%
Columbia City	97.3%	0.3%	0.1%	1.4%	0.0%	0.9%	100.0%	1.9%
Prescott	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	15.6%
Rainier	88.8%	1.8%	5.7%	0.0%	0.0%	3.7%	100.0%	1.9%
St. Helens	92.7%	0.8%	2.2%	0.4%	0.1%	3.9%	100.0%	7.1%
Scappoose	90.5%	0.0%	3.1%	2.8%	0.0%	3.6%	100.0%	5.9%
Vernonia	98.8%	0.0%	0.0%	0.0%	0.2%	0.9%	100.0%	3.0%
Hood River County	93.5%	0.6%	2.1%	1.4%	0.7%	1.8%	100.0%	29.8%
Cascade Locks	86.8%	6.0%	3.5%	0.4%	0.0%	3.2%	100.0%	3.4%
Hood River	93.5%	0.6%	2.1%	1.4%	0.7%	1.8%	100.0%	29.8%
Marion County	89.9%	1.1%	2.2%	2.0%	0.6%	4.2%	100.0%	26.4%
Aumsville	93.4%	0.0%	2.0%	0.2%	0.0%	4.4%	100.0%	12.9%
Aurora	93.4%	3.5%	0.9%	0.0%	0.0%	2.3%	100.0%	6.9%
Detroit	96.1%	0.0%	3.9%	0.0%	0.0%	0.0%	100.0%	16.3%
Donald	95.1%	0.0%	0.0%	0.0%	0.0%	4.9%	100.0%	14.3%

County / City	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)
Gates (part)*	93.1%	0.0%	3.1%	0.3%	2.7%	0.8%	100.0%	9.3%
Gervais	92.4%	0.0%	6.0%	0.3%	0.0%	1.3%	100.0%	99.6%
Hubbard	88.9%	0.0%	5.3%	0.2%	0.0%	5.6%	100.0%	70.2%
Idanha (part)*	91.4%	0.0%	0.0%	0.0%	0.0%	8.6%	100.0%	7.7%
Jefferson	88.3%	0.0%	6.2%	1.0%	0.0%	4.5%	100.0%	14.3%
Keizer	91.5%	1.0%	1.3%	1.6%	0.3%	4.4%	100.0%	20.2%
Mill City (part)*	89.0%	0.0%	7.8%	0.7%	0.5%	1.9%	100.0%	16.2%
Mt. Angel	94.5%	0.4%	1.1%	0.5%	0.0%	3.4%	100.0%	31.2%
St. Paul	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	15.2%
Salem (part)*	88.9%	1.4%	1.9%	2.8%	0.9%	4.1%	100.0%	21.1%
Scotts Mills	96.4%	0.0%	0.0%	0.0%	0.0%	3.6%	100.0%	13.2%
Silverton	95.5%	0.1%	0.9%	1.1%	0.0%	2.4%	100.0%	10.8%
Stayton	93.8%	0.7%	0.9%	0.7%	0.0%	3.8%	100.0%	18.4%
Sublimity	98.3%	0.0%	0.3%	0.3%	0.0%	1.1%	100.0%	2.4%
Turner	94.0%	0.0%	1.3%	0.2%	2.0%	2.5%	100.0%	7.2%
Woodburn	88.4%	0.7%	4.8%	1.8%	0.0%	4.3%	100.0%	83.3%
Multnomah County	81.3%	5.9%	1.2%	6.8%	0.6%	4.2%	100.0%	11.1%
Fairview	77.1%	6.9%	1.3%	6.9%	1.7%	6.0%	100.0%	14.7%
Gresham	85.3%	3.4%	2.4%	4.8%	1.1%	3.0%	100.0%	20.0%
Lake Oswego (part)*	90.6%	0.6%	0.1%	6.3%	0.1%	2.3%	100.0%	4.0%
Maywood Park	83.0%	7.2%	0.0%	8.0%	0.5%	1.3%	100.0%	2.8%
Portland (part)*	80.0%	6.6%	1.1%	7.4%	0.5%	4.5%	100.0%	9.5%
Troutdale	88.2%	3.6%	0.2%	5.2%	0.0%	2.7%	100.0%	10.7%
Wood Village	86.5%	0.6%	0.5%	4.0%	1.2%	7.3%	100.0%	27.6%
Polk County	91.2%	0.5%	2.2%	2.2%	0.3%	3.4%	100.0%	12.3%
Dallas	93.3%	0.2%	1.6%	1.1%	0.2%	3.6%	100.0%	4.2%
Falls City	95.1%	0.3%	1.3%	0.0%	0.0%	3.4%	100.0%	0.8%
Independence	90.1%	0.4%	2.2%	2.4%	0.7%	4.1%	100.0%	42.6%
Monmouth	90.2%	0.9%	0.8%	2.1%	1.6%	4.3%	100.0%	13.4%
Washington County	82.7%	1.9%	1.7%	9.3%	0.5%	3.9%	100.0%	16.5%
Banks	94.8%	0.0%	1.6%	0.3%	0.0%	3.3%	100.0%	6.1%
Beaverton	79.1%	2.1%	1.6%	13.3%	0.4%	3.6%	100.0%	17.2%
Cornelius	84.4%	0.6%	8.7%	1.6%	0.0%	4.6%	100.0%	63.1%
Durham	92.9%	2.5%	0.9%	0.8%	0.0%	2.7%	100.0%	8.8%
Forest Grove	91.4%	0.0%	2.9%	1.2%	0.2%	4.2%	100.0%	29.6%
Gaston	97.7%	0.0%	0.0%	0.0%	0.0%	2.3%	100.0%	1.0%

