Chapter 2  Proposed Project and Alternatives

2.1  Introduction

Northwest Innovation Works, LLC – Kalama (NWIW) and the Port of Kalama (Port) are planning to construct the Kalama Manufacturing and Marine Export Facility (KMMEF) (the proposed project), which would consist of a methanol manufacturing facility and a new marine terminal on approximately 100 acres on the Columbia River at the Port’s North Port site (the project site). The project site is shown on Figure 2-1. In related action, Northwest Pipeline LLC (Northwest) is proposing to construct and operate the Kalama Lateral Project (the proposed pipeline), a 3.1-mile natural gas pipeline to the proposed project, and Cowlitz County Public Utility District No. 1 (Cowlitz County PUD) is proposing to upgrade electrical service to provide power to the proposed project.

The proposed methanol manufacturing plant would convert natural gas to methanol, which would be stored on site and transported via marine vessel to global markets, primarily in Asia. The methanol is expected to be used for the production of olefins, which are the primary components in the production of consumer products, such as medical devices, glasses, contact lenses, recreational equipment, clothing, cell phones, furniture, and many other products.

The proposed marine terminal would accommodate the oceangoing vessels that would transport methanol to destination ports. It would also be designed to accommodate other vessel types and, when not in use for loading methanol, would be made available for general use by the Port, for other cargo operations, as a lay berthing where vessels could moor while waiting to use other Port berths, and for topside vessel maintenance.

The proposed project is subject to environmental review under the State Environmental Policy Act (SEPA). The Port and Cowlitz County are serving as co-lead agencies for the SEPA environmental review. Federal approvals would be necessary for permits for in-water work and would be subject to environmental review under the National Environmental Policy Act (NEPA). The proposed pipeline (a related action) is undergoing separate review through the Federal Energy Regulatory Commission (FERC), and a NEPA Environmental Assessment was issued in July 2015. The proposed project would also require permits, authorizations, approvals, or other government actions from Cowlitz County, the Washington State Department of Ecology (Ecology), the Southwest Clean Air Agency, the Washington State Department of Fish and Wildlife (WDFW), and other agencies as summarized in section 2.8. This document is a SEPA draft final environmental impact statement (DEIS/FEIS) intended to meet the environmental review needs of the Port, Cowlitz County, and other state and local agencies with jurisdiction over the proposed project. Analyses in this document are also expected to be used to support NEPA review of applicable federal actions.

This chapter describes the alternatives for the proposed project assessed in this EIS. As described below, these alternatives include two methanol production technology alternatives and two alternative designs for the marine terminal. A No-Action Alternative is also assessed as required by SEPA. The purpose and need for the proposed project are also discussed in this chapter. An Off-Site Alternative that was initially considered but not pursued, and the reasons for its elimination is also discussed in this chapter. Basic information about methanol and methanol production is also provided for context.
2.2 Project Site

The proposed project would be located at the Port’s North Port site at 222 West Kalama River Road in unincorporated Cowlitz County, Washington (Figure 2-1). Existing Port facilities are located along the Columbia River between approximately River Mile (RM) 72 and RM 77. The North Port site is located at approximately RM 72 along the east bank of the Columbia River. The BNSF Railway and Interstate 5 (I-5) lie immediately to the east.

The proposed project site is located in Sections 31 and 36, Township 7 North, Range 2 West Willamette Meridian. The project site consists of portions of tax parcels 63302, 63304, 63305, 60822, 60831, 63301, and WH2500003, including areas of pile removal activities that are proposed for mitigation as part of the proposed project. A portion of the project site consists of state-owned lands that are subject to a Port Management Agreement between the Port and the Washington State Department of Natural Resources. Figure 2-2 shows the project site boundary.

The project site is bounded by the Columbia River to the west; by Tradewinds Road, the Air Liquide industrial facility, and the Port’s industrial wastewater treatment plant to the east; by Port property primarily used for open space, recreation, and wetland mitigation to the north; and by the existing Steelscape manufacturing facility to the south.

The Port is the owner of the project site and has leased approximately 90 acres of the 100-acre site to NWIW for construction and operation of the proposed facility. The Port would construct the proposed marine terminal to accommodate the shipping of methanol. The Port would also improve existing access roads, construct a new access road, and develop water supply, recreation areas, and other elements to support the proposed project in the remaining 10 acres of the project site. The marine terminal would be designed to accommodate other vessel types and, when not in use for loading methanol, would be made available for general use by the Port, for other cargo operations, as a lay berth where vessels could moor while waiting to use other Port berths, and for topside vessel maintenance.

2.2.1 Existing Project Site Uses

The Port has owned the project site since 1979. The site was filled to its current elevation in 1980 using material dredged from the Columbia River. The last dredge material placement activity on the project site occurred in 1995. The project site was part of the U.S. Army Corps of Engineers (USACE) network of dredge material placement sites but was removed from the network in 2015.1 Dredge placement activities are also permitted on the site through an active shoreline conditional use permit from Cowlitz County and Ecology related to a previously proposed aggregate facility on the project site.

An existing building is located on the southwest portion of the project site. This approximately 38,000-square-foot building is currently used as a warehouse and office space for Steelscape and includes parking, loading, and landscaped areas. This building and adjacent areas would be reused as part of the proposed project. The remainder of the project site is undeveloped and sparsely vegetated. Site topography is generally flat and consists primarily of sandy dredged material.

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1 The Port of Kalama officially withdrew the Northport Dredge Disposal site on October 6, 2014 from the Columbia River Channel Improvements project. A confirmation letter from the USACE was received on November 24, 2015.
Figure 2-2. Project Site Parcel Map
2.2.2 Previous Proposals for the Project Site

The Port has been actively pursuing development of the project site. Four projects were previously proposed for the site, but were cancelled because of economic considerations. The projects are summarized below. Permits or environmental reviews completed for the projects before they were cancelled are also noted.

- North Port Dock Extension: The Port received permits in 2005 to construct a 1,000-foot extension to the existing North Port dock along with additional access trestles and upland support facilities. The dock extension was not constructed.

- Aggregate Facility: The northwest portion of the project site was approved for the construction of an aggregate handling facility and concrete batch plant in 2009. All permits were issued except the USACE Section 10 authorization (for in-water work). The project was canceled by the project proponent.

- Pacific Mountain Energy Center: An integrated gasification combined cycle power generation facility that would use fuel-flexible gasification technology and processes to produce approximately 680 megawatts of electrical power was proposed on the project site in 2005. A DEIS was published by the Washington State Energy Facility Site Evaluation Council in 2007. The applicant canceled the project in 2009.

- Kalama Energy Center: This project proposed a 346-megawatt gas-fired power plant on portions of the project site. The project was canceled by the applicant in 2013. A National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit (No. WA0040576) was received in August 2012 prior to the project being canceled.

2.3 Project Proponent

NWIW and the Port propose to design, construct, and operate the proposed project. Collectively, NWIW and the Port are referred to as the project proponent. A brief overview of each of these entities is provided below.

2.3.1 Northwest Innovation Works, LLC – Kalama

NWIW is a multinational partnership formed for the purpose of developing cleaner sources for methanol production to meet global demands. The parent company of NWIW is CECC (Shanghai Bi Ke Clean Energy Technology Co., Ltd.), a technology commercialization and project development firm in the gas, synthesis gas, chemicals, and fuels industries.

2.3.2 Port of Kalama

The Port oversees a variety of industrial uses on property along the Columbia River in the city of Kalama and unincorporated Cowlitz County, including the project site. Organized in 1920 by a vote of the people as authorized under the Washington State Port District Act of 1911, the Port is operated according to the provisions of Title 53 of the Revised Code of Washington (RCW) Chapter 53.04. Port districts are specifically authorized by RCW 53.04 to acquire, construct, maintain, operate, and develop harbor improvements, rail or motor vehicle transfer and terminal facilities, water transfer and terminal facilities, air transfer and terminal facilities, or any combination of such transfer and terminal facilities, and other commercial transportation, transfer, handling, storage, and terminal facilities, and industrial improvements.

The Port is governed by a three-member Port commission and administered by an executive director. Currently, the Port employs 16 full-time and several part-time employees. The Port
receives revenue from leases of various Port properties, buildings, and marine terminals; services associated with the grain terminal and breakbulk docks; and the Kalama marina. Thirty-one industries employing approximately 867 people are located at the Port.

The Port’s mission is “to induce capital investment in an environmentally responsible manner to create jobs and to enhance public recreational opportunities.”

**2.4 Project Objectives**

NWIW and the Port are pursuing the proposed project with the stated goal of reducing greenhouse gas (GHG) emissions globally by producing methanol from natural gas rather than coal. Global demand for methanol for use in production of olefins is high. Economic forecasts predict an increase in worldwide demand for methanol from 60 million tonnes in 2013 to 109 million tonnes in 2023 (IHS 2014). Increased demand for methanol in Asia is being met primarily by the construction of facilities in China that manufacture methanol from coal, which emits very high levels of GHG and generates toxic byproducts and wastes (Yang et al. 2012). Producing methanol from natural gas produces substantially lower levels of GHG emissions and fewer chemical byproducts. This DEIS evaluates two technology options for producing methanol from natural gas (discussed below), one of which is a new technology that produces even lower GHG and other emissions than conventional technologies for producing methanol from natural gas. NWIW has expressed its desire to use the new lower emitting technology consistent with its goal of global reduction of GHG emissions.

Producing methanol from coal in China is more expensive than producing it from natural gas in North America. Natural gas prices in the United States are lower than in China and most of the world. The cost advantages of producing methanol in Kalama from natural gas and shipping it efficiently to Asian markets, including China’s coastal chemical complexes, is expected to displace methanol production from existing coal-based plants in China and should also discourage development of new coal-based methanol plants. A very large portion of China’s increased methanol production is expected to occur in Inner Mongolia near coal mines, which is well inland and requires shipping the methanol to the coast where China’s petrochemical facilities are located. Transporting the methanol such long distances overland in China creates additional cost disadvantages for methanol produced from coal. In 2014, almost two-thirds of China’s domestically produced methanol for the merchant market came from coal. In 2014, the expanded methanol capacity was mainly from coal-based plants with one natural gas-based exception located in Qinghai. In 2015, the majority of new methanol plants were coal-based plants located in Inner Mongolia. Also, much of China’s capacity to produce methanol from coal is in older inefficient facilities with high costs (IHS 2015). Market forces would be expected to drive the methanol market to prefer less expensive methanol manufactured from natural gas in the United States over higher cost methanol from coal.

The marine terminal is being established both for NWIW’s purpose to provide the infrastructure needed to load vessels, as well as the Port’s purpose to provide general use by the Port for other marine operations (see section 1.1.2). The marine terminal also meets the Port’s need for an additional lay berth for vessel-related activities.

The project would provide economic benefit to the region, create jobs, and improve access to recreational resources, and thus meets the Port’s mission to “induce capital investment in an environmentally responsible manner to create jobs and to enhance public recreational opportunities.”
2.5 Characteristics of Methanol and Basics of Methanol Production

Methanol, also known as methyl alcohol or wood alcohol, is the simplest of all alcohols with the chemical formula CH₃OH. It is biodegradable and noncarcinogenic. Methanol can be used as a fuel, but is more commonly used as an essential ingredient in chemical and manufacturing processes for products, including paint, particle board, plastics, carpets, pharmaceuticals, laminated lumber, and windshield wiper fluid.

Methanol is primarily produced from either coal or natural gas. Production of methanol from natural gas has fewer environmental impacts than production from coal with respect to air pollutants and GHG emissions. The proposed project would produce methanol from natural gas feedstock that would be supplied via pipeline (see section 2.7, Related Actions). The proposed project would not involve the production or handling of ethanol, which is a renewable fuel produced from plant-based feedstocks.

