Chapter 12 Transportation

12.1 Introduction

This chapter addresses the potential impacts of the proposed project's Technology and Marine Terminal Alternatives and a No-Action Alternative, as well as the related actions, on transportation facilities. The sections below describe the regulatory context, define a study area for the assessment, describe the existing conditions within the study area, and assess the probable impacts on transportation facilities.

The assessment of the proposed project's potential impacts on area roadways and other surface transportation facilities presented in this chapter is based on a detailed transportation impact analysis provided in **Appendix K**. All backup analysis materials associated with this analysis are provided in **Appendix K**.

The proposed project, with either Technology Alternative and either Marine Terminal Alternative would be located on the same project site and would result in the same construction and operational employment, and so for the purposes of the transportation study, the Technology and Marine Terminal Alternatives for the proposed project are assessed using the same study area. This analysis applies to the proposed project with either Technology Alternative and either Marine Terminal Alternative and does not distinguish between the various alternatives.

The analysis concludes that the proposed project, with either Technology Alternative and either Marine Terminal Alternative, would not result in significant adverse impacts to transportation facilities.

12.2 Regulatory Context

12.2.1 Roadways

Area roadways are located in unincorporated Cowlitz County. The "Cowlitz County Road and Street Design Standards," issued by the Cowlitz County Department of Public Works specifies standards for establishing, laying out, constructing, altering, repair, improvement, and maintenance of roadways, bridges, and other related work in Cowlitz County.

12.2.2 Vessel Transportation

Table 12-1 lists the applicable federal, state, and local regulations applicable to marine vessels.

Table 12-1. Laws and Regulations Related to Vessel Transportation

Laws and Regulations	Description
Federal	
Ports and Waterways Safety Act of 1072 (31 U.S.C. 1221 et seq,)	Authorizes U.S. Coast Guard (USCG) to provide for navigation and vessel safety.
Anchorages under Ports and Waterways Safety Act (33 CFR 109)	Authorizes USCG to specify times of movement, restrict operations, and direct anchoring of vessels under hazardous conditions.

Laws and Regulations	Description
Navigable Water Regulations (33 CFR 126)	Regulates the handling of explosives or other dangerous cargoes within or contiguous to waterfront facilities.
Navigation and Navigable Waters, Subchapter E: Inland Navigation Rules (33 CFR 83–90)	Applies to vessel on the inland waters of the United States.
Navigable Water Regulations (33 CFR 160 – 167)	Ports and waterways safety regulations.
State	
Maritime Pilots and Pilotage (Oregon Revised Statutes Title 58 Chapter 776)	Requires the use of registered pilot when navigating certain waters in the State of Oregon including the Columbia River and/or Bar.

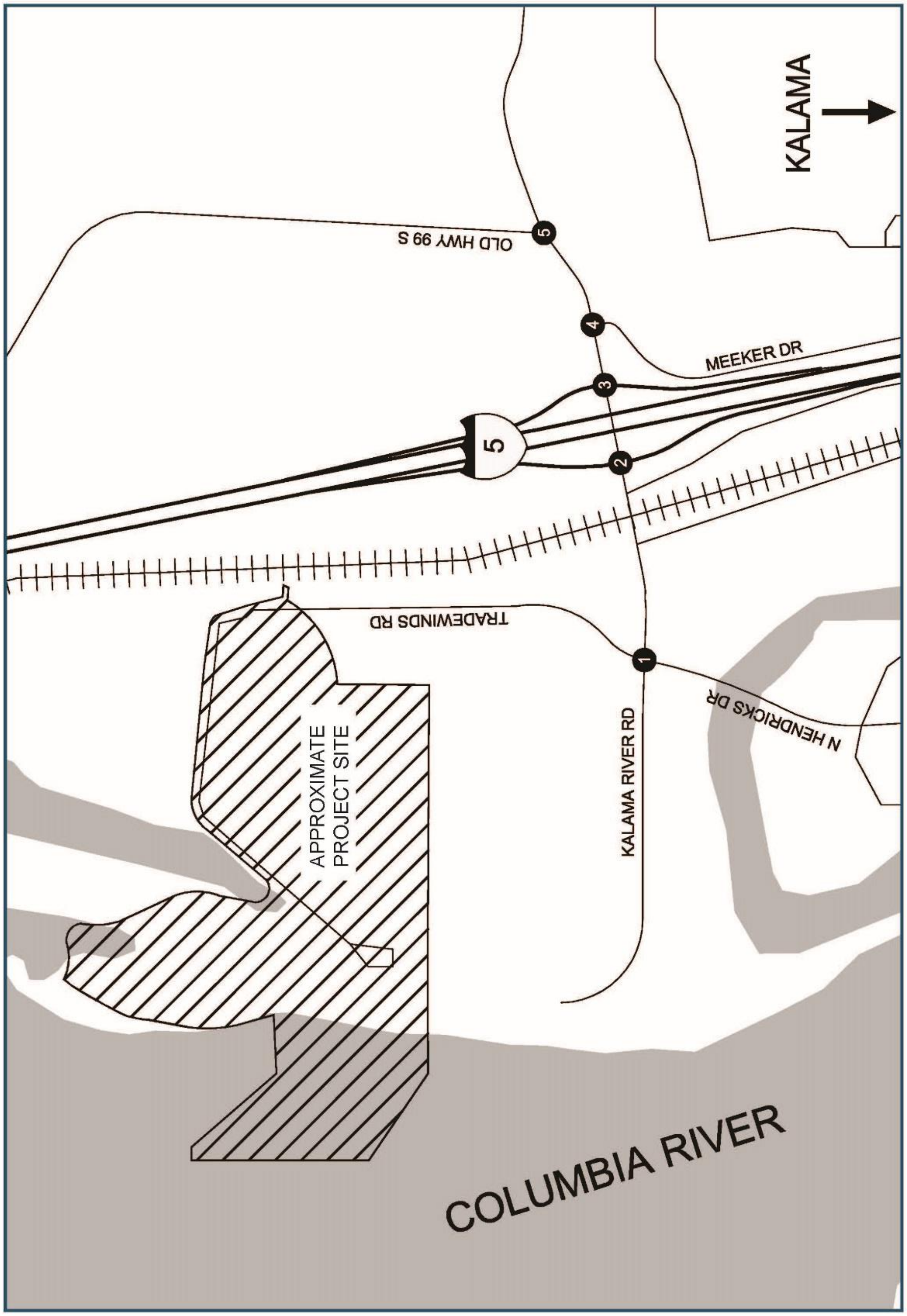
12.3 Methodology

12.3.1 Study Area

The project site is within the Port of Kalama's (Port) North Port site in unincorporated Cowlitz County. The study area for the surrounding surface transportation network was defined as the following five intersections near the project site (see **Figure 12-1**):