County / City	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)
Hillsboro	80.2%	2.3%	3.1%	8.9%	1.0%	4.6%	100.0%	26.6%
King City	95.7%	0.0%	0.0%	4.2%	0.0%	0.0%	100.0%	0.8%
North Plains	89.5%	0.0%	5.6%	1.5%	0.0%	3.4%	100.0%	8.9%
Sherwood	89.9%	1.2%	0.3%	4.8%	1.1%	2.7%	100.0%	7.9%
Tigard	87.8%	1.4%	0.4%	6.1%	0.9%	3.4%	100.0%	13.1%
Tualatin (part)*	90.1%	2.3%	0.8%	3.3%	0.4%	3.2%	100.0%	18.8%
Yamhill County	92.2%	0.9%	1.6%	1.3%	0.2%	3.9%	100.0%	15.5%
Amity	91.6%	0.7%	0.1%	0.3%	0.0%	7.3%	100.0%	9.8%
Carlton	94.1%	0.2%	0.5%	0.8%	0.0%	4.4%	100.0%	3.4%
Dayton	88.3%	2.7%	0.7%	0.6%	0.0%	7.8%	100.0%	51.7%
Dundee	93.7%	0.0%	1.8%	1.8%	0.0%	2.6%	100.0%	5.2%
Lafayette	95.4%	0.0%	0.4%	0.0%	0.0%	4.2%	100.0%	26.6%
McMinnville	91.2%	1.0%	1.8%	1.9%	0.5%	3.6%	100.0%	24.1%
Newberg	91.9%	0.7%	1.1%	1.4%	0.0%	4.8%	100.0%	12.7%
Sheridan	83.1%	5.3%	4.7%	0.9%	0.4%	5.7%	100.0%	15.7%
Willamina (part)*	84.4%	0.0%	5.8%	0.0%	0.3%	9.5%	100.0%	3.7%
Yamhill	92.2%	0.9%	1.6%	1.3%	0.2%	3.9%	100.0%	15.5%
Study Area	86.6%	2.6%	1.3%	5.1%	0.5%	3.9%	100.0%	12.8%

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4.4.1.2 Income and Poverty

According to data from the U.S. Census Bureau, per capita income averages $29,447 across the entire study area, but varies substantially by county. In three counties (Cowlitz, Marion, and Polk) per capital income is less than $25,000 per year. In contrast per capita income in Yamhill County is $43,543, and in Hood River County it is $50,761. In Clark County, the per capita income of $27,916 is lower than the average for the study area.

Approximately one out of eight residents in the study area has income that puts them below the poverty level. For the study area, the share of residents below the poverty level is 13.1 percent. As with per capita income, the poverty rate varies substantially from county to county. The counties in the study area with the highest poverty rates are: Cowlitz County (17.3 percent), Marion County (16.8 percent), and Multnomah County (16.2 percent). The counties with the lowest poverty rates are: Hood River County (9.3 percent), and Clackamas County (9.4 percent). Clark County has a poverty rate that is lower than the study area average, with a rate of 11.6 percent.

Table 4.4-5. Income and Poverty by City and County

Areas	Median household income (dollars)	Mean household income (dollars)	Median family income (dollars)	Mean family income (dollars)	Per capita income (dollars)	Population below poverty level	Share below poverty level	Population
Clark County	59,051	73,656	68,447	82,447	27,916	48,751	11.6%	421,154
Battle Ground	59,723	66,941	63,324	71,292	21,073	1,859	11.0%	16,925
Camas	77,967	102,549	86,386	112,340	34,808	1,358	7.2%	18,845
La Center	38,984	46,813	71,250	66,455	24,082	127	13.6%	935
Ridgefield	82,528	86,744	85,221	88,850	27,849	677	14.9%	4,551
Vancouver	50,387	61,863	57,867	69,842	25,821	24,668	15.3%	161,606
Washougal	63,537	80,739	74,184	89,996	30,613	1,751	12.8%	13,674
Yacolt	59,271	58,933	58,958	58,784	18,791	110	7.5%	1,459
Cowlitz County	46,461	59,111	57,133	68,294	23,575	17,620	17.3%	101,901
Castle Rock	33,424	43,648	43,036	48,903	19,286	410	20.2%	2,025
Kalama	39,856	51,495	48,359	55,249	21,497	194	8.1%	2,385
Kelso	34,391	43,112	35,850	45,995	18,411	3,231	27.0%	11,974
Longview	40,226	54,599	50,219	66,431	23,159	8,007	21.8%	36,695
Woodland	58,413	62,916	60,684	66,997	20,288	891	16.7%	5,347
Skamania County	52,884	65,770	68,229	77,538	26,624	1,202	10.9%	10,979
North Bonneville	39,958	57,422	44,545	62,947	21,137	69	7.1%	966
Stevenson	48,021	57,927	68,750	72,109	24,620	285	17.4%	1,640
Oregon Cities								
Clackamas County	63,790	82,892	75,850	95,110	32,382	35,312	9.4%	373,832
Barlow	55,972	61,051	56,528	60,314	16,671	-	0.0%	227
Canby	59,873	71,823	64,804	80,995	24,774	1,539	9.9%	15,613
Damascus	83,772	96,206	87,978	101,523	32,969	524	5.0%	10,412
Estacada	37,560	46,287	57,692	59,155	19,513	588	22.0%	2,676
Gladstone	48,876	63,910	58,393	65,568	26,121	2,063	17.9%	11,542
Happy Valley	100,647	122,923	107,069	128,136	36,164	394	3.0%	13,170
Johnson City	35,313	39,137	45,000	48,505	16,787	179	25.8%	693
Milwaukie	52,625	61,152	64,099	72,392	26,844	2,578	12.6%	20,414
Molalla	50,942	56,701	52,741	56,225	21,134	999	12.7%	7,887
Oregon City	57,618	66,948	66,848	74,409	25,905	3,944	12.5%	31,430
Rivergrove	106,250	130,883	125,833	158,171	58,862	4	1.6%	249
Sandy	56,182	60,899	60,898	65,375	25,320	832	9.1%	9,188
West Linn	92,342	110,869	111,534	129,662	43,350	1,007	4.0%	24,917
Wilsonville	55,316	73,965	76,597	92,602	30,187	2,011	10.7%	18,845
Columbia County	56,270	64,488	63,415	72,351	25,440	5,783	11.7%	49,247