Making pure methanol from natural gas is an established technology: natural gas is combined with steam and heat to produce a “synthesis gas” of carbon monoxide, carbon dioxide, and hydrogen. A catalyst is then used to create a chemical reaction and the resulting liquid is distilled to yield 99.9 percent pure methanol and 0.1 percent water (see Figure 2-3).

The process for producing methanol from natural gas has three key steps:

1. Natural gas reforming – the process of converting natural gas to synthesis gas (a mixture of hydrogen and carbon oxides; also referred to as syngas);
2. Methanol synthesis – the process of converting syngas to methanol; and
3. Methanol distillation – the process of purifying the methanol product to the required purity.

2.5.1 Natural Gas Reforming

Natural gas reforming is the process of making synthesis gas from natural gas.

Natural gas contains a low level of sulphur compounds, which would be removed to make the natural gas feedstock suitable for use in methanol production. Sulphur is collected before the reforming process in the form of zinc sulfide and disposed off site in accordance with applicable federal, state, and local regulations. Natural gas with the sulphur removed is referred to as treated natural gas.

The treated natural gas is compressed, then saturated with process water, and mixed with steam to increase water content. The treated water-rich natural gas is converted in the reformers into a mixture of carbon oxides and hydrogen, which is referred to as “synthesis gas” or “syngas” and contains the reactants for the formation of methanol. The process involves a partial natural gas reforming with steam as a primary step, and a complete reforming with oxygen in an autothermal reformer (ATR) as a secondary step. Combining the two reforming processes creates the optimum synthesis gas composition for methanol synthesis.

The synthesis gas is cooled in a series of heat exchangers that recover waste heat that is returned to the system to provide energy to feed the gas and methanol distillation process.
2.5.2 Methanol Synthesis

The reformed synthesis gas then enters the two converters where crude methanol is created. Not all of the synthesis gas can be converted to methanol in the first pass, so the outlet gas from the converters contains a mixture of methanol and unreacted synthesis gas.

The hot gas mixture leaving the converters flows through a series of coolers to allow methanol product to condense, and to recover and reuse waste process heat to improve energy efficiency. Condensed crude methanol is sent to the methanol distillation unit, and the noncondensed gas mixture is compressed and recycled back to the converters to enhance methanol production.

2.5.3 Methanol Distillation

Crude methanol from the synthesis process is sent to the distillation unit where it is distilled to the required purity. Water and several other hydrocarbon byproducts are synthesized at the same time as methanol. These byproducts are separated from the methanol through a separation vessel and a series of three distillation columns.

The refined methanol is then directed to the on-site storage tanks, the light hydrocarbon byproducts are recovered and used as fuel for the boilers, and the heavy byproducts (mainly water) are recycled to the reforming step for use in saturating the natural gas feedstock with process water.

2.6 Alternatives Analysis

The proposed project involves the construction and operation of a methanol manufacturing facility and marine terminal on the project site. The alternatives evaluated in this EIS include “action” alternatives, in which the proposed methanol manufacturing facility and marine terminal would be developed and a No-Action Alternative, in which the proposed project would not be developed.

The on-site action alternatives include two methanol production technology alternatives (collectively referred to as the Technology Alternatives), and two marine terminal design alternatives (collectively referred to as the Marine Terminal Alternatives). An Off-Site Alternative for the methanol manufacturing facility was also evaluated during the initial alternatives analysis but is not carried forward for the detailed EIS analysis because that alternative did not satisfy SEPA requirements for a reasonable alternative, explained in more detail in section 2.6.3 below.

The alternatives include:

- Technology Alternatives:
  - Combined Reformer (CR) Alternative – The proposed methanol manufacturing facility would use combined reforming technology, which employs a combination of a steam-methane reformer (SMR) and an ATR to produce methanol.
  - Ultra-Low Emissions (ULE) Alternative – The proposed methanol manufacturing facility would use ULE reforming technology, which employs a gas-heated reformer (GHR) and an ATR to produce methanol.

- Marine Terminal Alternatives:
  - Marine Terminal Alternative 1 – The proposed marine terminal would be a separate structure located approximately 380 feet north of the existing North Port dock.
Marine Terminal Alternative 2 – The proposed marine terminal would be a 1,000-foot northward extension to the existing dock, similar to the previously-permitted proposed extension of the existing North Port dock (see section 2.2.2).

- Off-Site Alternative: The proposed methanol manufacturing facility would be constructed on another Port-owned site. This alternative was determined to be not reasonable because of its potential to result in greater environmental impacts than the alternatives on the project site. The Off-Site Alternative was not carried forward with the detailed alternatives analysis in the EIS process (see section 2.6.3 below).

- No-Action Alternative

2.6.1 Technology Alternatives

2.6.1.1 Description of the CR Alternative and the ULE Alternative

The primary differences between the Technology Alternatives are energy efficiency and energy source and the technology used for the natural gas reforming step in the methanol production process. The other primary steps in the production process remain the same in both Technology Alternatives. Both technologies are viable for use in the proposed project.

Combined reforming (CR Alternative) is widely used in the methanol industry to perform the primary reforming of natural gas with steam. With combined reforming technology, the energy required by the reforming reaction is provided mainly by burning natural gas. Natural gas as fuel combuts through the firing burners, provides heat to allow natural gas steam reforming in the tubes of the SMR, and the flue gas is emitted to the atmosphere. The waste heat carried by hot flue gas is recovered through a series of heat exchangers to generate steam, and the steam is sent to turbines to drive rotating process equipment (such as pumps and compressors). The combined reforming technology results in lower CO₂ and GHG emissions than coal-based methanol production, which relies on coal gasification to produce synthesis gas from coal feedstock.

ULE reforming is a proven technology commonly used for reforming other chemicals from natural gas and has been used at a smaller scale for the production of methanol. If the ULE Alternative is selected, the proposed project would be the first large-scale application of ULE technology in the world. ULE technology is designed to use process heat directly to provide energy for the reforming reaction. With ULE technology, hot synthesis gas from the secondary reformer (referred to as the autothermal reformer) flows through the shell side of the primary reformer (referred to as the GHR). With the ULE reforming technology, rotating process equipment are driven by electricity instead of steam turbines.

Both the Technology Alternatives would require substantial amounts of electricity and natural gas to power their processes. The CR Alternative requires more energy input and relies more heavily on natural gas for that energy. The ULE Alternative uses natural gas to power boilers, but the reforming process is powered by process heat from the autothermal reformer. However, the ULE Alternative requires substantially more electricity because electricity is used to power compressors and pumps. Cowlitz County PUD does not currently have adequate transmission capacity to supply all the electricity needs of the ULE Alternative. Therefore, the ULE Alternative requires an on-site, natural gas-fired power generator to provide a portion of the power. The ULE Alternative would have lower GHG emissions than the CR Alternative as discussed in Chapter 4, Air Quality and Greenhouse Gas Emissions.
Figure 2-4 illustrates the differences between the CR and ULE alternatives within the overall methanol production process. Figures 2-5 and 2-6 show the site plans for each alternative.

2.6.1.2 Components Unique to the CR Alternative

Methanol Production Lines

With the CR Alternative, the primary reformer (an SMR) would be similar in height to the GHR used in the ULE Alternative, but it would have a larger footprint and would have the appearance of complex piping under a high roof. The production lines would occupy approximately 18 acres of the project site with the CR Alternative. Figure 2-7 shows an elevation of a methanol production line under the CR Alternative.

2.6.1.3 Components Unique to the ULE Alternative

Power Generation Facility

The ULE Alternative would meet its electric power demands using a combination of grid electric power and on-site power generation. As discussed below, it is expected that new power lines would be run on existing poles to the project site and a new substation would be constructed within the project site. The ULE Alternative would have greater demand for electric power than the CR Alternative (200 megawatts compared to 30 megawatts), so the proposed project with the ULE Alternative would need to supplement the grid electric power.

The ULE Alternative would supplement grid electric power with an on-site 125-megawatt power generation facility. The power generation facility would consist of two natural gas-fired combustion turbines and one steam turbine. Natural gas mixed with air would combust in the gas turbine to generate electricity, and the exhaust gas from each combustion turbine would be used to generate high pressure steam to produce power through a steam turbine. The exhaust stacks would be the tallest element of the power generation facility and would be approximately 90 feet tall. If in the future, Cowlitz County PUD constructs transmission capacity adequate to supply all of the power needs for the ULE Alternative, the on-site power generation facility may not be necessary.

Waste heat from the power generation facility would be managed through cooling towers. Under the ULE Alternative, one cooling tower with two cells would be installed for the power generation facility. This tower would be located adjacent to the cooling towers installed for the methanol production process as discussed below.

Methanol Production Lines

The proposed project with either of the Technology Alternatives would include two methanol production lines. The size, layout, and appearance of the methanol production lines would vary slightly for the CR Alternative and the ULE Alternative. The GHR used in the ULE Alternative would be of similar height to the SMR, but has a smaller footprint and would look like a large vessel or tank. The production lines would occupy approximately 14 acres of the project site with the ULE Alternative. Figure 2-8 shows an elevation of a methanol production line under the ULE Alternative.
Figure 2-4: Methanol Production Process - Technology Alternatives
ULE Alternative Site Plan

Figure 2-5
Combined Reformer Alternative Site Plan
Figure 2-6
For Illustrative Purposes Only

CR Alternative - Methanol Production Line Elevation

Figure 2-7
Figure 2-8

ULE Alternative - Methanol Production Line Elevation

For Illustrative Purposes Only
2.6.1.4 Components Common to both Technology Alternatives

The proposed project, with either of the Technology Alternatives, would result in the
development of a methanol manufacturing facility that would produce up to 10,000 tonnes² of
methanol per day when operating at full capacity. The anticipated yearly production at full
capacity with both production lines would be approximately 3.6 million tonnes. The methanol
would be stored on site for transfer to shipping vessels at the marine terminal.

With either Technology Alternatives, the proposed methanol manufacturing facility would
consist of the following major components.

- Methanol production components:
  - Two methanol production lines
  - Interconnecting facilities, including piping, product pipelines, electrical, and control
    systems
  - Eight finished-product storage tanks within a containment area and additional tanks
    (rework tanks and shift tanks) for storing raw methanol during the manufacturing
    process
  - Cooling towers for industrial process water cooling
  - Steam boilers
  - Two air separation units (ASUs) to provide oxygen for the secondary reforming
    (autothermal reforming) process
  - Flare system for the disposal of flammable gases during startup, shutdown, and
    malfunctions

- Fire suppression infrastructure and risk management system

- Water supply and treatment components:
  - Process water supply wells, treatment system, storage tanks, and distribution network
  - Industrial process water treatment and disposal system
  - Stormwater treatment, infiltration pond, and disposal system

- Support buildings and accessory facilities:
  - Security gate houses, laboratory, control rooms, warehouses, and other buildings and
    enclosures
  - Laydown areas for construction activities, plant maintenance, and spare part storage
  - Electrical substation
  - Natural gas meter station and transfer equipment
  - Emergency generators

- Site access ways and public recreation access

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² One tonne (approximately 2,204 pounds) is equivalent to approximately 333 U.S. gallons.
Methanol Production Components

Methanol Production Lines

The proposed project with either of the Technology Alternatives would include two methanol production lines. A methanol production line is a series of equipment that handles each step of the methanol production process. Each methanol production line would produce 5,000 tonnes per day of AA-grade methanol from natural gas feedstock. These production lines would consist of reforming, methanol synthesis and distillation elements. The size, layout, and appearance of the methanol production lines, particularly the reformer, would vary slightly for the CR Alternative and the ULE Alternative; those differences are discussed above. Both alternatives would include similar distillation towers, which would be approximately 235 feet tall.