- Tradewinds Road – N. Hendrickson Drive/Kalama River Road
- Interstate 5 Southbound Ramps/Kalama River Road
- Interstate 5 Northbound Ramps/Kalama River Road
- Meeker Drive/Kalama River Road
- Old Highway 99 S/Kalama River Road

The study area for marine transportation was defined as the navigable channel of the Columbia River, from the project site to 3 nautical miles beyond the river mouth, which represent the route for vessels serving the facility within the state of Washington.



Transportation Study Intersections
Figure 12-1

12.3.2 Identification of Existing Roadway Conditions

The existing conditions analysis identifies site conditions and current operational and geometric characteristics of roadways within the study area. This section creates a basis for comparison to other conditions. The study area was visited and inventoried in July 2015. At that time, information was collected regarding site conditions, adjacent land uses, existing traffic conditions, and transportation facilities in the study area.

12.3.2.1 Analysis Period

The weekday afternoon period (4:00 – 6:00 PM) was selected for evaluation of peak hour traffic conditions at all study intersections based on a review of current traffic patterns, which indicate higher weekday PM peak hour flows than AM peak hour flows on the street system, and expected weekday afternoon peaking conditions of the proposed project.

12.3.2.2 Intersection Analysis Methodology

All level of service (LOS) analyses described in this report were performed in accordance with the procedures stated in the 2000 *Highway Capacity Manual* (Transportation Research Board, 2000). LOS is used by planners and transportation engineers to describe the operational condition of a roadway network or intersection. LOS is described on a graded scale from LOS A, which indicates free-flow conditions with little to no delay, to LOS F, which indicates a breakdown in flow with significant congestion and delay. A more detailed description of LOS and the criteria by which it is determined for both signalized and unsignalized intersections is provided in the detailed Transportation Impact Analysis Report in **Appendix K**.

The peak 15-minute flow rate was used in the evaluation of all intersection operations to ensure that this study was based on a reasonable worst-case scenario. For this reason, the operations analyses reflect conditions that are only likely to occur for the peak 15 minutes of the weekday PM peak hour. Traffic conditions during all other weekday hours would likely operate under better conditions than those described in this report.

For the intersections operations analyses, Synchro Version 9.0 software was used to analyze all study intersections.

12.3.2.3 Intersection Operating Thresholds

The Washington State Department of Transportation (WSDOT) sets LOS standards for state highways of statewide significance based on RCW 47.06.140(2). WSDOT has established a LOS C standard for the Interstate 5 (I-5) corridor.

LOS E represents the level of delay at which drivers begin using alternative routes or may take risks when attempting maneuvers. Because Cowlitz County has no official LOS standards, a target threshold of LOS E or better was identified in this analysis for unsignalized, stop-controlled intersections under County authority. This threshold was selected because it represents the point at which drivers experience difficulty finding acceptable gaps in opposing traffic, and the length of average control delays approaches intolerable levels due to little or no remaining intersection capacity.

12.3.3 Development of Future Roadway Conditions

Future conditions in the transportation study area were projected based on planned or anticipated geometric changes to roadways and forecast transportation volume growth. This included a review of historical traffic growth trends on existing facilities to establish future

growth trends, as well as identification of planned developments, their associated trips, and roadway improvements.

12.3.4 Vessel Transportation Existing Conditions

Existing conditions within the vessel corridor were determined by reviewing existing vessel transit numbers from published sources. The primary data source is the Vessel Entries And Transit (VEAT) data published by the Washington Department of Ecology (Ecology 2015). Other sources include data from the United States Maritime Administration. Information on operating practices in the river were obtained from the National Oceanic and Atmospheric Administration U.S. Coast Pilot 7 Pacific Coast. 2016 Edition (NOAA 2016) and the Lower Columbia Region Harbor Safety Plan (LCRHSC 2013)

12.3.5 Vessel Transportation Assessment Methodology

The analysis evaluated the capacity of the navigation channel, berth, anchorages, pilotage organizations and assist tugs. Channel capacity was evaluated by comparing historic volumes to the 2014 baseline and adding the anticipated vessels serving the facility. There is no established level of service or published capacity of the channel.

Berth capacity is not considered a limiting factor because the project proposes a new berth and berth capacity is not discussed further. Anchorage capacity is not considered a limiting factor as the Applicant has indicated that vessels serving the facility would not be expected to anchor in the river either on the return or exit transit. Vessels would not be expected to cross the bar and enter the river unless the berth is available and similarly would not leave the berth unless conditions allow for an exit to the sea. The ability of the pilotage organization and assist tugs to serve vessels calling on the facility was addressed qualitatively by looking at the relative increase in demands presented by the vessels when compared to the existing base line and historic volumes.

12.4 Affected Environment

12.4.1 Roadways

12.4.1.1 Site Conditions and Adjacent Land Uses

The project site is located at the Port's North Port site, north of Kalama River Road and west of Tradewinds Road, the BNSF Railway and Union Pacific Railroad (UPPR) rail lines, and I-5. The site is currently used as a dredge material disposal site and has been graded in anticipation of future industrial development and is approximately 100 acres in size.