Areas	Median household income (dollars)	Mean household income (dollars)	Median family income (dollars)	Mean family income (dollars)	Per capita income (dollars)	Population below poverty level	Share below poverty level	Population
Clatskanie	40,000	51,932	55,852	67,882	22,279	311	17.6%	1,765
Columbia City	63,359	68,427	68,654	74,573	27,263	130	6.7%	1,947
Prescott	32,500	31,894	42,500	39,717	16,413	5	15.6%	32
Rainier	58,500	66,194	66,863	71,222	29,610	217	11.3%	1,919
St. Helens	52,923	55,933	58,440	61,650	21,307	1,687	13.3%	12,706
Scappoose	61,094	70,221	71,125	78,240	27,668	711	11.0%	6,492
Vernonia	50,568	59,723	57,292	66,981	23,371	189	8.5%	2,220
Hood River County	107,101	130,360	125,248	152,450	50,761	2,689	9.3%	28,947
Cascade Locks	40,893	45,398	45,250	47,150	18,355	141	14.2%	990
Hood River	107,101	130,360	125,248	152,450	50,761	2,689	9.3%	28,947
Marion County	46,191	59,672	54,618	67,788	22,192	52,506	16.8%	313,020
Aumsville	43,819	54,165	44,383	55,001	17,381	472	13.3%	3,546
Aurora	77,768	83,457	82,059	92,914	32,805	75	9.5%	793
Detroit	40,714	43,969	41,250	47,014	19,469	38	21.3%	178
Donald	54,402	62,944	56,250	65,293	23,539	87	8.6%	1,010
Gates	40,109	46,775	52,813	57,584	20,100	158	25.4%	621
Gervais	41,406	47,616	37,632	42,423	11,835	465	23.9%	1,945
Hubbard	44,730	53,262	46,830	56,038	15,567	483	15.6%	3,105
Idanha	47,500	47,839	51,806	53,392	14,346	21	9.5%	221
Jefferson	40,288	52,125	43,125	56,113	16,747	481	15.9%	3,028
Keizer	50,902	62,225	56,126	66,031	23,857	5,251	14.5%	36,119
Mill City	36,667	47,176	56,458	55,028	17,780	165	10.9%	1,513
Mt. Angel	37,990	47,435	54,063	60,365	19,129	478	14.6%	3,266
St. Paul	60,250	64,544	62,500	69,588	26,945	9	2.8%	319
Salem	44,226	59,100	56,833	70,346	23,162	25,477	16.6%	153,481
Scotts Mills	48,636	52,318	62,625	61,219	17,226	45	13.6%	331
Silverton	50,302	58,765	57,355	69,626	23,599	1,556	17.1%	9,091
Stayton	48,036	67,561	57,630	79,492	25,129	941	12.4%	7,570
Sublimity	62,500	68,098	70,083	81,848	28,130	132	5.0%	2,633
Turner	43,317	51,223	50,991	56,146	18,981	371	16.4%	2,256
Woodburn	42,717	50,909	46,489	56,250	16,864	4,699	19.9%	23,665
Multnomah County	50,726	68,930	64,071	84,189	29,544	117,466	16.2%	724,803
Fairview	51,579	65,936	55,897	70,579	26,779	1,186	13.6%	8,716
Gresham	47,852	57,895	56,844	66,021	21,748	17,440	16.8%	103,637
Lake Oswego	81,669	117,847	108,924	143,808	50,572	2,327	6.3%	36,704
Maywood Park	63,462	72,849	73,750	84,803	30,839	77	9.1%	849