Air Separation Units

Two ASUs (one for each production line) would be constructed to produce oxygen for use in the reforming process and nitrogen for use in the plant process, and to inert equipment during repair and maintenance activities (e.g., to provide inert nitrogen gas for the product storage tanks). The ASUs would use a low-temperature process to separate various gases from the air. Air from the atmosphere would be drawn into the plant, purified, and then separated into its various elements. The ASUs would occupy approximately 225,000 square feet each and would consist of an air intake and filter, compressors, washing towers, sieves, distillation element, and tanks. The ASUs would be approximately 60 feet tall.

Methanol Storage Tanks

Storage tanks would be required for methanol storage during various steps in the production process. All storage tanks would be erected in the field. Both of the Technology Alternatives would require two rework tanks, four shift tanks, and eight bulk product storage tanks. The rework tanks would hold raw methanol during the production process and would be approximately 82 feet in diameter and 58 feet in height holding up to 2,275,000 gallons. Shift tanks would hold refined methanol for testing prior to discharge to the storage tanks. Shift tanks would be approximately 60 feet in diameter and 50 feet in height holding approximately 1,000,000 gallons. The tanks would have fixed external roofs with internal floating roofs.

After final production steps are completed, methanol would be pumped to one of eight bulk product storage tanks prior to being loaded onto vessels. The bulk product storage tanks would be approximately 105 feet in height and 145 feet in diameter, with a maximum storage capacity of 9,400,000 gallons (approximately 26,000 tonnes). The total storage capacity on site would be 200,000 tonnes when accounting for operation limits on the tank capacity. The bulk product storage tanks would have an external fixed roof and internal floating roof and would be capped with inert nitrogen gas (a “nitrogen blanket”) to keep the oxygen level in the individual tanks to a level below that required for combustion. A piping system would convey methanol from the bulk product storage tanks to the loading arms at the proposed marine terminal.

The bulk product storage tanks would be encompassed by a containment berm or wall approximately 7 feet in height. The containment area would be designed with a capacity at least equal to 110 percent of the volume of the largest tank plus precipitation from a 24-hour, 100-year storm event, and would be lined with an impervious membrane to prevent any spills from leaving the containment area via the ground. Stormwater (and/or spills) collected in the containment area would gravity-drain to the berm area sump. The water would be tested and directed to the stormwater system if found to meet stormwater discharge criteria. The sump
water would be disposed off site at an appropriate commercial disposal facility in the event of a spill, or if found to exceed the stormwater discharge criteria.

**Flare System**

A flare system would be used for safe disposal of combustible gases during process upset\(^3\), maintenance activities or an emergency shutdown situations, and during the normal start-up and shutdown of the production process with either of the Technology Alternatives. The flare would be approximately 245 feet in height. The flare would be enclosed and a visible flame would not be present except during the events described above. The flare will be equipped with a small pilot light, which will combust natural gas provided by pipeline. The pilot light will operate at all times, will be enclosed, and will not be visible.

The initial start-up of the production lines or after catalyst replacement will require use of the flare between 48 to 60 hours while the catalysts are prepared for initial use. The catalysts are expected to last between four to six years; a 48- to 60-hour start-up period can be expected every four to six years while the catalysts are replaced. The flare will also be used for approximately 2 hours when shutting down the production process to replace the catalysts.

The methanol production process is designed to operate continuously but process upsets and shutdowns (including associated start-ups) of the production process will occur that will require use of the flare. For the purposes of estimating flare operations and calculating air emissions, the plant was assumed to involve six shutdowns (requiring 2 hours of flaring each), six start-ups (requiring 12 hours of flaring each), and four process upsets (requiring 4 hours of flaring each) per year.

Based on these estimates, the flare will operate for a total of 160 hours during the initial year (approximately 1.8 percent of the time) and during years when the catalysts are being replaced. During other years, the flare will operate for 100 hours (approximately 1.1 percent of the time) (see Appendix D).

**Cooling Towers**

Waste heat from the methanol production process would be managed through cooling towers. The cooling towers would also provide cooling water to various heat exchangers used in the methanol production process. Two cooling towers consisting of five cells each would be installed for the methanol manufacturing facility (one for each production line).

The cooling towers would have mechanical draft (fans located on the air outlet of the cooling towers) and countercurrent flow (in which air enters at the bottom and exits at the top, and warm cooling water enters at the top and exits at the bottom). The cooling towers for the methanol manufacturing facility would be approximately 290 feet long, 110 feet wide, and 40 feet tall.

**Steam Boilers**

The proposed methanol manufacturing facility would include steam boilers fired by natural gas from the pipeline and purged gas from the methanol synthesis unit. The boilers would produce steam for use in the methanol production process.

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\(^3\) Process upset is an unplanned outage of the manufacturing process caused by an operational disruption or failure in the course of its performance.
Fire Suppression Infrastructure and Risk Management System

The proposed project’s operations and risk management system would meet or exceed local, state, and federal codes and regulations in order to minimize the risk of fire, leak, personal injury, or other health and safety impacts. The project proponent would develop a written emergency response plan, which would be reviewed and approved by local and state agencies before operations begin. The proposed project would include full emergency response capabilities to respond to all incidents within the methanol manufacturing facility or on the proposed marine terminal.

The facility will also be staffed with the appropriate number of private security personnel necessary to control access to the facility around its perimeter. Additionally, security personnel will serve as members of the emergency response team. As members of the emergency response team, security personnel will be accountable for assisting with the evacuation of non-facility personnel from areas within or immediately surrounding the facility perimeter, such as recreational users.

In the event of an emergency with potential off-site impacts that would warrant off-site actions, a hierarchy of notifications will be made to alert recreational users, neighboring businesses, and members of the public to the existence of a potentially hazardous condition. NWIW facility local notifications will include immediate notification to the Port of an incident or emergency. As part of the notification system, audible and visible alarms will be placed throughout the facility and its perimeter. Notification of federal, state, and local stakeholders will follow established protocol as defined by statute and industry best practices. The Port will work with NWIW facility/security personnel and will jointly develop a shoreline evacuation plan to address procedures for an incident or an emergency at the plant site.

The project proponent would develop close relationships with Cowlitz County Fire District No. 5 and would conduct regular emergency response drills at the project site with them and the Port. The project proponent has consulted with Cowlitz County Fire District No. 5, and the fire district has agreed that the emergency response staff at the methanol manufacturing facility would be first responders and would manage the response to an incident at the facility with the fire district providing support. For fires exceeding the capability of these facility first responders, the Cowlitz County Fire District No. 2 and City of Vancouver HAZMAT teams would provide response support based on existing mutual aid agreements with Cowlitz County Fire District No. 2. Emergency response training and certification for the proposed project’s staff would be in compliance with Occupational Safety and Health Administration, Process Safety Management, and the National Fire Protection Association (NFPA) requirements.

The proposed project will include a fire station to house the on-site fire brigade to respond to emergencies at the facility, as well as an emergency response vehicle. The on-site fire brigade is made up of staff trained in proper firefighting procedures. The proposed project will also include an emergency alarm system with alarm boxes located throughout the facility.

In addition to the on-site fire brigade, the proposed project will include a comprehensive fire suppression system with the following features:

- **Fire Detection.** Throughout the site, multi-spectrum infrared/ultraviolet (IR/UV) detection sensors and gas detectors will be positioned to provide coverage of the facility. IR/UV detectors are specifically designed to detect the presence of invisible and odorless fires produced from materials, such as methanol and hydrogen. Gas detectors alert facility personnel of potential fire/explosion conditions associated with a gas or vapor leak.
- **Fixed Foam System (foam used for fire suppression).** Foam is used to cool the fire and to coat the fuel, preventing its contact with oxygen and resulting in suppression of the combustion. The fixed foam system will include a foam storage tank, located outside the methanol storage tank containment dike, with an estimated 3,300 gallons of foam stored.

- **Portable Foam Generators.** A portable foam generator will be stored inside the fire station and have the capacity to discharge 60 gallons per minute of foam. Sufficient foam concentrate will be kept on hand to operate the foam generator for 60 minutes (3,600 gallons). Forty-five 5-gallon buckets of foam (225 gallons) will also be housed in the fire station.

- **Fire Water System.** The proposed project’s fire water supply will be stored in the fire water pond located at the northwest end of the plant, with an estimated capacity of 5 million gallons. The proposed project will be designed to have 100 percent coverage of fire water, with fire hydrants and monitors throughout the facility.

- **Deluge System.** Deluge systems are piping configurations with open spray nozzles designed for self-draining of the piping network to ensure the piping remains dry when not flowing water. The deluge system will serve two purposes during a fire. First, it would reduce the temperature in the fire area, potentially below the ignition temperature required for the burning material. Second, the deluge system would keep vessels and structure supports water sprayed. By keeping a structure cool, its strength would be maintained to prevent collapse during a fire situation. By keeping vessels cool, it would prevent possible metal fatigue and overpressure when exposed to flame.

- **Fire Extinguishers.** Hand-held portable extinguishers will be located throughout the facility in accordance with NFPA 10 and 29 CFR 1915.507.

**Site Access**

The proposed project, under either Technology Alternatives, would develop and improve roadways around the project site to provide access to the proposed methanol manufacturing facility, improve recreational access for the public, and provide emergency access to the site. Access to the proposed methanol manufacturing facility would be provided from Tradewinds Road in the northeast portion of the project site. Emergency access to the facility would be provided at three locations along the site perimeter.

The proposed project would include three primary road improvements: (1) improving Tradewinds Road along the north side of the project site; (2) creating a new roadway connecting Eastwind Road to Tradewinds Road; and (3) improving an existing gravel roadway along the south side of the project site.

The proposed project would improve recreational access to the Columbia River and the areas north of the project site by improving Tradewinds Road and creating a new parking area near the Columbia River. Access to this parking area would be provided by Tradewinds Road along the north boundary of the project site. Tradewinds Road would be improved by the Port by extending the paving 3,400 feet from the current intersection with Eastwind Road. The improved road would be 24 feet wide and consist of two 12-foot travel lanes and be approximately 3,400 feet long.

Tradewinds Road connects with Kalama River Road, which is a County-owned roadway with a 35-mile-per-hour (mph) speed limit. It crosses over the BNSF rail corridor and connects to I-5 approximately a quarter-mile east of the project site. I-5 is Washington’s main north-south
highway and extends from Canada to Mexico. At this location, I-5 consists of three travel lanes in each direction with a posted speed limit of 70 mph.

Eastwind Road is located within the footprint of the proposed project and that portion of the road would be abandoned. The Port would construct a connection from Eastwind Road to Tradewinds Road south of the proposed project to maintain access to the existing Air Liquide facility and the Port’s wastewater treatment plant. The new road would be approximately 720 feet long and 24 feet wide with two 12-foot travel lanes.

Access along the southern boundary of the proposed project site would be provided by a westbound extension of Eastwind Road. This road would extend from the existing southern terminus of Eastwind Road west to the existing warehouse (to be converted to the proposed project’s fire station) by improving an existing gravel road. The road would be approximately 1,400 feet long and 24 feet wide with two 12-foot travel lanes.

All three new and/or improved roadways would be designed consistent with the Cowlitz County Rural Low Volume Access standard. Construction of the roadways would require subgrade excavation and surface compaction, base and top course placement and compaction, and asphalt surfacing. The improvements to Tradewinds Road and the connection from Eastwind Road to Tradewinds Road would also require cuts and fills. Stormwater on the roadways improved outside of the project site boundary would flow to roadside ditches and shallow containment to infiltrate. Stormwater generated from the roads within the project would be directed to the proposed project’s stormwater system.