Existing land uses bordering the site include the Air Liquide facility and the Port's wastewater treatment facility to the southeast. The Steelscape manufacturing facility is immediately south of the project. To the north, the site is bounded by Port property primarily used for open space, recreation, and wetland mitigation. The Columbia River borders the site to the west. A marine terminal (the existing North Port dock serving the Steelscape facility) also exists on the Columbia River immediately southwest of the project site.

Beyond the site boundary lies the Kalama River Industrial Park to the south along N. Hendrickson Drive across the Kalama River, and a small cluster of cabins that receive seasonal use to the southwest along Sportsman Club Road. Across I-5 to the east are additional Port properties, including a large undeveloped property northeast of the I-5/Kalama River Road interchange, west of Old Highway 99 S, the future site of the Eastport Business Park along the north side of Kalama River Road, and Haydu Park south of Kalama River Road, which

provides a wide array of recreational opportunities, sports fields, shoreline access, a picnic area, riding arena, and an event center.

12.4.1.2 Adjacent Roadway Facilities

Table 12-2, Existing Transportation Facilities and Roadway Designations, summarizes key characteristics of the local study area roadways.

Table 12-2. Existing Transportation Facilities and Roadway Designations

Roadway	Classification	Cross Section	Speed Limit	Side-walks?	Bicycle Lanes?	Median?	On-Street Parking?
Kalama River Road	Rural Major Collector (east of I-5) Rural Minor Arterial (west of I-5)	2-lane	35 mph	No	No	No	No
Tradewinds Road	Private	2-lane	Not Posted	No	No	No	No
N. Hendrickson Road	Rural Minor Arterial	2-lane	35 mph	No	No	No	No
Interstate 5	Freeway	6-lanes	70 mph[2]	No	No	Yes	No
Meeker Drive	Rural Minor Collector	2-lane	35 mph	Yes, partial	No	No	No
Old Highway 99 S	Rural Major Collector[1]	2-lane	40 mph	No	No	No	No

1 Source: Cowlitz County 2012
2 Posted speed limit is 60 mph for trucks.

Kalama River Road
At its westernmost point, Kalama River Road begins next to the Columbia River at the existing North Port dock and Steelscape facility. The roadway proceeds east and up onto a grade-separated structure over the BNSF and UPPR rail lines and I-5. From there, the roadway continues east as it follows along the north side of Kalama River. The roadway has rural design features with two lanes of travel, and open shoulders with no bicycle lanes or sidewalks. There are continuous guardrails lining both sides of the roadway where there are steep slopes in the vicinity of the I-5 interchange.

Tradewinds Road
Tradewinds Road, a private road owned by the Port, would serve as the primary access road into and out of the proposed project. The roadway has two lanes of travel, and can facilitate the turning needs of large interstate-type trucks (WB 67) along the roadway, including its intersection with Kalama River Road. It should be noted that although a stop sign is posted, adequate stop bar striping is lacking on the southbound approach of Tradewinds Road at Kalama River Road.

N. Hendrickson Drive
This roadway is just west of I-5 and provides north-south access for industrial businesses and Port facilities located between Kalama River Road and the City of Kalama to the south. It is a

public road with two lanes of travel, no sidewalks or bicycle lanes, and no on-street parking. Where shoulders are present, they are narrow and unpaved.

Interstate 5
Interstate 5, including the ramp terminals at the Kalama River Road interchange, is operated and maintained by WSDOT. From the study area, I-5 leads north to the cities of Longview, Kelso, and Olympia, and south to the cities of Woodland and eventually Vancouver and Portland. The freeway has six lanes of travel, with single-lane on- and off-ramps at the Kalama River Road interchange.

Meeker Drive
Meeker Drive is just east of I-5, providing north-south access between Kalama River Road, the I-5 ramps, and the City of Kalama to the south. It is a public local road with two lanes of travel, partial sidewalks, no bicycle lanes, and no on-street parking. Where shoulders are present, they are narrow and unpaved. Sidewalk is present along the southern portion of the road near residential neighborhoods.

Old Highway 99 S
Old Highway 99 S extends north from Kalama River Road parallel to I-5. It is a rural, regional road with two lanes of travel, no bicycle lanes, and no on-street parking. Most sections of the road have unpaved shoulders.

12.4.1.3 Bicycle and Pedestrian Facilities

Sidewalks and bicycle lanes generally are not present at the project site or along facilities near the site. No continuous sidewalks or bicycle lanes are installed on the local streets that lead directly to the site, namely Tradewinds Road and Kalama River Road.

12.4.1.4 Transit Facilities

The rural public transportation service south from Longview to Vancouver runs six times a day, Monday through Friday. Stops include Longview (Transit Center), Kalama (Toteff Park), Woodland (Visitors Center/Park & Ride), and Vancouver (99th Street Station).

The service north from Longview to Castle Rock runs two times a day, Monday through Friday. Stops include Longview (Transit Center), Lexington (Country Run Apts.), and Castle Rock (Exit 49 Park & Ride).

Rural transportation is open to the general public. The fare for each one-way trip is $1.00. Vans are equipped with bike racks and are wheel chair accessible. These services do not serve the project site directly.

12.4.1.5 Existing Lane Configurations and Traffic Control Devices

Each of the study area intersections is described below.

Tradewinds Road – N. Hendrickson Drive/Kalama River Road
This four-legged intersection operates with stop-control on the minor street approaches of Tradewinds Road and N. Hendrickson Drive. All approaches operate with single shared left-through-right lanes.

I-5 SB Ramps/Kalama River Road
This four-legged intersection operates with stop-control on the minor approach of I-5 SB off-ramp, a one-way southbound road. The south leg the intersection is the I-5 SB on-ramp and operates as a one-way southbound entrance to the freeway. The north, east, and west approaches operate with single shared left-through-right lanes.