Areas	Median household income (dollars)	Mean household income (dollars)	Median family income (dollars)	Mean family income (dollars)	Per capita income (dollars)	Population below poverty level	Share below poverty level	Population
Portland	50,177	69,269	64,617	86,462	30,631	94,763	16.4%	576,543
Troutdale	62,429	69,681	69,466	75,952	24,861	1,984	12.7%	15,674
Wood Village	47,617	60,412	50,185	57,557	20,898	1,018	26.9%	3,780
Polk County	52,865	64,864	63,907	75,908	24,794	9,250	12.4%	74,734
Dallas	49,209	54,756	55,909	62,516	21,604	1,838	12.7%	14,496
Falls City	41,528	44,054	47,292	47,840	15,203	239	22.3%	1,073
Independence	48,816	57,388	52,500	61,519	18,780	1,625	19.3%	8,405
Monmouth	40,154	49,479	64,911	72,594	17,899	1,843	19.5%	9,430
Washington County	63,814	80,980	77,028	93,375	31,165	53,851	10.3%	524,275
Banks	65,417	72,851	73,043	76,727	22,363	127	6.4%	1,971
Beaverton	55,115	72,534	70,361	86,552	30,225	10,672	12.0%	89,160
Cornelius	48,778	57,816	50,475	58,491	16,473	2,030	17.3%	11,706
Durham	66,563	92,584	107,917	122,172	44,974	111	10.0%	1,105
Forest Grove	49,034	59,408	58,519	68,393	21,118	4,203	20.1%	20,908
Gaston	58,958	74,532	69,583	77,271	31,775	72	10.1%	710
Hillsboro	64,197	74,139	72,206	82,837	27,034	10,520	11.7%	89,946
King City	37,833	49,881	58,438	65,144	31,943	267	8.7%	3,070
North Plains	71,346	74,187	74,107	82,972	31,597	103	5.6%	1,854
Sherwood	79,209	91,683	91,396	100,060	31,375	778	4.4%	17,636
Tigard	62,521	83,000	79,219	95,247	33,749	4,091	8.6%	47,759
Tualatin	60,818	77,744	75,122	85,362	29,987	3,124	12.1%	25,893
Yamhill County	123,304	134,381	139,819	148,112	43,543	12,080	12.1%	99,584
Amity	47,440	52,406	52,500	55,320	18,561	271	17.8%	1,520
Carlton	54,044	57,094	62,900	63,139	20,656	157	8.6%	1,829
Dayton	49,934	52,673	56,726	57,544	16,840	361	14.4%	2,510
Dundee	69,142	83,770	73,438	89,933	31,077	89	2.8%	3,128
Lafayette	53,750	60,925	52,870	63,564	17,510	532	14.6%	3,644
McMinnville	41,782	58,792	55,194	71,435	22,505	5,332	16.8%	31,769
Newberg	53,057	60,706	63,784	68,141	22,254	2,519	11.6%	21,786
Sheridan	46,867	54,843	46,800	57,378	14,556	588	9.8%	6,023
Willamina	37,379	43,806	42,935	49,564	15,916	292	15.6%	1,874
Yamhill	123,304	134,381	139,819	148,112	43,543	12,080	12.1%	99,584
Study Area					$29,447	356,510	13.1%	2,722,476

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As illustrated in Table 4.4-6, 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

County	Housing Units			% Vacancy	
	Total	Occupied	Vacant	Homeowner	Rental
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

City Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011*	2012*
Camas	313	333`	376	391	447	449	463	453	453	473	484
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

Median gross rent varies by county in the study area. In Clark County, median gross rent is $895 per month. Within the study area, median gross rent ranges between $684 per month (in Skamania County) to $1,822 per month (in Yamhill County).

In Clark County, nearly one-third of the 50,000 rental units have gross rent of less than $750 per month, one third have gross rent ranging between $750 and $999 per month, and the remainder rent for $1,000 or more. Clark County has approximately 14,100 housing units that rent for less than $750 per month.

In the study area, approximately 30 percent of rental units have monthly rent of $750 or less, and there are approximately 361,500 of these units. The study area contains a total of nearly 1.2 million rental housing units.

Table 4.4-10. Gross Rent by County

Areas	Less than $200	$200 to $299	$300 to $499	$500 to $749	$750 to $999	$1,000 to $1,499	$1,500 or more	Total	Median (dollars)
Clark County	649	823	1,774	11,488	16,314	14,936	4,183	50,167	$895
Cowlitz County	353	309	1,512	4,946	2,821	2,068	448	12,457	$705
Skamania County	117	28	48	373	191	135	44	936	$684
Clackamas County	506	753	1,327	7,174	15,703	10,402	5,238	41,103	$913
Columbia County	124	179	457	1,428	1,021	820	214	4,243	$739
Hood River County	48	101	505	1,387	515	788	191	3,535	$1,408
Marion County	649	690	3,301	15,847	11,908	7,723	2,497	42,615	$761
Multnomah County	2,707	3,244	5,954	32,205	42,450	31,570	13,250	131,380	$858
Po k County	178	339	876	3,050	2,101	1,800	497	8,841	$749
Washington County	16,442	21,459	55,997	180,116	240,027	253,959	122,108	890,108	$923
Yamhill County	104	207	557	3,071	2,669	2,271	763	9,642	$1,822
Study Area	21,877	28,132	72,308	261,085	335,720	326,472	149,433	1,195,027	

2007-2011 American Community Survey 5-Year Estimates

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 4.4-11. Employment by County in Study Area