Figure 2-9 illustrates the site access and roadway improvements with the proposed project. Public transit does not serve the project site.

Recreational Access

The Port currently allows informal recreation access to portions of the North Port site that are not fenced for security purposes. Recreation use is focused on the sandy beach along the Columbia River and informal trail systems located north of the project site. The Port intends to allow continued access to these areas, consistent with project and federal security requirements, and would develop a formal parking area at the end of Tradewinds Road at the Columbia River as part of the proposed project. The area would provide parking for approximately 21 vehicles and allow recreational users to park and access the beach, river, and trails.

The Port currently implements access control for recreational lands, and users are required to have a recreational access permit for areas adjacent to the project site. The Port will update its recreational permit to define access and restrictions surrounding the facility and adjacent grounds. The Port will work with facility personnel regarding the on-site facility notification system and train authorized recreational users of procedures to take in the event of an emergency or incident at the plant site.
Figure 2-9

Proposed Site Access & Roadway Improvements
Support Buildings and Accessory Facilities

The proposed methanol manufacturing facility with either Technology Alternatives would include several support buildings and accessory facilities. These buildings and facilities would include a control building and laboratory, motor control center units, security gate house, electrical substation, a natural gas meter station and transfer equipment, and an emergency diesel generator. The project proponent would have office space off site in the Port or elsewhere for administrative offices associated with the proposed methanol manufacturing facility.

The control building and motor control center units would house control centers for facility operations. The laboratory would be used to test the finished methanol product for purity. The control center and laboratory would be housed together in a building that would be approximately 6,400 square feet and 15 feet tall. The motor control center units control building would be approximately 14,000 square feet and up to 40 feet tall.

A small security gate house would be located at the entrance to the proposed methanol manufacturing facility. Warehouse and maintenance buildings would be constructed to house maintenance equipment and vehicles.

A natural gas meter station and transfer equipment would be constructed to receive natural gas from the pipeline and stabilize the flow rate and pressure of the gas. The proposed methanol manufacturing facility would also include a diesel-fired emergency generator for use during power outages.

A new electrical substation would be constructed by Cowlitz PUD within the project site along with electric service lines to the various buildings and project elements. Service lines would generally be located on cable trays and raceways within the proposed project.

Water Supply and Treatment

Process and Domestic Water Supply and Treatment

The proposed project with either Technology Alternatives would require water for process uses and domestic uses (e.g., drinking, sanitation, showers, etc.). Process water would be provided by a collector well (Ranney well) to be constructed by the Port near the Columbia River shoreline. The well would be constructed under Groundwater Permit No. G2-30283 issued by Ecology. The groundwater permit allows the use of up to 10,640 acre-feet and 6,600 gallons per minute of water for various uses, including industrial activities. It is estimated that the proposed project would use approximately 3,610 gallons per minute for a total of approximately 5.2 million gallons per day of process water.

The process water supply system would consist of a 22-foot collector well approximately 100 feet deep and a 2,200-square-foot pump station facility. The pump station would be equipped with three 4.5-million-gallon-per-day pumps to provide a capacity of 9 million gallons per day (one pump would remain in standby). The pump station would be concrete masonry or similar type of construction on a mat foundation. A redundant process water supply would be provided by three backup wells operated by the Port.

The pump station would convey raw water to the water treatment supply tanks via pipeline. The pipeline would be provided with a blow-off valve for flushing that would be discharged to an

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4 An acre-foot contains approximately 325,851 gallons of water.
infiltration basin near the point of discharge. The infiltration basin could also be used to manage overflow and drain the water supply tank. Stormwater from the pump station facility would be captured and routed to an infiltration basin immediately north of the new pump station. This infiltration basin would also receive blow off from the pump station during pump start-up as required.

Raw water delivered to the methanol manufacturing facility would be treated prior to use in methanol production. The initial stage of raw water treatment would be precipitation softening using a cold-lime softener (CLS). Precipitation softening processes are used to reduce raw water hardness, alkalinity, silica, and other constituents, including iron and manganese. Water from the CLS would be used for cooling tower make-up water and a portion would be routed to a combined reverse osmosis and electrodeionization (RO-EDI) system.

The RO-EDI system would produce high-purity feed water necessary for the auxiliary boilers, power generation plant, and methanol production process. The reverse osmosis portion of the treatment would allow flow through a semi-permeable membrane producing a dilute solution and a concentrated solution. The flow would be reversed forcing water through the membrane producing filtered water and a concentrated brine. The RO membranes typically remove 95 percent of dissolved salts and all suspended particulates. Waste material from the RO membranes would be nontoxic and would be disposed of in accordance with local, state, and federal regulations. The high-quality filtered water would then be polished using the EDI system. The EDI system would use ion exchange membranes, ion exchange resin, and direct current electricity to produce ultrapure water.

Potable water for domestic uses (e.g., drinking water, sanitation, showers, and other general uses) would be supplied from a connection to the City of Kalama water system. Alternatively, the proposed project may receive potable water from the Port’s water supply system rather than the City of Kalama. Water treatment would be provided on site if potable water is supplied by the Port.

**Wastewater Treatment and Disposal**

Sources of wastewater from the proposed project would include domestic sewage wastewater and process wastewater. Domestic wastewater would be generated from the restrooms. Process wastewater would be concentrated and discharged only from the cooling towers. Other waste streams on site would be treated and reused on site or discharged to the cooling tower for make-up water. The proposed project, with either Technology Alternatives, would require an individual industrial NPDES permit. The NPDES permit application and engineering report are provided in Appendix A.

Domestic wastewater from the proposed project would be discharged to the existing Port wastewater treatment plant. The treatment plant discharges through a common outfall shared with the Steelscape facility to the Columbia River.

Process wastewater would be generated from various industrial units on the site. The primary discharges of wastewater on the site would be related to cooling and condensate loads. Additional discharges would be generated from the brine/waste stream of the RO-EDI unit and the methanol production process. All wastewater streams would be reused on site prior to discharge. The only direct discharge location from the proposed methanol manufacturing

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5 Make-up water refers to the additional water supply that is necessary to compensate for water lost as evaporation, condensate, or other causes during the cooling process.
facility would be from the blowdown of the cooling towers. The cooling towers would discharge wastewater to the firewater pond for temporary storage and to maintain sufficient fire water. Discharges from the firewater pond would be treated for temperature through a heat exchanger to a maximum discharge temperature of 68 degrees Fahrenheit (20 degrees Celsius) prior to discharge to the outfall.

The methanol production process would produce a process wastewater stream of approximately 35 gallons per minute that would be recycled and reused on site. This process wastewater stream would be treated with a membrane bioreactor (MBR). The MBR would be an aerobic biological treatment with ultrafiltration. The process would use an ultrafiltration membrane downstream of an aeration basin. An aerobic biological treatment system was selected specifically to treat any trace amounts of methanol in the waste stream, organics, and suspended solids. Discharges from the MBR would be directed to the RO-EDI system for reuse on site.

Wastewater generated by auxiliary boilers and/or the on-site power generation (in the case of the ULE Alternative) would consist of condensate that would be discharged to the RO-EDI system and/or the cooling towers for reuse. The cooling towers would reuse the water for a specified number of cycles prior to discharge of the blowdown. Blowdown from the cooling towers is anticipated to be less than 400 gallons per day and would be discharged directly to the fire pond. If NWIW determines that the zero liquid discharge (ZLD) system is feasible, the cooling tower blowdown would be directed to the ZLD system.

In response to concerns about impacts to surface water, the project is conducting a more in-depth analysis of the possibility of eliminating the process wastewater discharge to surface water by incorporating into the facility design a ZLD system. The evaluation of the feasibility of using ZLD for the project is ongoing. However, use of the ZLD is evaluated in this EIS together with the surface water discharge to the Columbia River. To the extent a ZLD system could have other impacts, those possible impacts are evaluated in Chapter 5 of this EIS.

The ZLD system would use an evaporator and a crystallizer to reduce the process wastewater to a solid salt cake suitable for landfill disposal and high-quality distillate for reuse in the plant. The ZLD system would eliminate the process wastewater discharge to surface water. The ZLD system would produce approximately 340 gallons per minute of distillate that will be used for boiler feed water and approximately 62 gallons per minute that will be returned to the raw water treatment for reuse on site. Reuse of this distilled water would reduce total water consumption of the plant to 3,038 gallons per minute.

The ZLD system would produce approximately 10 tons of dry salt cake per day. The dry salt cake will consist of magnesium and sodium sulfate with a small amount of sodium and magnesium chloride. The waste salt cake would not exhibit any of the dangerous waste characteristics (as specified in the Washington Administrative Code [WAC] 173-303) and is suitable for disposal as non-hazardous solid waste. The ZLD system would require the addition of single-story buildings of approximately 5,000 square feet to house pumps and other equipment and crystallizer and brine concentrator towers that will be less than 100 feet in

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6 Blowdown refers to the loss of water due to high concentrations of dissolved solids (such as calcium, magnesium, chloride, and silica). When water evaporates, the dissolved solids are left behind and over time the concentration of dissolved solids increases, which can result in scale and corrosion affecting the process. To maintain the correct concentration, water with high-dissolved solids is removed from the system and replaced with water from the supply system.

7 Distillate is purified water resulting from condensing the vaporized wastewater stream.
height. These structures can be accommodated within the proposed project footprint and would not significantly change the project's appearance. The ZLD system would increase the average electrical load of the facility but peak levels would remain within the levels identified in Chapter 7 of the EIS. Air emissions also would remain within the levels discussed in Chapter 4 of the EIS and truck traffic is accounted for in Chapter 12 of the EIS. The ZLD system would also increase the number of noise generating equipment on the site but would be in enclosed buildings and would not increase the noise levels analyzed in Chapter 14 of the EIS.

**Stormwater Treatment**

With either of the Technology Alternatives, stormwater from the proposed methanol manufacturing facility and marine terminal would be segregated into two streams depending upon the anticipated pollutant loadings. These two streams would be (1) potentially contaminated stormwater and (2) non-contaminated stormwater. Non-contaminated stormwater would be from areas of the project site that are physically separated from the methanol production line areas from on-site paved areas (i.e., access roads, parking lots, and building rooftops) and would be directed to infiltration facilities for discharge into the ground. Potentially contaminated stormwater would be from the methanol production line areas of the facility, as well as the methanol storage tank areas. Stormwater from these areas may contain pollutants and, therefore, would be directed to a first flush pond for treatment. The first flush pond would discharge treated stormwater to the infiltration facility.

**Stormwater from the first flush pond may be reused on site as raw water for methanol production.** Stormwater from the first flush pond would be treated through a coalescing plate oil-water separator and a granulated activated carbon filter prior to discharge into the CLS for reuse. The ponds and infiltration facility would be sized to manage stormwater on site consistent with Cowlitz County and state standards. The ponds would be sized to infiltrate the 100-year, 24-hour rainfall event.

Detailed spill prevention, control, and countermeasures, including isolation valves and monitoring requirements, would be implemented across the site in accordance with 40 CFR 112.

Stormwater generated from site access roadways outside of the methanol manufacturing facility would be directed to roadside ditches and shallow containment to infiltrate.