I-5 NB Ramps/Kalama River Road
This four-legged intersection operates with stop-control on the minor street approach of I-5 NB off-ramp, a one-way northbound road. The north leg the intersection is the I-5 NB on-ramp and operates as a one-way northbound entrance to the freeway. The south, east, and west approaches operate with single shared left-through-right lanes.

Meeker Drive/Kalama River Road
This T-shaped intersection operates with stop-control on the minor street approach of Meeker Drive. All approaches are single lanes with shared turn movements.

Old Highway 99 S/Kalama River Road
This T-shaped intersection operates with stop-control on the minor street approach of Old Highway 99 S. All approaches are single lanes with shared turn movements. Although a private drive intersects Kalama River Road on the south side of this intersection, for the purpose of this study, due to low volume, it was not considered in the analysis of intersection operations.

12.4.1.6 Existing Traffic Conditions

Traffic counts were obtained at the study intersections on Wednesday, 4 February 2015, during the afternoon (4:00 – 6:00 PM) peak period. The counts were compiled and reviewed to identify the peak hour for the street system, which occurred from 4:25 – 5:25 PM.

As shown in **Table 12-3**, all WSDOT study intersections meet the WSDOT standard of LOS C or better while all other intersections operate at levels that meet the target threshold of LOS E or better during the weekday PM peak hour.

Table 12-3. Existing Traffic Operations Summary (Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (sec) [1]	LOS
Tradewinds Rd - N Hendrickson Dr/ Kalama River Rd	SB	9.6	A
I-5 SB Ramps/Kalama River Rd	SB	12.0	B
I-5 NB Ramps/Kalama River Rd	NB	9.5	A
Meeker Dr/Kalama River Rd	NB	10.0	A
Old Highway 99 S/Kalama River Rd	SB	9.5	A

[1] Represents delay of worst movement at two-way stop controlled intersections.

12.4.2 Vessel Corridor

12.4.2.1 Columbia River Navigation System

The project is located at approximately Columbia River Mile 72 on the federally authorized Columbia and Lower Willamette project. The proposed dock will be located approximately 650 feet from the channel and a new berth will be dredged to accommodate vessels. The channel in this location is straight stretch with an anchorage area located directly across the

river from the project site. The federally authorized Columbia and Lower Willamette project begins at the mouth of the Columbia River and extends 106.5 miles to the I-5 Bridge crossing at Vancouver and the lower 11.6 miles of the Willamette River. The federally authorized mouth of the Columbia River project covers the 6 miles of the river located between the north and south jetties. The width of the Columbia River varies from up to 5 miles across at its mouth (Columbia Bar) to approximately 1/2-mile wide at the project site. Maintained channel depths are 55 feet over the bar (the entrance to the river from the Pacific Ocean), 43 feet from River Mile 3 to the lower turning basin at Vancouver. The 43-foot portion of the channel was deepened from the previous level of 40 feet between 2005 and 2010 (USACE 2016).

The channel operates similar to a two-lane highway with one 300-foot inbound and one 300-foot outbound vessel traffic lane. The channel widens beyond 600 feet near the Columbia bar and in designated vessel turning areas and anchorages along the entire stretch of the river to accommodate the flow of vessel traffic. The majority of the channel's bottom and edges is composed of soft, sandy mud with the exception of a few areas where shear rock edges are present (USACE 1999).

USACE is authorized to maintain the Lower Columbia River's navigational channel depth at -43 feet (below mean lower low water). As a safety measure, the pilots implement a 2-foot underkeel clearance requirement for vessels navigating the channel, which allows for fully laden drafts up to -41 feet to be accommodated. Occasionally the river levels run below mean lower low water, depending on the season and dam and lock operations upriver, and draft restrictions are instigated by the pilots limiting vessels to become fully laden during that time.

Between the bar and the Port of Kalama, there are two bridges over the Columbia River. The Astoria Megler Bridge is located at approximately River Mile 13 and connects Astoria, Oregon, with the Washington shoreline. It is a fixed span with a vertical clearance of 205 feet at the center of the main channel and a horizontal clearance of 1,070 feet (NOAA 2016). The Lewis and Clark Bridge is located at River Mile 57.3 and connects Longview, Washington, and Rainier, Oregon. It has a fixed span with a vertical clearance of 187 feet and a horizontal clearance of 1,120 feet (NOAA 2016). There are 11 designated anchorages within the river that can accommodate oceangoing vessels; 6 of which are located at or downstream of the Port of Kalama and typically can accommodate 36 total vessels (LCRHSC 2013).

Astoria, Oregon; Longview, Washington; Kalama, Washington, Vancouver, Washington; and Portland, Oregon, are the principal shipping points along the river and include both private and public (port) facilities. The distances above the mouth of the Columbia River to these ports are, respectively: 12 nautical (14 statute) miles, 58 (66) miles, 92 (106) miles, and 97 (112) miles; Portland has facilities on both the Columbia and Willamette Rivers.

USCG has designated Regulated Navigation Areas pursuant to 33 CFR Part 165B in the Columbia River. The only applicable Regulated Navigation Area that would apply to the vessel corridor is the Columbia River Bar. This Regulated Navigation Area provides USCG with the ability to close the bar to vessel traffic when conditions exceed the operational limitations of the USCG search and rescue resources (NOAA 2016). The Columbia River Bar Pilots also impose bar restrictions based on their expertise of the river.

Pilotage service is provided by two separate organizations. The Columbia River Bar Pilots guide vessels across the Columbia River Bar. Bar pilots board vessels by either helicopter or boat in the vicinity of the Columbia River Entrance Buoy, about 5 miles from shore. Bar pilots assume navigation control of the vessel until approximately the Astoria Megler Bridge. From

this location, Columbia River Pilots assume navigational control until reaching the destination. All vessels serving the proposed Facility would be required to use pilot services to enter, transit, and exit the Columbia River and bar.