Change	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2012	% Change
Washington	2,877,022	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	12.10%
Clark	170,096	170,968	180,700	188,730	192,679	196,119	198,829	188,747	186,527	187,179	189,421	24,123	12.90%
Cowlitz	38,218	38,553	39,051	39,637	39,843	40,581	40,493	38,659	38,590	37,912	38,380	284	0.70%
Skamania	4,293	4,295	4,510	4,624	4,688	4,666	4,687	4,415	4,501	4,461	4,515	292	6.10%
Oregon	1,704,131	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	6.50%
Clackamas	176,583	175,118	177,506	180,656	185,938	187,337	188,717	181,268	178,777	181,905	183,824	9,838	5.20%
Columbia	20,899	20,823	21,102	21,619	22,409	22,380	22,476	21,357	21,526	21,683	21,912	1,143	5.00%
Hood River	11,095	11,155	11,441	11,538	11,922	12,296	12,632	12,815	13,196	13,304	13,487	2,406	19.90%
Marion	136,577	136,976	137,804	138,962	142,018	143,510	145,044	140,510	141,020	140,720	140,106	7,600	5.20%
Multnomah	348,945	342,767	338,901	340,275	349,215	360,495	365,458	351,922	360,613	369,121	373,015	24,841	6.50%
Polk	31,647	31,996	32,680	33,733	35,249	36,560	37,458	36,391	35,548	35,352	35,198	4,660	13.80%
Washington	247,008	245,736	249,121	255,825	266,761	271,610	273,971	263,334	262,950	269,929	272,777	28,109	10.60%
Yamhill	40,511	40,330	40,790	41,581	43,273	44,232	44,778	42,767	43,386	44,010	44,475	4,866	11.10%
Study Area	1,225,872	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	8.10%

Source: Bureau of Labor Statistics

Table 4.4-12. Labor Force by County in Study Area

Change	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Change 2002-2012	% Change
Washington	3,104,698	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	376,765	12.1%
Clark	187,319	189,109	195,202	201,564	204,406	207,853	214,101	217,536	216,991	213,635	211,442	24,123	12.9%
Cowlitz	42,783	42,820	42,663	42,724	42,607	43,327	44,119	44,627	44,376	43,072	43,067	284	0.7%
Skamania	4,768	4,779	4,928	5,002	5,042	5,001	5,126	5,075	5,188	5,103	5,060	292	6.1%
Oregon	1,843,740	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	119,168	6.5%
Clackamas	189,738	189,349	190,199	191,232	195,283	196,328	200,108	201,930	198,863	199,654	199,576	9,838	5.2%
Columbia	23,078	23,233	23,207	23,340	23,771	23,737	24,188	24,586	24,484	24,265	24,221	1,143	5.0%
Hood River	12,091	12,200	12,353	12,321	12,612	12,878	13,346	13,936	14,384	14,438	14,497	2,406	19.9%
Marion	147,299	148,851	149,066	148,651	150,558	151,714	155,295	157,808	158,598	156,976	154,899	7,600	5.2%
Multnomah	379,516	374,435	366,118	362,362	368,171	379,016	388,198	392,741	400,065	404,114	404,357	24,841	6.5%
Polk	33,782	34,348	34,993	35,752	37,090	38,455	39,688	40,136	39,198	38,834	38,442	4,660	13.8%
Washington	265,363	265,300	265,583	269,807	279,060	283,871	289,259	290,455	288,873	292,843	293,472	28,109	10.6%
Yamhill	43,745	43,915	43,969	44,285	45,617	46,566	47,868	48,294	48,538	48,604	48,611	4,866	11.1%
Study Area	1,329,482	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	108,162	8.1%

Source: Bureau of Labor Statistics

Table 4.4-13. 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 4.4-14. 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 4.4-15. 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 4.4-16. Average Annual Payroll per Worker 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)

Construction of the Facility is expected to pay wages higher than the study area average. Because the Facility is located on public property, this analysis assumes that it is subject to the Davis-Bacon act and must pay local prevailing wages. Average hourly wages were based on 2013 Occupational Employment and Wage Estimates for Clark County, for each of the trades expected to be used on the Facility. The analysis also assumes that a share of the jobs in each trade will be filled by apprentices who make lower wages than journeymen, and the wages were adjusted to account for this.

The hourly wage was converted into a fully-loaded hourly rate (including wages and benefits), and then the annual compensation per job was calculated assuming 2,080 hours per year per worker. Because construction of the Facility will last less than one year, and the number of workers from each trade needed will vary through the Facility, the actual amount earned will vary substantially among the individual workers. Overall, a total of 250 workers are expected to be employed during construction, with total compensation of $8,961,986.

When the Facility is in operation, the total compensation earned by workers is likely to be relatively high, when compared with the study area. At start-up in 2016, the Facility is estimated to generate a total of 151 jobs, and this is projected to grow to 295 jobs at full operation in 2036. Total compensation (including wages and benefits) is estimated to be $112,880 at start-up, and to grow to $118,710 in 2036.

The majority of the jobs at start-up will be terminal workers. Based on the 2013 Occupational Employment and Wage Estimates, workers in industry 537121 (Car, Truck, & Ship Loaders) in Washington State earn an average of $64,461 per year. With benefits added in, the total compensation per worker is $96,691 per year.

In addition to the terminal workers, the Facility will directly create the need for various transportation-related jobs, including ships pilots, longshore workers, ship assist tugboats, and railroad crews. The need for railroad transportation will increase as the volume of product handled through the Facility grows, and the number of railroad jobs associated with the Facility is projected to grow from 58 at start-up to 151 at full operating capacity. According to data from the Association of American Railroads, average total compensation for rail workers is $118,790 per year.

Table 4.4-17. Estimated Employment and Compensation from Operations

	Start-up – (2016)			Full Capacity (2036)		
Type of Worker	Number	Compensation	Average Income	Number	Compensation	Average Income
Terminal workers	80	$7,735,320	$96,692	110	$10,636,065	$96,692
Longshore	2	$368,134	$189,077	5	$959,778	$189,077
Pilots - Bar	1	$427,406	$299,998	4	$1,114,307	$299,998
Pilots - River	4	$1,234,020	$302,151	11	$3,217,267	$302,151
Tug ship assist	6	$406,713	$71,369	15	$1,060,360	$71,369
Rail Transportation	58	$6,909,625	$118,790	151	$17,900,012	$118,790
Total	151	$6,909,625	$112,880	295	$34,887,789	$118,710

Table 4.4-18. 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 4.4-19. 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, as illustrated in Table 4.4-20. 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.