**Ground Improvements**

The proposed project with either Technology Alternatives would incorporate seismic design criteria in accordance with applicable building codes and standards to account and compensate for anticipated earthquake effects. At this point in the design process, a range of design measures are being considered that would address the seismic hazards of the project site and meet the code performance requirements. These measures may include a ground improvement program that could be implemented to improve the existing subsurface soils and reduce the risk of ground movement during an earthquake. Ground improvement measures may include vibro-replacement (stone columns), soil mixing and jet grouting, and/or driven piles. Ongoing design and analysis would determine the final configuration and specific locations of the ground improvements to be installed, and the improvement techniques may be refined as the design progresses.
Employment

With either of the Technology Alternatives, the proposed methanol manufacturing facility would employ approximately 192 full-time employees, including administrative and management, production, maintenance, logistics, and technical staff. Workers would also be needed to work on the dock with vessel and export operations. The labor necessary for these tasks would vary based on vessel size and type.

2.6.1.5 Methanol Manufacturing Facility Construction Overview

The proposed project would be developed in one or two phases. The construction duration would be approximately 26 to 48 months depending on whether it is built in one or two phases. Construction is expected to begin in late 2016 and be completed as early as mid-2018 and as late as mid-2020.

The analyses of construction in this EIS assume that the proposed project would be constructed in one phase lasting approximately 26 months. This represents a reasonable worst-case assumption for analysis purposes because it would result in the most intense construction activity with the greatest amount of daily worker and truck traffic.

Construction of the proposed manufacturing facility and marine terminal would introduce construction workers and truck trips to the project site. Table 2-1 shows the average number of daily construction workers based on a 26-month construction duration. As shown in Table 2-1, the number of workers would vary throughout the construction period depending on the activities being undertaken. The average number of workers would be about 550 per day throughout the construction period. During the peak construction activities, there would be an average of approximately 1,032 workers per day. This schedule includes workers associated with the marine terminal construction activities.

<table>
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<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tr>
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<td>818</td>
<td>718</td>
<td>678</td>
<td>622</td>
<td>472</td>
<td>377</td>
<td>402</td>
<td>200</td>
<td>150</td>
<td>100</td>
<td>545</td>
<td>1,032</td>
</tr>
</tbody>
</table>

Note: This schedule conservatively assumes that in-water construction activities associated with the marine terminal would overlap with peak construction activities for the proposed methanol manufacturing facility.

Temporary support facilities would be installed on the project site as needed during construction. These facilities would include construction trailers for office space, food and catering facilities, a first aid station, portable restrooms, laydown areas, and site security.

It is expected that construction employees would park off site at nearby locations and would be bused to the project site. Three locations have been identified for potential parking lots for construction workers. These areas are lots adjacent to the existing Air Liquide facility, adjacent to the Steelscape facility, and at 2301 Hendrickson Drive (Figure 2-10). All three are west of I-5. During the peak construction period (three to four months), up to approximately 1,000 workers would park in the lot(s) and continue to the project site via shuttle buses.
Potential Temporary Construction Parking Areas

Figure 2-10
It is expected that some components of the proposed project (e.g., boilers, ASUs, water treatment, substation, and motor control centers) would be assembled off site and transported to the project site via barge. These modules may be offloaded from the existing North Port dock, across temporary falsework for the new dock trestle, or alternatively, may be offloaded directly from the barges using a temporary crane. A temporary concrete crane pad would be constructed on an upland portion of the site for offloading materials/equipment from barges.

Modules would be delivered to the site in self-anchoring barges, which would anchor offshore using spuds or similar temporary anchors. Barges would not be allowed to ground out on the beach. Barges would typically only be anchored in place for approximately one to two days, as material is being unloaded. Once offloaded, the equipment/modules will be moved into place and erected on the site. The temporary concrete pad would be demolished and removed prior to project completion.

Construction of the proposed methanol manufacturing facility would commence with mobilization, site preparation, and civil works activities. Site preparation would consist of clearing and grubbing the site, grading, and setting up the temporary construction facilities discussed above. The majority of the project site would be located at approximately Elevation 23 feet Columbia River Datum (CRD). The northwest portion of the project site may be elevated by as much as 10 feet higher than the rest of the site (i.e., to 33 feet CRD) using existing dredged materials on site or new material generated during dredging for the proposed project. Civil works would follow site preparation and would involve installation of ground improvements and utilities. Utility work at project outset would include firewater, drain lines, the underground duct bank, and other underground utilities. These utilities would be prioritized along with the other civil work. Following completion of the utility work, site paving would begin.

Construction of the methanol production lines would be modularized to the maximum extent practicable, with as much of the construction activity occurring off site as feasible. It is expected that certain components (e.g., boilers, ASUs, water treatment, substation, and motor control centers) would be assembled off site and transported to the project site via the Columbia River as discussed above. Certain components, such as the cooling towers, bulk product storage tanks, and support buildings, may be constructed on the project site. The flare would be ordered as a package and erected on site by a mechanical contractor.

### 2.6.2 Marine Terminal Alternatives

The Marine Terminal Alternatives analyzed in this EIS include Marine Terminal Alternative 1, in which the proposed marine terminal would be separate from the existing North Port dock, and Marine Terminal Alternative 2, in which the existing North Port dock would be extended.

With either Marine Terminal Alternative, the proposed marine terminal would be located on the western portion of the project site at approximately RM 72 and would consist of a dock and a single berth to accommodate the oceangoing vessels that would transport methanol to destination ports. The marine terminal under both Marine Terminal Alternatives would include a dock, a berth, loading equipment, utilities, and a stormwater system. These components are designed to support the necessary product transfer equipment and safely moor the vessels that may call on the proposed project. The berth would be designed to accommodate other vessel types and, when not in use for loading methanol, for other cargo operations, as a lay berth where vessels could moor while waiting to use other Port berths, and for topside vessel maintenance activities.
The primary difference between the two Marine Terminal Alternatives would be the design of the dock and trestles, and the resulting number of piles and area of overwater coverage.

2.6.2.1 Components Unique to Marine Terminal Alternative 1

Dock

The dock would generally be 530 feet long and 36 feet wide and would be designed to accommodate vessels ranging in size from 45,000 deadweight tonnage (DWT) to 127,000 DWT, and would include Handymax to Suezmax vessels measuring from 600 to 900 feet in length and 106 to 152 feet in width. The dock would consist of a transition platform, trestle, and turning platform. From the access trestle, the berth face of the dock would extend approximately 530 feet downstream, and would consist of an approximately 100-foot transition platform, a 370- by 36-foot berth trestle, and a 104- by 112-foot turning platform. Figure 2-11 shows a plan view of Marine Terminal Alternative 1.

The dock would be supported by precast 24-inch octagonal concrete piles supporting cast-in-place concrete pile caps and precast, prestressed haunched concrete deck panels. The dock would total approximately 44,943 square feet and include 320 concrete piles and 16 steel pipe piles. The bottom of the superstructure (deck, pile caps, etc.) would be located above the ordinary high water mark (OHWM).

Two 15- by 15-foot breasting dolphins would be constructed near the center of the dock. Each breasting dolphin would consist of seven 24-inch precast, prestressed concrete battered piles supporting a cast-in-place concrete pile cap with mooring bollards.8

Four 15- by 15-foot concrete mooring dolphins would be constructed (two upstream and two downstream of the platforms) for securing vessel bow and/or stern lines. Each mooring dolphin would consist of twelve 24-inch-diameter, precast, 24-inch-octagonal-diameter concrete piles supporting a cast-in-place concrete pile cap. The dolphins would be equipped with mooring bollards and electric capstans. Access to the mooring dolphins would be provided from the platform by trussed walkways with open grating surfaces. The walkways would be 3 feet wide with a combined length of 375 feet supported by four 18-inch-diameter steel pipe piles.

To provide for safe mooring and to prevent damage to the dock and vessel during the berthing and loading process, six fender units would be provided. Each unit would consist of 9- by 9-foot ultra-high molecular weight polyethylene face panels with a super cone fender unit and two 12-inch-diameter steel pipe fender piles. Below the panels, the fender piles would have 18-inch-diameter high-density polyethylene sleeves. Fender units would be placed on the dock face, two upstream and two downstream, and on the two breasting dolphins.

A single access trestle 34 feet wide and approximately 365 feet long would be constructed to provide vehicle, equipment, and emergency access to the dock from the shoreline.

A small building would be constructed on a corner of the turning platform. The building would function as a shelter from the weather and a small lunch area for the dockworkers and as a place to store tools and supplies. Electricity and communication services would be provided to the shelter but no water or sewer services would be provided.

8 The “battered” piles are installed at an angle to vertical as opposed to plumb piles, which are installed vertically.
Marine Terminal Alternative 1 Plan
Figure 2-11
A second small building would be constructed at the center of the dock, adjacent to the loading arms. The building would be used as an operations shack for the loading arms. Electricity and communications services would be provided to the operations building; no water or sewer services would be provided.

Figures 2-12 and 2-13 show section views of the proposed dock and trestle.

2.6.2.2 Components Unique to Marine Terminal Alternative 2

Dock

The new dock under this alternative would have the same design as the North Port dock extension permitted by USACE and other permitting agencies in 2005. The marine terminal under this alternative, as with the proposed project, would be used for loading methanol onto oceangoing vessels and general use by the Port for other cargo operations, as a lay berth where vessels could moor while waiting to use other Port berths, and for cleaning holds and other vessel maintenance activities.

The proposed dock would be a 100-foot-wide by 1,000-foot-long pile-supported structure extending from the north end of the existing North Port dock and oriented parallel to the shoreline. The proposed dock would be supported by approximately 450 24-inch-diameter octagonal precast concrete piles. The shoreward face would be 335 feet from the OHWM at a water depth of -25 feet CRD, and the waterward face at 435 feet from the OHWM at a water depth of -40 feet CRD. The offshore face of the pier would be protected from berthing vessels by 40 24-inch-diameter concrete fender piles. The dock surface would be concrete on top of precast concrete deck panels similar to Marine Terminal Alternative 1. Figure 2-14 shows a plan view of Marine Terminal Alternative 2.

The marine terminal under this alternative would be accessed by two 34-foot-wide access trestles supported by approximately 138 24-inch-diameter octagonal precast concrete piles. The trestles would be aligned perpendicular to shore and ground/mudline and the elevation varies from approximately +23 feet to -24 feet CRD on the north trestle and between +23 feet and -36 feet CRD on the south trestle. The trestles would be configured to eliminate abutments and shoreline armoring where they land on the riverbank. Instead, the abutments would be located upland, above the OHWM (CRD). Figure 2-15 shows a section view of Marine Terminal Alternative 2.

One dolphin containing nine 24-inch-diameter steel piles would be relocated from the north end of the existing dock to the north end of the proposed dock at approximately -36 feet CRD. The dolphin would be installed approximately 195 feet north of the trestle and would be connected to the dock by a 190-foot-long by 2.5-foot-wide catwalk. The catwalk would be supported by four 16-inch-diameter steel piles, two of which would be relocated from the existing North Port dock to the proposed dock.

2.6.2.3 Components Common to both Marine Terminal Alternatives

Marine Terminal Alternatives 1 and 2 would require similar dredging, stormwater treatment, utilities, and methanol loading equipment. They would also serve similar marine vessels.
Figure 2-12

Marine Terminal Alternative 1 Section
Figure 2-13

Marine Terminal Alternative 1 Trestle Section
Figure 2-14

Marine Terminal Alternative 2 Plan
**Berth Dredging**

The existing berth serving the Port’s North Port terminal would be extended northward to the new berth and deepened to -48 feet CRD with a 2-foot overdredge allowance consistent with the existing berth. The berth would extend at an angle from the edge of the Columbia River navigation channel to the berthing line at the face of the proposed dock. The footprint of the expanded berth would be approximately 18 acres, of which approximately 16 acres would require dredging to achieve the required berth depth. Figure 2-16 shows the area to be dredged. Existing water depths in the proposed berth area currently vary from -39 feet CRD to -50 feet CRD. The total anticipated dredging volume would be approximately 126,000 cubic yards.