Information on the number of vessels using the Columbia River is available from several sources, with several differences in the way vessel activity is reported. Ecology produces an annual report, Vessel Entries and Transits for Washington Waters[1] (VEAT). The VEAT report is a summary based on a compilation of many primary data sources, including some individual vessel operators and shipyards and is used as the primary source of data in determining the existing vessel use of the channel. It is important to note that this represents all deep draft vessels transiting the river and they have various destination ports. Not all vessels transit the entire channel length. **Table 12-4** lists the historic vessel traffic in entry transits.

Table 12-4. Existing Columbia River Deep Draft Vessel Traffic

Year	Entry Transits
2014	1581
2013	1457
2012	1428
2011	1466
2010	1583
2009	1397
2008	1806
2007	1872
2006	1720
2005	1654
2004	1669
2003	1771
2002	1780
2001	1881
2000	1934
1999	2269

Source: Ecology 2015, 2014

12.5 Environmental Impacts

12.5.1 Roadways

The assessment of environmental impacts is an analysis of the cumulative impacts of the proposed project. It begins by projecting future conditions at the study area intersections without the proposed project (referred to as the year 2019 background traffic forecast). Then,

[1] VEAT data includes vessels bound for both Washington and Oregon ports.

traffic conditions with the proposed project (referred to as the 2019 total traffic conditions) are assessed by adding the site trips to the projected 2019 background traffic forecast.

12.5.1.1 Background Traffic Conditions

The background traffic conditions analysis estimates operating conditions for the year 2019, when the proposed project is anticipated to reach full capacity and full employment. This baseline analysis accounts for expected traffic growth in the region and anticipated trips from a planned project (Eastport Business Park) but does not include traffic from the proposed project. It also accounts for planned transportation improvements associated with the planned project (Eastport Business Park) but not improvements associated with the proposed project.

12.5.1.2 Background Traffic Volumes

A 2.5 percent lineal annual growth rate was developed based on a review of the mean change in Average Annual Daily Traffic (AADT) volumes on I-5 between 2011 and 2013[2] near the project. This annual growth rate was then applied to existing year 2015 PM peak hour traffic volumes at all study intersections over a 4-year period to reflect continued anticipated growth in the region.

Additionally, vehicle trips associated with the planned Eastport Business Park project were identified and included in the 2019 traffic volume forecast. Although not yet approved, the Eastport Business Park is a planned industrial, professional, and business commercial development located east of the I-5/Kalama River Road interchange on the north side of Kalama River Road. The vehicle trips associated with this development were obtained from the *Eastport Business Park Traffic Impact Study* (Lancaster Engineering 2014).

12.5.1.3 Planned Transportation Improvements

No known roadway or intersection improvements have been planned by Cowlitz County, per a review of the updated six-year Transportation Improvement Plan (2014-2019). Also, there are no known planned and funded WSDOT projects in the vicinity of the site.

It should be emphasized that the Eastport Business Park Traffic Impact Study indicates certain physical improvements would be necessary to maintain acceptable operations with the addition of traffic from the Eastport Business Park development. Recommended improvements from the study include:

- Installation of an eastbound left-turn lane at Old Highway 99 S/Kalama River Road intersection,
- Channelization of the Southbound right-turn lane at Old Highway 99 S/Kalama River Road intersection,
- Installation of an all-way stop control at Old Highway 99 S/Kalama River Road intersection, and
- Installation of an all-way stop control at I-5 SB ramps/Kalama River Road intersection.

While the above improvements are not funded and not yet approved as final conditions of development approval, they were anticipated as a requirement of the Eastport Business Park site and, therefore, were accounted for in the background traffic conditions of this assessment.

[2] Year 2013 data are the most recent AADT data available from WSDOT.

Should higher-capacity solutions (e.g. traffic signals or roundabouts) be identified for implementation through development of the Eastport Business Park, the intersections included in this analysis would perform better than as described in this study. No other funded transportation improvements were identified in the study area.

12.5.1.4 Background Traffic Operations

Table 12-5 presents the build-out year 2019 background traffic operations for the weekday PM peak hour without the proposed project. These results reflect the assumed annual traffic growth pattern and the projected trip generation of the planned Eastport Business Park, as well as the anticipated physical improvements associated with the Eastport Business Park. As the table shows, all WSDOT study intersections are forecast to meet the WSDOT standard of LOS C or better, while all other intersections are forecast to operate at levels, which meet the target threshold of LOS E or better during the weekday PM peak hour.

Table 12-5. Background Traffic Operations Summary (Year 2019 Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (sec) [1]	LOS
Tradewinds Rd - N Hendrickson Dr/ Kalama River Rd	SB	9.8	A
I-5 SB Ramps/Kalama River Rd	-	14.8	B
I-5 NB Ramps/Kalama River Rd	NB	13.0	B
Meeker Dr/Kalama River Rd	NB	17.2	C
Old Highway 99 S/Kalama River Rd	-	10.4	B

[1] Represents average delay of all movements at all-way stop controlled intersections and delay of worst movement at two-way stop controlled intersections.

12.5.2 Proposed Project Alternative

This section presents the proposed project, its anticipated trip generation, distribution and assignment patterns, and presents the operational impacts of project trips on the study intersections.

Northwest Innovation Works, LLC – Kalama (NWIW) and the Port are proposing to construct the proposed project, which would receive natural gas from the Kalama Lateral Project (a proposed pipeline to be constructed by Northwest Pipeline LLC [Northwest]), process the gas into methanol, store it on site, and then ship it via the Columbia River to global markets. The proposed project is assumed to reach peak operations (full staffing) by 2019. At that time, the proposed project would reach peak employment of 192 workers.

Access to the proposed facility, including the new marine terminal, would occur from Tradewinds Road and then from a series of secure access points along Eastwind Road at the northern site boundary. It should be emphasized that one of these access points to Eastwind Road exists today for the Air Liquide facility and the Port's wastewater treatment facility. For security reasons, a separate access road to these facilities would be established with a new two-lane standard county road access along Tradewinds Road as part of the proposed project.