Because the Facility is located at the Port of Vancouver, it is assumed that the distribution of county of residence of the Facility's workers will be similar to that of existing Port-related workers.

Table 4.4-20. 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 4.4-21. 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 4.4-22. 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 project would be subject to a variety of taxes. Taxes on the construction would be assessed on a one-time basis, while taxes on operations would be ongoing. Businesses in Washington State are subject to the B&O tax, which is levied on the value of products, gross proceeds of sale, or gross income of a business. Construction of the terminal would be subject to the state B&O tax rate of 0.00471 (Schatzki and Strombom 2014, see Appendix K). There is no local B&O tax in the City. However, construction activities would be subject to retail sales tax, which partially accrues to the City. Retail sales tax is assessed against the value of the construction project. In Vancouver, the total sales tax rate is 8.4 percent, of which 6.5 percent goes to the State and 1.9 percent to local government.

The Port is not subject to property taxes; however, privately owned improvements located on land leased from the Port are subject to leasehold excise tax, which is a tax collected in lieu of property tax for the use of public property by a private party. Therefore, the proposed Facility would be subject to leasehold excise taxes throughout its operating life. Leasehold excise tax for the project would be assessed at 12.84 percent of the rent paid for the property. Approximately 53 percent of the tax goes into the state's General Fund, and 47 percent of the tax is returned to the county and city in which the leased property is located (Washington Department of Revenue 2014). Additional sources of county revenue include sales taxes, real estate excise taxes, and fuel taxes; other taxes such as the gambling tax and timber tax; state and federal government grants; and private sources, including permit fees, court fines, payments for licenses, and other goods and services (Clark County 2013).

The total property tax at the Facility 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 4.4-23. 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 4.4-24. 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 Facility, respectively.

Table 4.4-25. 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 4.4-26. 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

During the estimated 12-month construction period for Phase I construction, direct on-site and off-site employment associated with the Facility is projected to be 239 jobs (see section 2.15.2). During the estimated six-month construction period for Phase II construction, direct on-site and off-site employment associated with the Facility is projected to be 81 jobs. The estimated direct labor income associated with the Facility (including employee compensation and proprietor's income) during construction is estimated at $31 million. While the annual wage in the study area averages $45,700 across all sectors, construction jobs associated with the Facility are likely to generate direct income that is substantially higher than the study area average wage; an average annual compensation of $95,595 was assumed for on-site construction workers. Including both indirect and induced benefits, construction of the proposed Facility is projected to support a total of 1,429 jobs, with associated total income of $87 million (Appendix K) (Table 4.4-27).

Table 4.4-27. Economic Impacts of Construction on Study Area

Impact Type	Employment	Labor Income ($millions)
Direct	320	$31
Indirect and Induced	1,109	$55
Total	1,429	$87

Source: Schatzki and Strombom (2014) using the IMPLAN model.
Note: Labor income is reported in nominal dollars. Employment reflects job-years.

As detailed above, construction of the Facility would be subject to the state B&O tax rate of 0.00471 and a retail sales tax rate of 8.4 percent, of which 6.5 percent goes to the state and 1.9 percent goes to local government. With a total construction value for both Phase I and Phase II of $210 million, the total state B&O tax associated with construction would be $989,100. Construction is projected to generate a total of $17.64 million in retail sales tax, of which the state would receive $13.65 million and local government would receive $3.99 million.

Overall, it is anticipated that construction of the proposed Facility would result in a positive economic impact to Clark County and Washington due to increased employment, employment income, tax revenues, and local expenditures.

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 potential impacts from construction and/or operation of the proposed Facility 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. See the discussion at section 1.4.2.

4.4.2.2 Operations

The proposed terminal will directly employ an estimated 176 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 176 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 4.4-28. Direct Employment from Operation at Startup and Full Build-Out Capacity

Trade	Number of Operations Staff	
	Start-up	Full Build-out
Marine (dock, vessel securement, etc.)	16	19
Rail (engineers, switchmen, inspectors, etc.)	20	40
Trans-load (trans-loaders, tanks farm, trainers, etc.)	30	79
Safety, health, environment & maintenance (mechanics, maintenance, EHS, etc.)	9	13
Office/management (managers, coordinators, supervisors, etc.)	16	25
Total	91	176

At start-up[6], the Facility is estimated to generate direct employment of 302 total jobs, projected to grow to 616 jobs at full operation in the subsequent years. The direct labor income associated with the full operation is estimated to be $67 million, rising annually to $88 million in 2030. Including both indirect and induced impacts with direct impacts, the operation of the Facility at full build-out is projected to support 1,081 jobs annually, with associated total income of $90 million in 2017, rising to $118 million in 2030 (Appendix K) (Table 4.4-29).

Table 4.4-29. Economic Impacts in Study Area from Operations

Impact Type	Start-up (2016)		Full Build-out (2036)	
	Employment	Labor Income ($millions)	Employment	Labor Income ($millions)
Direct	302	$33	616	$88
Indirect & Induced	217	$11	465	$30
Total	519	$44	1,081	$118

Source: Schatzki and Strombom (2014) using IMPLAN model

Note: Labor income is reported in nominal dollars. Employment reflects job-years.