Chemical characterization was performed to evaluate appropriate placement of the material dredged for the new berth (BergerABAM 2015) in accordance with guidance from the USACE Portland Sediment Evaluation Team and its interim final guidelines, *Regional Sediment Evaluation Framework* (USACE et al. September 2009), for the Lower Columbia River Management Area. The characterization results indicate that the proposed dredged material would be suitable for placement at any of the existing Port in-water or upland placement sites or on the upland portion of the project site for use during construction.

The existing authorized in-water placement locations include: (1) flow lane placement to restore sediment at a deep scour hole associated with a pile dike at RM 77.48 located on the Oregon side of the river; (2) flow lane placement to restore sediment at a deep scour hole associated with a pile dike at RM 75.63 located on the Washington side of the river; (3) beach nourishment at the Port’s shoreline park (Louis Rasmussen Park) at RM 76; and (4) the Ross Island Sand and Gravel disposal site in Portland, Oregon. The anticipated upland placement sites include the South Port site located north of the CHS/TEMCO grain terminal at approximately RM 77 and the project site. Additional in-water and upland sites may be identified and permitted for dredge material placement for general Port maintenance dredging needs in the future.

Maintenance dredging would likely be required over time to maintain the berth to the permitted depth. This activity would occur in the same manner as used for the establishment of the berth. The volumes and frequency of maintenance dredging events would vary based on the needs of the facility and the rate of shoaling. It is estimated that an average of 27,000 cubic yards of sediment could be deposited in the berth area yearly. Maintenance dredging would be permitted separately as part of the Port’s maintenance dredging program.

**Loading Equipment**

Methanol would be transferred from the bulk product storage tanks to the dock for loading onto vessels by three 16-inch pipelines. In addition, there would be three 6-inch vapor return lines and three 2-inch inert gas (nitrogen) lines running from the methanol manufacturing facility to the loading equipment on the dock. All of the pipelines, as well as mechanical, electrical, and plumbing utilities, would be elevated above the dock surface on a steel frame pipe rack.

Three complete loading systems on three arms will be installed to transfer methanol from the pipelines to the vessel manifold. Each has a liquid loading line, a vapor return line, and an inert gas line. Small vessels require only one or two arms to load.
Figure 2-16: Marine Terminal Alternative 1 Dredging Plan
Loading rates would vary from approximately 203,000 to 523,000 gallons (610 to 1,571 tonnes) per hour per line depending on the vessel size. The loading arms would be hydraulically articulated, equipped with an emergency release system, and configured to maintain clearance for emergency vehicles on the trestle behind.

Vessels would arrive with inert gas in the product tanks to keep the oxygen level in the individual tanks to a level below that required for combustion. The gas would be displaced from the tank as it is loaded with the methanol. The inert gas would be collected by three 6-inch-diameter pipes located on the loading arms and directed back to the plant via the vapor return pipes where it would be redirected to the production process.

Utilities

Domestic water service would be provided to the proposed dock and to the new fire hydrants serving it. New hydrants fed by 6-inch-diameter lines would be located at the dock and where the trestle connects to the land as required by the fire code. These hydrants would be fed using a 6-inch-diameter fire main. A 1-1/2-inch water service for domestic water service would be provided on the dock. A 3-inch domestic waterline would be constructed to the outside face of the dock. This water supply would serve two 2-inch-diameter provisioning connections, as well as approximately two washdown water spigots on the dock. All exposed water piping hung from the dock structure would be heat-traced to prevent freezing. Pipe supported on hangers would be equipped with flexible couplings at expansion joints.

Alcohol-resistant normal aqueous film-forming foam concentrate would be used for firefighting. The foam line would be mounted on the utility support frames and directed to fire monitors on the dock surface.

A new electrical substation would serve the new dock and provide shore power for berthed vessels. Dock lighting will be provided by fixtures mounted on 40-foot steel poles. Lighting levels would be designed to 5 foot-candles per the Washington Administrative Code (WAC) requirements. Private aids to navigation lighting would also be installed on the dock.

Stormwater Treatment

Stormwater runoff generated on the proposed dock and trestle would be collected and conveyed to a pumping station located at the platform to access trestle transition. The pump station would convey flows to the upland stormwater facility (see section 2.6.1.4) be fitted with a primary pump that would be capable of accommodating stormwater flows that would be subject to treatment requirements per the Stormwater Management Manual for Western Washington. A second pump at the pump station would pump flows in excess of the flow rate. All pumped flows would be conveyed upland in a single pipe to a flow separation structure.

Stormwater flow subject to treatment requirements would discharge to an oil/water separator prior to discharge to a water quality swale, designed in accordance with Ecology criteria. After passing through the swale, the runoff would be directed to a newly constructed infiltration ditch located upland. This infiltration ditch would also accommodate stormwater flows from the existing North Port dock and yard area, as well as the new collector well pump house and surrounding area. Stormwater from these areas are currently directed to an infiltration ditch that would be eliminated by the methanol plant. The proposed infiltration ditch would be approximately 495 feet long with a bottom width of 12 feet and depth of 5 feet. Flows at the flow separation structure that exceed the flows requiring treatment would discharge to a bypass line for direct discharge to the infiltration area.
Any accidental spills from pipelines on the dock (for both alternatives) would be captured on the dock surface and collected by the stormwater system. Valving would be installed on the storm conveyance pipes so that the spill could be diverted to a separate pumping system that would convey the contaminated water back to the proposed methanol manufacturing facility for treatment and reuse.

A new stormwater system would be constructed with the project to accommodate stormwater flows from the existing North Port dock because the project will displace the existing infiltration ditch. Stormwater flow subject to treatment requirements would discharge to an oil/water separator prior to discharge to an infiltration swale, designed in accordance with Ecology criteria. This swale would also accommodate stormwater flows from the new collector well pump house and surrounding area. The proposed infiltration ditch would be approximately 490 feet long with a bottom width of 12 feet and depth of 5 feet.

Marine Vessels

The marine terminal would be designed to load methanol onto oceangoing vessels that can handle methanol as a cargo. Vessels would arrive at the terminal from the Pacific Ocean via the Columbia River navigation channel. As noted above, the dock would be designed to accommodate vessels ranging in size from 45,000 DWT to 127,000 DWT, which would include vessels measuring from approximately 600 feet to 900 feet in length and 106 feet to 152 feet in width.

The typical speed of the types of vessels that would serve the proposed project is 15 knots in the ocean and 10 knots in the Columbia River. Vessels would be piloted across the Columbia River bar and up the river to the terminal as required by state and federal regulations. Assist tugs would help vessels arriving at and leaving the berth. Based on the typical vessel size and production of the plant, an estimated 3 to 6 ships per month or 36 to 72 ships per year would use the berth for loading and unloading methanol.

Additional ships may use the berth for other cargo operations, as a lay berth, and for topside vessel maintenance activities. There is no specific cargo use identified for the dock, but anticipated cargo would be similar to the types of limited cargo moved across other port public docks. At the existing Steelscape dock, for instance, other cargo has included steel plate, steel wire, a small number of yachts, and ship stores. These are examples of general cargo that could move across any public dock. The dock design limits the potential for other cargo operations. For example, the loading of other bulk materials (such as grain, minerals, or coal) would not be possible as no material handling elements for such cargos are included in the dock design. It is not expected that other cargo operations would be frequent or significant. Based on current lay berth activities at the Port, approximately 12 vessels per year are anticipated to use the dock as a lay berth, but this number will vary depending on the need. These lay berth vessels are anticipated to be vessels that are transiting the river for other purposes (such as loading cargo at other facilities); therefore, construction of the proposed dock is not expected to induce new vessel traffic to the river beyond those associated with the methanol production, but could serve as an additional lay-berthing facility for existing vessel traffic.
2.6.2.4 **Mitigation Activities under the Marine Terminal Alternatives**

Compensatory mitigation would be proposed to offset the reduction in habitat function of the water column due to shading and the loss of benthic habitats from pile installation under both Marine Terminal Alternatives. It is expected that each alternative would include three compensatory mitigation activities: (1) pile removal in the area shown on Figure 2-17; (2) engineered log jams (ELJ); and (3) riparian habitat restoration and wetland buffer enhancement. Potential aquatic habitat mitigation activities are discussed in more detail in Chapter 6, Plants and Animals.

The proposed project with either Marine Terminal Alternative would also include best management practices (BMPs) to minimize the extent of any impacts to marine mammals or the aquatic environment due to dredging, overwater work, and pile installation.

2.6.2.5 **Marine Terminal Alternatives Construction Procedures**

**Mobilization**

Most of the construction activities would be water based and mobilization would generally consist of moving barge-mounted equipment to the site with tug boats. Two to four barges would typically be used at the site at any given time.

**Pile Installation**

Concrete and steel piles would be installed using vibratory and/or impact hammers (depending upon pile type, as described below), most likely operated from a barge. Piles would typically be transported to the site and stored at the site on a work barge. The contractor’s water-based equipment would include a barge-mounted crane with pile-driving equipment and a materials barge with piles. At times, a second barge-mounted crane may be on site with an additional materials barge.

Concrete piles would be installed with an impact hammer. It is anticipated that steel piles would be driven with a vibratory hammer, and that it would not be necessary to impact drive or impact proof any of the steel piles. If it does become necessary to impact-drive steel piles, a bubble curtain or similarly effective noise attenuation device would be employed to reduce the potential for effects from temporarily elevated underwater noise levels. Temporary piles may be required during the pile driving and overwater construction process. Temporary piles are typically steel pipe or H-piles and are driven with a vibratory hammers. These are placed and removed as necessary during the pile driving and overwater construction process.

All pile installation would be conducted during the in-water work window that is approved for this project via project permitting. The typical in-water work window at the site is September through January but may vary for specific activities.

It is anticipated that pile driving would be completed over approximately 80 to 120 days during the 2016-2017 and/or 2017-2018 in-water work windows. Ordinarily, work would be conducted during standard daylight working hours, roughly 8 to 10 hours a day.
Figure 2-17

Pile Removal

Parcel: WH2500003 (Port of Kalama)

Parcel: WH2516001 (WDFW)

Parcel: WD3012003 (WDFW)

Piles to be removed (approximately 157 total)
Overwater Construction

Overwater construction includes those activities that are waterward of the OHWM, but that are conducted above the OHWM elevation or the actual water surface at the time of construction, such as construction of pile caps, deckin, fenders, and other associated overwater structures. These overwater structures would include a combination of cast-in-place and precast concrete structures, grated steel walkways, and associated structures, such as rails, fenders, bollards, etc. Overwater activities and activities conducted in the dry below OHWM would be conducted according to the BMPs established for the project, which would minimize potential impacts to water quality, such as spills or release of construction debris into the waters at the site. These activities would not be limited to the in-water work window.

Surface features, such as loading arms, pipe racks, fenders, and bollards, would be manufactured off site, arrive at the site by land or water, and be installed with a crane.