12.5.2.1 Site Trip Generation

Trip generation estimates of average daily and weekday PM peak hour vehicle trip ends for the proposed project were calculated using the employment plan and shift schedule provided by

NWIW for the methanol manufacturing facility. Based on NWIW plans, the plant is expected to operate under a three-shift schedule with shift changes occurring at 8:00 AM, 4:00 PM, and 12:00 AM. An alternate schedule is under consideration in which the production staff, which constitutes 15 employees per shift, would operate on a two-shift schedule with shifts changing at 6:30 AM and 6:30 PM and one of three shift-groups not scheduled to work for any given day.

Estimates were prepared for both the three- and two-shift production staff scenarios. The two-shift schedule requires 15 fewer daily employees than the three-shift schedule, which translates to 30 fewer average daily trips compared to average daily trips for the three-shift schedule. Moreover, the two-shift schedule sets the PM shift change for production staff members (15 departing and 15 arriving) at 6:30 PM, which is outside the weekday PM peak hour. Compared to the three-shift schedule, the two-shift schedule would have 30 fewer total trips during the PM peak hour (15 fewer inbound and 15 fewer outbound).

For comparative purposes, trip generation estimates were also prepared using the standard reference manual *Trip Generation* (Institute of Transportation Engineers, 2012). For this exercise, a Light Industrial land use (ITE Land Use Category 110) was assumed to apply and the number of permanent site workers was used as the independent variable. (Another comparative ITE Land Use Category 140, Manufacturing, was not used for this exercise as its trip generation in the PM peak hour is lower than that of Light Industrial.) Two different ITE Light Industrial trip rates were used to assess weekday afternoon peak hour conditions; one that reflects the weekday PM peak hour of adjacent street traffic (typically within the 4:00 – 6:00 PM period), and one that reflects the peak hour of the site generator (typically prior to 4:00 PM).

Table 12-6 shows the trip generation results for the proposed project under the two worker shift schedules and for the two alternative ITE rates considered. As shown, the three-shift production staff schedule in the first row of the table represents a worst-case estimate of average daily and weekday PM peak hour trips. Therefore, these trips were selected to produce a conservative analysis of site traffic impacts.

Table 12-6. Site Trip Generation Estimates

Options	Average Daily	Weekday PM Peak Hour		
		Total	In	Out
Plant Schedule: 3 Production Shifts*	**320**	**128**	**32**	**96**
Plant Schedule: 2 Production Shifts	290	98	17	81
ITE Code 110: Adjacent Street	484	68	15	54
ITE Code 110: Site Generator	484	82	24	58

* Denotes estimate used for analysis

12.5.2.2 Site Truck Traffic

Because the primary function of the proposed project is to produce methanol and transfer it from the manufacturing facility to vessels at the proposed project's marine terminal, operation of the proposed project is not expected to generate any meaningful level of tractor-trailer truck trips on the external street network. Instead, typical delivery and service vehicle trips are expected.

12.5.2.3 Site Trip Distribution and Assignment

The estimated vehicle trip distribution pattern was based on a review of the existing traffic counts at the Kalama River Road intersections with Tradewinds Road and the I-5 ramp terminals to understand the traffic patterns of current North Port facilities.

12.5.2.4 Total Traffic Operations

The analysis of year 2019 total traffic conditions identifies how the study area's transportation system would operate with the proposed project complete and operating at full capacity and full employment. Traffic volumes for this scenario were determined by adding the site trip assignment to year 2019 background traffic volumes, which include trips and improvements associated with Eastport Business Park.

Table 12-7 displays the year 2019 total traffic operations analysis results. As shown, all WSDOT study intersections are forecast to meet the WSDOT standard of LOS C or better, while all other intersections are forecast to operate at levels which meet the target threshold of LOS E or better during the weekday PM peak hour with the proposed project in place.

Table 12-7. Total Traffic Operations Summary (Year 2019 Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (s) [1]	LOS
Tradewinds Rd - N Hendrickson Dr/ Kalama River Rd	SB	11.1	B
I-5 SB ramps/Kalama River Rd	-	17.2	C
I-5 NB ramps/Kalama River Rd	NB	16.9	C
Meeker Dr/Kalama River Rd	NB	18.2	C
Old Highway 99 S/Kalama River Rd	-	10.6	B

[1] Represents average delay of all movements at all-way stop controlled intersections and delay of worst movement at two-way stop controlled intersections.

12.5.2.5 Traffic Operations with No Eastport Business Park

Because the Eastport Business Park had not yet been approved at the time the analysis was performed for this study, there is the possibility the proposed project would become operational before the business park is fully built out. For this reason, all study intersections were reanalyzed under year 2019 total traffic conditions assuming no Eastport Business Park trips or associated transportation improvements. This analysis used year 2019 background traffic plus site generated traffic and existing roadway capacity conditions.

Table 12-8 displays the analysis results. As shown, all WSDOT study intersections are forecast to meet the WSDOT standard of LOS C or better while all other intersections are forecast to operate at levels that meet the target threshold of LOS E or better during the weekday PM peak hour.

Table 12-8. Total Traffic Operations with No Eastport Business Park (Year 2019 Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (sec)[1]	LOS
Tradewinds Rd - N Hendrickson Dr/ Kalama River Rd	SB	10.7	B
I-5 SB ramps/Kalama River Rd	SB	13.4	B
I-5 NB ramps/Kalama River Rd	NB	10.7	B
Meeker Dr/Kalama River Rd	NB	10.4	B
Old Highway 99 S/Kalama River Rd	SB	9.7	A

[1] Represents delay of worst movement at two-way stop controlled intersections.

12.5.2.6 Vehicle Queuing Impacts

Estimated vehicle queues on all approaches of the Tradewinds Road – N. Hendrickson Drive/Kalama River Road study intersection would be accommodated within available lane storage during the year 2019 background and total traffic conditions of the weekday PM peak hour.

12.5.2.7 Intersection Sight Distance

Intersection sight distance at the Tradewinds Road access with Kalama River Road is adequate and consistent with standards specified in AASHTO's A Policy on Geometric Design of Highways and Streets (AASHTO 2011).