The total annual property tax revenue associated with operation of the Facility is expected to be $2.32 million in 2014 dollars.

Additional taxes that would be received by state and local government during Facility operations, such as non-Facility related property taxes resulting from expanded business activity, payments

[6] The economic analysis conducted in 2014 anticipated a start date in 2016. The actual date to begin construction depends on the timing of the Governor's decision on the Application. See the construction schedule presented at section 2.15.1.

for temporary disability insurance, and business license fees, are estimated at $1.07 million during the first (start-up) year of operations and $2.32 million annually during full operations (Appendix K).

It is, therefore, anticipated that operation of the proposed Facility would result in an overall positive economic impact to the county and the state due to increased employment, employment income, tax revenues, and local expenditures.

4.4.2.3 Housing Impact

During the construction period, approximately 298 construction workers would be employed at the site. Levels would vary over the construction period with a maximum daily workforce of 149 construction workers. Development of the Facility would occur on land owned by the Port and located about 0.6 mile from the closest residential neighborhood. Therefore, no land use displacements or relocations, or related adverse housing impacts, would occur. Because the majority of construction workers are expected to come from within the local study area, and with employment of 298 construction workers on site during the Phase I and total rental housing inventory of approximately 9,000 vacant units in Clark County and 73,000 vacant units in the study area, construction of the proposed Facility should have no noticeable impact on housing in the study area. This small increase in occupancy rate associated with housing 298 construction workers within the study area would also have no noticeable impact on median gross rent, median housing values, or new housing construction. The impact of construction workers on hotel occupancy in the study area is also likely to be limited. As described in section 4.4.1.5 Lodging, the Portland lodging market has nearly 26,000 hotel/motel rooms, with occupancy of less than 60 percent. Of this total, more than 5,300 are classified as “Economy” rooms and more than 4,300 are classified as mid-scale. Assuming that construction workers rent rooms in one of these two categories, the 149 workers on site would increase demand for these room by 1.6 percent. This magnitude of demand increase is not likely to impact pricing.

With direct employment of 616 workers, operation of the proposed Facility should have no noticeable impact on housing in the study area. This number is very small relative to the inventory of housing in the study area. The plan is to recruit most of the operational workforce from the local area thereby reducing the impact on local housing. In this case, the majority of the workforce does not represent an increase in demand for housing in the study area. The operational workforce should have no noticeable impact on median gross rent, median housing values, or new housing construction.

Likewise, because the closest residential neighborhood is located about 0.6 mile from the Port and existing Port operations, adverse impacts to residential property values from operation of the proposed Facility are not anticipated.

4.4.3 Taxes

The Facility 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 will be subject to the state B & O tax rate of 0.00471. With a

construction value of $210 million, the total state B & O tax associated with construction would be $989,100 (Appendix K). 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 of the Facility. In Vancouver total sales tax rate is 8.4 percent, of which 6.5 percent goes to the State and 1.9 percent to local government. The $210 million in construction is projected to generate a total of $17.64 million, of which the State would receive $13.65 million and local government $3.99 million.

Property taxes include taxes on the Facility itself, as well as increased property taxes due to expanded business activity in support of the Facility's construction and operation. Property taxes from expanded (indirect and induced) business activity are expected to be about $2.6 million during construction.

Other taxes, such as payments for temporary disability insurance, business license fees, payments for fines and donations, are also calculated by IMPLAN. Construction of the Facility will generate approximately $0.9 million in other one-time taxes and fees to state and local government.

In total, construction of the terminal is expected to generate $22 million in non-recurring taxes, as summarized in Table 4.4-30 below.

Table 4.4-30. Construction and Operation Taxes ($ millions)

Tax	Construction (Phases I and II)	Annual Operations (Start-Up)	Annual Operations (Full Build-Out)
Retail Sales	$17.64	$1.50	$3.23
Business and Occupation	$0.99	See Note 2	See Note 2
Property (Facility)	Not applicable	$2.32	$2.32
Property (Non Facility)	$2.57	$0.75	$1.64
Other	$0.95	$0.31	$0.68
Total	$22.15	$4.88	$7.86

Source: Schatzki and Strombom, 2014 (Appendix K)

Notes:
[1] Retail sales tax includes a state and local portion, and is calculated on the full construction costs for Phases I and II of $210 million. The state tax rate is 6.5% and the local tax rate is 1.9%, for a total tax rate of 8.4%. Sales tax for annual operations comes from the IMPLAN results. IMPLAN estimates of sales tax from indirect and induced activities are not included for the construction phase. For more information, see http://dor.wa.gov/content/FindTaxesAndRates/SalesAndUseTaxRates/.
[2] Business & Occupation tax is based on the classification of activity, and is calculated on gross business income. The rate for construction is based on the retailing classification, and is 0.00471. The B&O tax for annual operations is not reported independently in IMPLAN, but is accounted for in the sales tax and other taxes categories reported. For more information, see http://dor.wa.gov/content/FindTaxesAndRates/BAndOTax/.
[3] The Project's property tax for annual operations was estimated by Tesoro Savage.
[4] The non-Project property tax for annual operations is based on IMPLAN results, and represents property taxes on production and imports only (i.e., it does not include household property taxes).
[5] Other taxes include a variety of other taxes and fees, such as payments for temporary disability insurance and business license fees.