Timing

Proposed in-water work will be conducted only during the in-water work window that is ultimately approved for this project. The currently published in-water work window for this reach of the Columbia River is 1 November to 28 February. However, regulatory agencies, including the USACE, WDFW, U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, have recently suggested making modifications to the window to take into account the best available science and to address newly listed species. The following work windows are proposed for this project, as explained further below:

- Pile installation will be conducted between 1 September and 28 February
- Dredging will be conducted between 1 August and 31 December
- ELJ installation will be conducted between 1 August and 31 December may be conducted year-round
- Pile removal may be conducted year-round
- Work conducted below the OHWM, but outside the wetted perimeter of the river (in the dry), may be conducted year-round

These work windows are necessary to accommodate the construction schedule, while simultaneously being cognizant of avoiding biologically sensitive time periods for given activities. One of the driving considerations is the need to conduct all or most berth dredging prior to pile installation. The proposed dredging window is designed to begin early enough in the season to allow pile-driving activities to begin on schedule, while avoiding the bulk of the peak juvenile salmonid outmigration in the spring/summer, and the peak run timing for Pacific eulachon in the late winter/early spring. An early pile installation window will minimize the need for pile installation to be extended into the late winter/early spring time frame. The project proposes to use impact driven concrete structural piles (rather than steel), which are not known to result in injurious levels of underwater noise. For this reason, an early start to the pile installation window will not result in adverse effects to any fish or other aquatic species. ELJ installation could be conducted during late summer, fall, or early winter, to accommodate the range of times when Columbia River water levels could be low, to allow for improved access to the shoreline, and to minimize disturbance to the aquatic environment. Pile removal activities, and work conducted below the OHWM, but outside the wetted perimeter of the river (i.e., in
the dry), are not expected to result in significant impacts to aquatic species or resources and, as such, these activities could be conducted year-round.

Construction crews and methods will be influenced by weather, timing, and available equipment, as well as this time frame.

2.6.3 Off-Site Alternative

The Off-Site Alternative would develop the proposed methanol production facilities at the Port’s East Port site located east of I-5 as shown in Figure 2-18. The Off-Site Alternative project site would be approximately 90 acres in size and would consist of a portion of tax parcel 412220134 in the city of Kalama. This portion of the Off-Site Alternative project site is currently used for interim agricultural uses. The Off-Site Alternative project site would also include the same area for the marine terminal and pile removal as the proposed project and would include portions of tax parcels 60831 and 60822 for new pipelines to convey methanol from the methanol manufacturing facility to the marine terminal and raw water from the collector well and pump house to the methanol manufacturing facility.

This alternative would include the same methanol manufacturing facility components as the proposed project, except they would be located on the East Port site. The Off-Site Alternative, like the proposed project, would produce up to 10,000 tonnes of methanol per day when operating at full capacity. The methanol would be stored on site for shipment to global markets by oceangoing vessel from a newly constructed marine terminal to be operated by the Port. The same marine terminal and collector well would be developed with the Off-Site Alternative as with the proposed project.

Approximately 0.9 mile of pipeline would be required to convey methanol from the Off-Site Alternative project site to the marine terminal in the Columbia River. It would also require pipelines of similar length to raw water from the proposed collector well to the Off-Site Alternative project site.

The pipeline and utilities would cross beneath I-5 and would be installed using horizontal directional drilling methodology.

2.6.3.1 Analysis of the Off-Site Alternative

The analysis below indicates that the Off-Site Alternative is not a reasonable alternative because the environmental impacts associated with developing the project at the off-site location would be greater than developing the project at the proposed site. This conclusion is based primarily on:

- potential impacts to existing wetlands and/or other habitat;
- visual, noise, and safety issues due to proximity to residences;
- distance from the marine terminal; and
- inconsistency with existing comprehensive plan and zoning designation.

These factors are described in more detail below.
Off-Site Alternative Parcel Map

Figure 2-18
Wetlands and Other Habitat

The Off-Site Alternative site includes wetlands, riparian, and agricultural land habitat types. The National Wetlands Inventory (NWI) identifies several wetland polygons that encompass the majority of the project site for the Off-Site Alternative. Wetland types include palustrine emergent (PEMC, PEMA) and palustrine unconsolidated bottom, excavated wetlands (PUBHx) (USFWS 2015). The palustrine unconsolidated bottom wetlands correspond to excavated open ponds associated with prior gravel mining activities that occurred on the site.

NWI mapping at the Off-Site Alternative site was conducted in 1981 and is the product of “photo-interpretation of high-altitude aerial photography, supported by preliminary field reconnaissance and aided by the use of collateral information (County Soil Surveys, USGS quadrangles, etc.)” (USFWS 1982). The NWI data is reflective of the conditions visible from aerial photography conducted during the specific year and season when the mapping was conducted are not precise delineations. In addition, the Off-Site Alternative project site has been leased for agricultural use for corn, hay, and cattle grazing. Nonetheless, wetlands are present on the Off-Site Alternative project site, although the actual extent of such wetlands may not be as extensive as indicated by the NWI.

Development of the Off-Site Alternative would directly impact wetlands and other habitat at the site. In contrast, the development of the proposed project on the North Port site would not directly impact wetlands.

Noise

The Off-Site Alternative would involve the same equipment as the proposed project but would be located east of I-5. The Off-Site Alternative would be farther from residences in Prescott, Oregon (over 6,000 feet away), and from the Sportsmans Club (over 3,000 feet away, which is treated as a residential use for the purposes of the noise analysis) than the proposed project, but would be much nearer to residences to the east and southeast than the proposed project. The residences that would be nearest to the Off-Site Alternative project site are on the hillside to the northeast, approximately 600 feet from the site boundary, and residences approximately 1,250 feet to the southeast. There are approximately 8 residences to the southeast and 20 residences on the hillside to the northeast, including those along Old Pacific Highway.

Operational noise with the Off-Site Alternative would likely exceed the nighttime noise limits set forth in the WAC 173-60 at six residential receptors southeast and northeast of the Off-Site Alternative project site (receptors SE1, SE2, NE1, NE2, NE3, and NE4, see Chapter 14, Noise, for a map of receptor locations). In addition, operational noise could result in substantial, clearly discernible increases (i.e., 10 dBA or more) over existing levels at two locations (receptors NE3 and NE4). Mitigation measures to address these impacts could include the use of equipment enclosures, quieter specified equipment, stack/exhaust/inlet silencers, and changes to operating parameters (i.e., reduced nighttime operation). It is uncertain at this time if noise mitigation that is both feasible and cost-effective could be identified that could reduce the noise from the Off-Site Alternative project site to levels that would not result in significant adverse noise impacts. Therefore, unlike the proposed project, operation of the Off-Site Alternative would result in potential unavoidable significant adverse noise impacts.

Visual Resources

The Off-Site Alternative would displace interim agricultural uses, open space, and mature trees with heavy industrial facilities on the East Port site. Certain viewers from residential areas on the hillside to the northeast of the site would have direct views of the Off-Site Alternative in the
visual foreground to middle ground. This alternative would result in more noticeable and prominent effects on views from residential areas than the proposed project, which would be located more distant from these residential areas.

The Off-Site Alternative would also be highly visible in views from Kress Lake, unlike the proposed project. This alternative would be a prominent feature in views for recreational users of Kress Lake and would alter the site’s existing visual context of interim agricultural land, open space, and mature trees. This change would adversely affect views from Kress Lake. The proposed project site would only be visible from Kress Lake during winter, when trees are bare.

**Design Considerations – Distance to the Marine Terminal**

The Off-Site Alternative would require approximately 0.9 mile of pipeline to convey methanol from the Off-Site Alternative project site to the marine terminal in the Columbia River. It would also require pipelines of similar length to convey raw water from the proposed collector well to the Off-Site Alternative project site. These pipelines would require crossing under I-5 and would result in a greater amount of land disturbance than would be necessary under the proposed project. They would also require greater energy use for the increased pumping loads, greater maintenance and potential for spills due to their longer length, and increased operational costs related to energy and the additional maintenance.

**Land and Shoreline Use – Consistency with Comprehensive Plan and Zoning Designation**

The Off-Site Alternative project site is located in the city of Kalama and has a zoning and comprehensive plan designation of Mixed Use. Per Kalama Municipal Code 17.25, the mixed-use zone is intended to combine two or more land uses, such as residential, commercial, business, and light industrial uses in close proximity. The Port of Kalama Comprehensive Scheme of Harbor Improvements also anticipates a mixed-use business/light industrial/recreational park on the East Port site. The Off-Site Alternative would introduce a single-use development on a large portion of the broader East Port site, and a methanol manufacturing facility would likely not be considered a light industrial use compatible with the other mix of uses planned for the properties in this area. Therefore, the Off-Site Alternative may be inconsistent with the zoning and comprehensive plan designation of the East Port site and the Port of Kalama Comprehensive Scheme of Harbor Improvements.

**2.6.3.2 Off-Site Alternative Summary**

The comparison of the proposed project and Off-Site Alternative indicates that impacts to a variety of environmental factors would be greater with the Off-Site Alternative, and the use would not be consistent with current comprehensive plan and zoning designations, as summarized below in Table 2-2.

Reasonable alternatives under SEPA are those that feasibly attain or approximate a proposal’s objectives and provide a lower environmental cost or decreased level of environmental degradation than the proposal. The Off-Site Alternative would not attain the project objectives with a lower environmental cost. The Off-Site Alternative is, therefore, not included in the more detailed EIS analysis.
### Table 2-2. Summary of Off-Site Alternative Compared with the Proposed Project

<table>
<thead>
<tr>
<th>Technical Area</th>
<th>Proposed Project</th>
<th>Off-Site Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Considerations – Distance to Marine Terminal</td>
<td>Adjacent to marine terminal.</td>
<td>Approximately 0.9 mile of pipeline to convey methanol and water from the site to the marine terminal.</td>
</tr>
<tr>
<td>Plants and Animals</td>
<td>The proposed project would require approximately 336 new piling, approximately 44,943 square feet of new overwater coverage, and approximately 126,000 cubic yards of dredging within approximately 16 acres of an 18-acre expanded berth. The proposed project would not result in any direct wetland impacts. See Chapter 6, Plants and Animals.</td>
<td>The Off-Site Alternative would result in greater impacts to wetlands and associated plants and animals. Impacts associated with piling, overwater coverage, and dredging would be the same as the proposed project.</td>
</tr>
<tr>
<td>Noise</td>
<td>No significant adverse noise impacts. See Chapter 14, Noise.</td>
<td>Potential significant adverse noise impacts.</td>
</tr>
<tr>
<td>Water</td>
<td>The proposed project would not result in any direct wetland impacts. See Chapter 5, Water Resources.</td>
<td>The Off-Site Alternative would result in greater impacts to wetlands.</td>
</tr>
<tr>
<td>Land and Shoreline Use - Comprehensive Plan and Zoning Designations</td>
<td>Consistent with the comprehensive plan and zoning designation for project site. See Chapter 9, Land Use and Shoreline Use, Housing, and Employment.</td>
<td>Potentially inconsistent with the City of Kalama zoning and comprehensive plan designation of the East Port site, as well as the Port of Kalama Comprehensive Scheme of Harbor Improvements.</td>
</tr>
<tr>
<td>Visual Resources</td>
<td>Views would change from surrounding areas but impacts are not considered to be significant and adverse.</td>
<td>Potential for greater impacts to residential viewers and recreational viewers at Kress Lake.</td>
</tr>
</tbody>
</table>

### 2.6.4 Use of the Existing Dock

The Port’s existing North Port dock, which is located immediately downstream of the project site, is used by an existing Port tenant (Steelscape, Inc.) to import steel coil and by the Port for lay berthing of vessels being cleaned in support of the Port’s two grain terminals. During the development of the project design, the Port considered the feasibility of exporting methanol over the existing North Port dock. This alternative ultimately was rejected for several reasons.