12.5.2.8 Construction Traffic Impacts

Construction of the proposed project is assumed to occur over a 26-month period with peak construction activity expected to occur in months 13 and 14 of the construction period. This peak period was selected to analyze the potential impacts of construction activity under worst-case conditions.

The assessment of construction-related impacts was conducted by projecting future traffic conditions in the study area without project construction activities (referred to as the construction year 2017 background traffic conditions) and then assessing conditions at peak construction of the project (referred to as the construction year 2017 total traffic conditions).

Construction Year 2017 Background Traffic Conditions

Consistent with prior assumptions of future traffic growth, a 2.5 percent lineal annual growth rate was applied to existing year 2015 PM peak hour traffic volumes over a two-year period to reach an assumed peak construction year of 2017. The projected trips and roadway improvements associated with the planned Eastport Business Park were excluded from this forecast because the business park is not expected to be operational by 2017.

Table 12-9 presents the construction year 2017 background traffic operations for the weekday PM peak hour. As shown in the table, all WSDOT study intersections are forecast to meet the WSDOT standard of LOS C or better while all other intersections are forecast to operate at levels that meet the target threshold of LOS E or better during the weekday PM peak hour.

Table 12-9. Construction Year 2017 Background Traffic Operations Summary (Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (sec) [1]	LOS
Tradewinds Rd - N Hendrickson Dr/ Kalama River Rd	SB	9.6	A
I-5 SB Ramps/Kalama River Rd	SB	12.3	B
I-5 NB Ramps/Kalama River Rd	NB	9.6	A
Meeker Dr/Kalama River Rd	NB	10.1	B
Old Highway 99 S/Kalama River Rd	SB	9.5	A

[1] Represents delay of worst movement at two-way stop controlled intersections.

Construction Trip Generation

NWIW provided an estimated amount of construction materials and the construction time line. Based on conversations with NWIW, certain assumptions were made about the number of trucks needed to transport the materials to and from the project site throughout the course of construction. **Appendix K** includes the chart of estimated amount of materials, a table documenting assumptions and resultant truck deliveries per material type, and the construction time line.

Construction Delivery Trips

Based on the estimated time line for construction, it was assumed that 11 percent of all truck deliveries (23,665 tractor-trailer deliveries for total project) would occur during the peak construction month, constituting 2,605 deliveries during this month. Assuming 20 delivery days in the month (five days per week across four weeks), 131 deliveries would be made on average per day. For worst-case analysis of the PM peak hour, it was further assumed that deliveries would be made with consistent frequency across an 8-hour workday rather than be concentrated in the first half of the day, which commonly occurs on construction sites.

Construction Worker Trips

Based on the estimated time line for construction, a maximum of 1,122 workers could be on the project site on a daily basis during the peak construction month.[3] It was assumed that these workers would depart the site at the end of a workday with uniform distribution across a 3-hour period, from 4:30 PM to 7:30 PM. This window for worker departures is based on anticipated worker schedules, as well as constraints associated with the circulation frequency of a shuttle service provided to transport workers between temporary off-site parking areas and the construction site.

The Port and NWIW have identified multiple locations where the workers may park during the construction phase. These locations are 2310 Hendrickson Drive, the Air Liquide facility parking area nearby at 185 Eastwind Road, and the Steelscape facility parking area nearby at 222 W. Kalama River Road. For the purposes of being conservative, it was assumed that

[3] Subsequent to the completion of the traffic analysis, the peak construction worker population estimate was revised to 1,032 per day during the peak construction month. The higher estimate in this assessment was retained because it provides for a conservative assessment.

workers would park primarily at the lot on N. Hendrickson Road, which is just south of the Tradewinds Road – N. Hendrickson Drive/Kalama River Road intersection. Workers were assumed to be shuttled to and from the project site using 40-person buses, based on experience with construction efforts for similar industrial facilities.

Table 12-10 displays the trip generation for peak construction conditions.

Table 12-10. Construction Trip Generation

Trip Type	Average Daily Trips	Weekday PM Peak Hour Trips		
		Total	In	Out
Tractor-trailer Truck Deliveries	262	36	18	18
Workers	2,244	374	0	374
Shuttles to/from Worker Parking	120	20	10	10
TOTAL	**2,566**	**430**	**28**	**402**

Construction Trip Distribution and Assignment

The estimated vehicle trip distribution pattern used in the prior analysis of permanent worker project trips was used for the construction worker trips. Tractor-trailer truck delivery trips were routed to/from I-5 with equal north-south distribution. Bus shuttle trips were also accounted for in this step.

Construction Year 2017 Total Traffic Conditions

The analysis of construction year 2017 total traffic conditions identifies how the study area's transportation system operate with the estimated peak season construction traffic. Traffic volumes for this scenario were determined by adding the construction trip assignment to year 2017 background traffic volumes.

Table 12-11 displays the construction year 2017 total traffic operations results. As shown, all WSDOT study intersections are forecast to meet the WSDOT standard of LOS C or better while all other intersections are forecast to operate at levels that meet the target threshold of LOS E or better during the weekday PM peak hour with peak season construction traffic.

Table 12-11. Construction Year 2017 Total Traffic Operations Summary (Weekday PM Peak Hour)

Intersection	Critical Movement	Delay (sec) [1]	LOS
Tradewinds Rd – N. Hendrickson Dr/Kalama River Rd	SB	36.2	E
I-5 SB ramps/Kalama River Rd	SB	19.4	C
I-5 NB ramps/Kalama River Rd	NB	12.2	B
Meeker Dr/Kalama River Rd	NB	10.7	B
Old Highway 99 S/Kalama River Rd	SB	9.7	A

[1] Represents delay of worst movement at two-way stop controlled intersections.