4.4.3.2 Operations-related Tax

The operation of the Facility will generate about $1.5 million in state and local sales taxes in the initial start-up year, and then produce approximately $3 million in annual sales tax revenues thereafter.

The Facility 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 Facility will be subject to property taxes.

Property tax on the Project itself is expected to be $2.3 million annually. Additional property taxes from expanded (indirect and induced) business activity are expected to be about $0.75 million in the first year of operation start-up, and about $1.6 million annually during the remainder of the Project's operation.

Based on the taxing millage rate of an adjacent parcel, the property tax rate at the Facility 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 4.4-31 summarizes how Facility property taxes would be approximately distributed.

Table 4.4-31. Property Tax

Taxing District	Tax Rate	Est Property Tax
Port Vancouver General Adref	0.000449	$74
County General Adref	0.003626	$595
Veterans Asst	0.009925	$1, 630
City Vancouver General Adref	0.010346	$1,699
Dev Disability	0.012500	$2,052
Mental Health	0.012500	$2,052
Vanc Library Capital Facilities	0.256084	$42,045
SD37 Vancouver M&O Adref	0.016503	$2,710
Conservation Futures	0.062500	$10,261
Port Vancouver Bonds	0.223412	$36,681
Port Vancouver General	0.211683	$34,755
County General	1.537209	$252,384
SD37 Vancouver Debt Svc	1.851094	$303,919
SD37 Vancouver M&O	3.758351	$617,059
State Schools	2.489687	$,408,765
City Vancouver General	3.161863	$519,126
Ft Vancouver Reg Library	0.500000	$82,092
Totals	14.11773	$2,317,898

Source: Clark County Assessor

Operation of the Project will generate an additional $0.31 million in other tax revenues the first year of operations start-up, and $0.68 million annually thereafter.

As summarized in Table 4.4-30 above, the total annual operation of the Project is expected to have a recurring annual impact of approximately $7.8 million once the Facility is operating at full capacity.

4.4.3.3 Impact on Clark County Public Service Costs

The potential for gaps in County expenditures on additional Facility-related county-provided public services versus tax revenue from the Facility was also estimated. County services provided within City jurisdiction are primarily related to providing direct assistance to residents (community services, public health), funding county operations and debt (General Government, Internal Support, Capital and Debt, Fiscal Entities), funding a portion of the County Public Works budget, and providing Law and Justice services (for example, the City of Vancouver does not maintain a municipal court). The cost of the services provided within the boundaries of the City of Vancouver are primarily a function of the number of city residents. Table 4.4-32 summarizes the estimated cost of County services required as a result of the addition of new residents resulting from operation of the Facility. The additional service cost to the County, estimated at $42, 862, is approximately one quarter the value of taxes to be collected by the County ($169,492; see Table 4.4-32, "County General Adref" plus "County General").

Table 4.4-32. Estimated Cost of Additional Clark County Services

	County Budget (1)	County Population (2)	Budget per capita	Additional Residents (3)	Additional Cost
General Government	$98,054,506	441,572	$ 222.06	22	$ 4,955
Law & Justice	220,523,379	441,572	$ 499.41	22	$ 11,143
Public Works	225,982,039	441,572	$ 511.77	22	$ 11,418
Community Development	17,136,446	441,572	$ 38.81	22	$ 866
Community Services	85,943,279	441,572	$ 194.63	22	$ 4,343
Public Health	24,106,507	441,572	$ 54.59	22	$ 1,218
Internal Support	43,899,519	441,572	$ 99.42	22	$ 2,218
Capital & Debt	74,707,315	441,572	$ 169.19	22	$ 3,775
Fiscal Entities	57,931,532	441,572	$ 131.19	22	$ 2,927
Total	$848,284,522				$ 42,862

(1) http://www.clark.wa.gov/budget/2013-2014/5%20-%20Financial/13-14%20Financial.pdf#page=46
(2) Interpolated to FY 2013/2014, based on Table 4.4-1
(3) Calculated based on page 4-445 bottom paragraph (origin of employees), Table 4.4-3 (population), and Table 4.4-7 (occupied housing units)

Clark Regional Emergency Services Agency (CRESA) is a regional public safety agency that provides 9-1-1 call taking and dispatch, technology support services, emergency management coordination, and ambulance contract oversight for EMS District 2. CRESA's service area includes Clark County and each of its seven cities, and Woodland in Cowlitz County. CRESA also hosts the Region IV Homeland Security Office which coordinates Homeland Security efforts within four southwest Washington counties: Clark, Cowlitz, Skamania and Wahkiakum. CRESA 911 activities are funded through excise taxes and stakeholder agencies' user fees. In 2012, the City of Vancouver's contribution amounted to 25 percent of the CRESA 911 budget (CRESA, 2012). The Region IV Homeland Security Coordinating Council's program is funded 100 percent by federal grants related to Homeland Security.

The County provides Emergency Medical Services (e.g., ambulance service) to the City of Vancouver; these services are funded 100 percent by the ambulance contractor through a contract administration fee. Increases in CRESA 911 service-use as a result of the Facility would be funded through the City of Vancouver's user fee, which will in turn be funded through City of Vancouver taxes collected from the Facility construction and operations. Any negative impact from the Facility on CRESA 911 service costs is therefore likely to be mitigated by the Facility's payment of taxes to the City of Vancouver.

4.4.4 Mitigation

The socioeconomic conditions will not be negatively affected; therefore, no mitigation measures will be required.