Given the projected call frequency and berth utilization for the proposed facility (approximately 3 to 6 ships per month or 36 to 72 ships per year), it is expected that both vessels serving the facility, as well as vessels serving Steelscape, could potentially be waiting to berth at the dock. Steelscape has preferential berthing rights to the dock, which would shift the burden for delays in docking to the proposed facility. Delays in docking would have the potential to lead to storage problems, which would in turn affect the manufacturing process. A lack of available storage would result in a need to reduce production, which would affect the efficiency of the operation. These delays would represent an unreasonable economic burden for the proposed project. Delays could also result in the need to accommodate vessels waiting to load at the dock at existing anchorages in the river resulting in congestion and overuse of anchorages.

Additional factors that make the existing dock infeasible include the fact that the methanol loading equipment (including marine loading arms, fire protection and monitoring equipment, and piping) would interfere with Steelscape’s ability to unload steel coils from the dock, and overhead equipment would represent a potential safety hazard to Steelscape’s operations. In addition, the size of the largest vessels that could potentially call on the proposed facility,
which includes vessels up to 127,000 DWT, are larger than those that can currently be accommodated by the existing dock and berth.

2.6.5 No-Action Alternative

A No-Action Alternative is analyzed in this EIS as required by SEPA regulations. Under the No-Action Alternative, the proposed project would not be constructed on the project site.

Given the project site’s highway, rail, and waterfront access and the Port’s Comprehensive Scheme for Harbor Improvements, it is expected that the Port would pursue future industrial or marine terminal development of the site absent the proposed project.

Given the demand for methanol in global markets, the proposed project may be constructed on another site within the Pacific Northwest or at other locations in the world and could use natural gas or other feedstock, such as coal.

2.7 Related Actions

2.7.1 Natural Gas Supply – Kalama Lateral Project

The proposed project would use natural gas as the feedstock of the methanol project. Northwest is proposing to construct and operate the Kalama Lateral Project (the proposed pipeline) a 3.1-mile, 24-inch-diameter natural gas pipeline and related facilities to provide natural gas transportation service to the proposed project.

The proposed pipeline is subject to the jurisdiction of the FERC and an application pursuant to Section 7(c) of the Natural Gas Act and Subpart A of Part 157 of FERC’s regulations was submitted by Northwest to FERC on October 27, 2014 (Docket No. CP15-8-000). The proposed pipeline is undergoing a separate review process through FERC. However, because the proposed pipeline is being constructed primarily for the proposed project, it is considered a related action and the effects of the construction and operation of the proposed pipeline will be considered in the evaluation of the proposed project.

The proposed pipeline would begin at the interconnection of Northwest’s existing Ignacio to Sumas 30-inch mainline at approximately Milepost 1254.1 of the mainline in Section 33, Township 7 North, Range 1 West, and would end within the boundary of the manufacturing facility in Section 31, Township 7 North, Range 1 West, Cowlitz County, Washington (Figure 2-19).

The pipeline would be located within a new 50-foot-wide permanent pipeline easement. The pipeline project would require new appurtenances, including a new tap and isolation valve to tie the proposed 24-inch-diameter lateral pipeline into the existing 30-inch-diameter mainline. Additionally, pigging⁹ facilities would be installed at the beginning of the lateral pipeline and at the new delivery meter station to be constructed within the boundary of the manufacturing facility. The meter station would include standard appurtenances, piping, and buildings within an approximate 150-foot by 200-foot fenced area. A complete description of the proposed pipeline is available in the FERC environmental assessment for the proposed pipeline.

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⁹ A “pig” is a device that is inserted into and moves through a pipeline to clean the pipe, inspect it, or for other purposes.
Proposed Pipeline Route

Figure 2-19

The proposed pipeline would use the same preferred route as the Kalama Lateral Project. That project was filed previously with FERC in Docket No. CP13-18 (Docket CP13-18). Docket CP13-18 was assigned after the FERC pre-filing process, subsequently filed with the Commission, and later withdrawn prior to the issuance of a Certificate of Public Convenience and Necessity (certificate) when the proponent cancelled the project. Additional information is provided in Appendix B.


It is anticipated that the pipeline would be constructed in the following sequence: clearing, grading, trenching, trench preparation for the 24-inch-diameter pipeline, pipe stringing, welding, lowering-in, backfilling, regrading, and restoration. The construction activities would occur in sequence along the pipeline route with one crew following the next from clearing until final cleanup. In certain areas, such as residential areas or at water body and road crossings, most of the construction activities would be completed together as one operation.

Additional information on the proposed pipeline construction is provided in Appendix B.

2.7.2 Electrical Service

In order to provide electric service to the proposed project under either of the Technology Alternatives, it is expected that Cowlitz PUD would upgrade an existing transmission line from its existing Kalama Industrial Substation (located east of the project site at the northwest corner of N. Hendrickson Drive and Wilson Drive) to the project site by installing new lines on existing towers within an existing transmission line corridor. This line originates at the substation and continues north along N. Hendrickson Drive before crossing the Kalama River and continuing north to the project site. New equipment (e.g., 115-kilovolt [kV] breakers and switches) would be installed at the Kalama Industrial Substation within the existing footprint of that facility.

Cowlitz PUD also has indicated that it may construct a short transmission line (approximately 750 feet) between the Kalama Industrial Substation located on the west side of I-5 and an existing 115-kV transmission line on the east side of I-5 to provide redundant supply to the substation. This short line would cross I-5, the railroad, and N. Hendrickson Drive and would require installation of new poles. Figure 2-20 illustrates the location of these improvements with the proposed project.

The electrical load delivered by Cowlitz PUD must be considered by the PUD as a “new large single” load. This legal designation requires that the customer needing the service, in this case NWIW, to pay for the costs for the electrical service, including all power generation costs, transmission costs, and any system upgrades that are specifically required to deliver the electrical service. In addition, power purchased for this “new large single load” cannot be provided from the “preference power” generated by the federal Columbia River Hydropower System. “Preference power” is federally obligated to be made available to public utility districts and preference customers and not to industrial customers. Cowlitz PUD anticipates that there will be no impacts to rates paid by existing customers as a result of the project (Cowlitz PUD 2016).
Proposed Electrical Service
Figure 2-20
2.8 Anticipated Permit Requirements

2.8.1 Proposed Project

The proposed project would require federal, state, and local permits and authorizations. Table 2-3 below is a preliminary list of the permits that are anticipated to be required. Additional permits or approvals may be identified as the design and environmental review processes proceed.

Table 2-3. Permits and Authorizations Required for the Proposed Project

<table>
<thead>
<tr>
<th>Permit/Authorization</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal</strong></td>
<td></td>
</tr>
<tr>
<td>Rivers &amp; Harbors Act Section 10/Clean Water Act Section 404</td>
<td>USACE</td>
</tr>
<tr>
<td>Endangered Species Act Section 7 Consultation</td>
<td>National Oceanic and Atmospheric Administration (NOAA) Fisheries/USFWS</td>
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<td>Marine Mammal Protection Act</td>
<td>NOAA Fisheries</td>
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<td>NEPA</td>
<td>USACE, NOAA Fisheries</td>
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<td>Private Aids to Navigation Permit</td>
<td>U.S. Coast Guard</td>
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<tr>
<td>Section 106 of the National Historic Preservation Act</td>
<td>USACE</td>
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<tr>
<td>Funding</td>
<td>Various agencies to be determined</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
</tr>
<tr>
<td>Hydraulic Project Approval</td>
<td>WDFW</td>
</tr>
<tr>
<td>Shoreline Conditional Use Permit</td>
<td>Ecology</td>
</tr>
<tr>
<td>401 Water Quality Certification</td>
<td>Ecology</td>
</tr>
<tr>
<td>Prevention of Significant Deterioration (Air) Permit or Air Discharge Permit (based on the CR or ULE Alternative)</td>
<td>Southwest Clean Air Agency/Ecology</td>
</tr>
<tr>
<td>NPDES Construction Stormwater Permit</td>
<td>Ecology</td>
</tr>
<tr>
<td>NPDES Industrial General Stormwater Permit</td>
<td>Ecology</td>
</tr>
<tr>
<td>NPDES Industrial Wastewater Discharge Permit (unless the ZLD system is feasible and is selected)</td>
<td>Ecology</td>
</tr>
<tr>
<td>SEPA</td>
<td>Port and County</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td></td>
</tr>
<tr>
<td>Shoreline Substantial Development and Conditional Use Permit</td>
<td>County</td>
</tr>
<tr>
<td>Critical Areas</td>
<td>County</td>
</tr>
<tr>
<td>Floodplain Permit</td>
<td>County</td>
</tr>
<tr>
<td>Engineering and Grading</td>
<td>County</td>
</tr>
<tr>
<td>Building, Mechanical, Fire, etc.</td>
<td>County</td>
</tr>
</tbody>
</table>
2.8.2 Related Actions

Table 2-4 lists the anticipated permits, approvals, and consultation required for the construction and operation of the proposed pipeline. Table 2-5 lists the anticipated permits for the construction and operation of the proposed transmission line improvements.

Table 2-4. Permits and Authorizations Required for the Proposed Pipeline

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal</strong></td>
<td></td>
</tr>
<tr>
<td>FERC</td>
<td>Certificate of Public Convenience and Necessity</td>
</tr>
<tr>
<td>USACE</td>
<td>Permit for the discharge of dredge or fill material into waters of the United States under Section 404 of the Clean Water Act</td>
</tr>
<tr>
<td>USFWS</td>
<td>Consultations for impacts on federally listed threatened and endangered species and critical habitat under Section 7 of the Endangered Species Act and the Migratory Bird Treaty Act</td>
</tr>
<tr>
<td>NOAA Fisheries</td>
<td>Consultations for impacts on federally listed threatened and endangered species and critical habitat under Section 7 of the Endangered Species Act and the Magnuson-Stevens Act</td>
</tr>
<tr>
<td>Advisory Council on Historic Preservation</td>
<td>Consultation under Section 106 of the National Historic Preservation Act if the Project would affect historic properties</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td>General Permit for Construction Stormwater Discharge under the National Pollution Discharge Elimination System</td>
</tr>
<tr>
<td>WDFW</td>
<td>Hydraulic Project Approval</td>
</tr>
<tr>
<td>Washington Department of Natural Resources</td>
<td>Forest Practices Act</td>
</tr>
<tr>
<td>Department of Archaeology and Historic Preservation</td>
<td>National Historic Preservation Act – Section 106 Consultation</td>
</tr>
<tr>
<td>Washington State Department of Transportation</td>
<td>Road Crossing Permit</td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td></td>
</tr>
<tr>
<td>Cowlitz County</td>
<td>Critical Areas Ordinance, Pipeline Ordinance, Grading Ordinance, County Road Crossing Permits</td>
</tr>
<tr>
<td>City of Kalama</td>
<td>Fill and Grade, Critical Areas, Right-of-Way Permits</td>
</tr>
</tbody>
</table>

Table 2-5. Permits and Authorizations Required for the Proposed Electrical Service

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>BNSF</td>
<td>Wire Line Crossing License</td>
</tr>
<tr>
<td><strong>State</strong></td>
<td></td>
</tr>
<tr>
<td>Washington State Department of Transportation</td>
<td>Utility Permit</td>
</tr>
</tbody>
</table>
2.9 Benefits or Disadvantages of Reserving Project Approval for a Later Date

If the Port, County, or other agency with permitting authority were to delay action on the proposed project, the impacts associated with construction and operation of the facility would be delayed along with any potential benefits of the project, such as increased tax revenues and job creation. In addition, if the proposed project were to be delayed, the market for methanol and products created from it could respond by developing additional methanol plants in other locations. These plants may manufacture methanol from coal or through use of a less efficient technology. Delaying the action could allow the Port to pursue other development opportunities on the site that could result in similar, lesser, or more adverse impacts than the project.

2.10 References