12.5.3 Vessel Corridor

The operation of the proposed project under either Marine Terminal or Technology Alternative would result in increased ship traffic along the Columbia River from the project site to the mouth of the river. The proposed project would result in approximately 36 to 72 entry transits per year. The use of the berth for general use by the Port would not likely result in additional vessel traffic to the marine terminal because in most cases it is expected that these vessels would already be transiting the Columbia River for other reasons such as to load grain at one of the existing port terminals. Based upon the most recent data, the river accommodated approximately 1,581 cargo and passenger vessels, tank ships, and articulated tug barge vessel entry transits in 2014. As shown in Table 12-3, the channel has historically accommodated much higher numbers of vessels (Ecology 2015). The small increase in vessel traffic associated with the proposed project operations would contribute a minor increase in vessel trips (less than 5 percent) but would remain at levels below the historic highs and the channel would be able to accommodate the increase without any impact on existing traffic.

The dock face is located approximately 650 feet from the edge of the navigation channel. The location of the dock is such that any vessel using the facility will not interfere with use of the navigation channel or anchorages by blocking or otherwise preventing access. In addition, an analysis of the project and its effect on river flow and sediment movement indicated that the new dock and berth would not affect sedimentation rates or dredging needs of the channel (Coast & Harbor Engineering 2015).

The additional ship traffic will increase the demand on assist tugs that are used to help the vessel during arrival and exit from the marine terminal. Assist tugs are provided by private companies and are not on contract or otherwise provided by the Port or another public agency. On the Columbia River assist tugs are provided by Shaver Transportation and Foss. The minor increase in vessel traffic would not be expected to impact the ability to provide assist tugs to the additional traffic or existing vessels. The private companies providing the services would likely respond by increasing available crews or adding additional vessels to their fleet.

Similarly the minor increase in vessel trips would result in a minor increase in demand on pilots. Both pilot groups indicate that they are not operating at full capacity and if demand requires additional pilots could be added (DNV GL 2014).

12.5.4 Related Action

Two related actions would be constructed to facilitate the development of the proposed project. The related actions are the Kalama Lateral Project (the proposed pipeline) and the new transmission lines and substation improvements by the Cowlitz County Public Utility District No. 1 (Cowlitz PUD). Each of these related actions is assessed below.

12.5.4.1 Kalama Lateral Project

The assessment of the proposed pipeline is based on information contained in its environmental assessment (Federal Energy Regulatory Commission [FERC] Docket No. CP15-8-000, see **Appendix B**).

Construction of the proposed pipeline would last approximately five months and require a peak workforce of 75 construction workers and 12 construction inspectors, except during work in the vicinity of I-5 and the BNSF railroad, which would require approximately 8 additional workers. The effects of these workers on the surrounding transportation network would be temporary, lasting only for the duration of construction activities.

Construction across paved roads, highways, and railroads would be conducted in accordance with Northwest's Erosion Control and Revegetation Plan and requirements identified in road and railroad crossing permits or approvals. A horizontal directional drill would be used to install the pipeline below I-5 and the BNSF Railroad. At most other road crossing locations, Northwest anticipates using open-cut methods. Northwest anticipates that each open-cut road crossing, including cutting the road, installing the pipeline, and repairing the road, would be completed in a single day. One exception to the use of the open-cut method would be Old State Highway 99, which would be crossed using the bore-crossing method. The bore-crossing method would consist of excavating a pit on each side of the road; placing boring equipment within the pits; boring a hole under the roadbed; and pulling a section of pipe through the hole. Typically, there would be little or no disruption to traffic at road, highway, or railroad crossings during boring operations. Northwest would prepare a traffic plan in coordination with Cowlitz County to limit disruption and ensure safety to both workers and the public at all proposed road crossings. At paved county road crossings, Northwest has committed to maintaining 5 feet of cover between the road surface and the top of the pipe where possible.

Operation of the proposed pipeline would not generate additional traffic. Overall, the proposed pipeline would not result in significant adverse impacts to transportation.

12.5.4.2 Electrical Service

In order to provide electric service to the proposed project with the Ultra-Low Emissions Alternative, it is expected that Cowlitz PUD would upgrade an existing transmission lines and install new equipment at its existing Kalama Industrial Substation. Cowlitz PUD also has indicated that it may construct a short transmission line (approximately 750 feet) between the Kalama Industrial Substation and an existing transmission line on the east side of I-5 to provide redundant supply to the substation. This short line would cross I-5, N. Hendrickson Drive, and the railroad and would require installation of new poles. Traffic flow would be maintained during construction activities and the upgraded transmission lines and substation would not generate additional trips during operation. Therefore, the upgraded transmission lines and substation would not result in significant adverse impacts to transportation.

12.5.5 No-Action Alternative

The proposed project would not be constructed on the project site under the No-Action Alternative. However, it is anticipated that the Port would pursue future industrial or marine terminal development at the North Port site, consistent with the Port's *Comprehensive Scheme for Harbor Improvements* (Port of Kalama 2015). The potential transportation impacts of the No-Action Alternative during construction and operation would depend on the type of industrial development that is ultimately pursued and could be greater or less than those of the proposed project.

12.6 Mitigation Measures

12.6.1 Project Mitigation

The design features the Applicant proposes to avoid or minimize transportation environmental impacts during construction and operations and those required by agency standards or permits are assumed to be part of the Project. These design features have been considered in assessing the environmental impacts to transportation resources and are discussed below.

12.6.1.1 Design Measures

The Transportation Impact Analysis report recommended the installation of stop bar striping on the southbound approach of the Tradewinds Road/Kalama River Road intersection, consistent with Cowlitz County and/or Manual of Uniform Traffic Control Devices striping standards. This measure is intended to improve transportation safety near the project site by addressing an existing substandard condition not related to the proposed project.

12.6.2 Additional Mitigation

There are no significant adverse impacts identified for transportation resources and therefore no additional mitigation measures are identified.

12.7 Unavoidable Significant Adverse Impacts

The proposed project, with either Technology Alternative and either Marine Terminal Alternative, would not result in unavoidable significant adverse impacts to transportation facilities.

12.8 References

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