February 2018

INDUSTRIAL WAY
INTERSECTION PROJECT | LONGVIEW
OREGON WAY

Industrial Way/Oregon Way Intersection Project

Draft Environmental Impact Statement

U.S. Department of Transportation
Federal Highway Administration

COWLITZ COUNTY WASHINGTON

WSDOT

Availability and Cost of Document Statement

An electronic copy of this Draft Environmental Impact Statement is available at www.IndustrialOregonWay.org. Paper copies of this document are available for a charge ($43), which does not exceed the cost of printing and mailing. Please refer to the Fact Sheet section of this document for project contacts and locations where additional copies of the document are available.

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For information on filing a Title VI complaint with FHWA, see Questions & Answers at https://www.fhwa.dot.gov/civilrights/programs/docs/FHWA_Title_VI%20_Complaint_QA.pdf or contact FHWA's Washington Division Civil Rights Program Manager at (360) 534-9325. For information regarding filing Title VI complaints with the DOJ, see https://www.justice.gov/crt/how-file-complaint or contact the DOJ's Federal Coordination and Compliance Section at (888) 848-5306.

Nota

Las quejas que alegan violaciones a la Ley de Estadounidenses con Discapacidades o al Título VI también se pueden presentar ante la agencia de financiamiento federal (por ejemplo, la Administración Federal de Carreteras) y / o el Departamento de Justicia de los EE. UU. (DOJ). Para obtener información sobre cómo presentar un reclamo de ADA ante la Administración Federal de Carreteras (FHWA), comuníquese con el Gerente del Programa de Derechos Civiles de la División de Washington de FHWA al (360) 534-9325. Puede encontrar información sobre cómo presentar un reclamo de ADA ante el DOJ en https://www.ada.gov/fact_on_complaint.htm o si tiene preguntas sobre cómo presentar un reclamo de ADA, llame a la línea de información de ADA al: 800-514-0301 (voz) o 800-514-0383 (tty).

Para obtener información sobre cómo presentar una queja del Título VI ante FHWA, vea Preguntas y respuestas en https://www.fhwa.dot.gov/civilrights/programs/docs/FHWA_Title_VI%20_Complaint_QA.pdf o comuníquese con el Gerente del Programa de Derechos Civiles de la División de Washington de FHWA al (360) 534-9325. Para obtener información sobre la presentación de reclamos del Título VI ante el Departamento de Justicia, consulte https://www.justice.gov/crt/how-file-complaint o comuníquese con la Sección de Coordinación y Cumplimiento Federal del Departamento de Justicia al (888) 848-5306.

Abstract

FHWA-WA-EIS-18-01-D

Industrial Way/Oregon Way Intersection Project

Draft Environmental Impact Statement

Located in the industrial area of Longview, Washington, the Industrial Way/Oregon Way intersection is a critical connection between State Route (SR) 432 and SR 433, two Highways of Statewide Significance and part of the National Highway System. This intersection is an important component of Cowlitz County's long-term economic vitality as it is one of the highest truck tonnage intersections in Washington State, provides for interstate vehicle travel between Washington and Oregon, and supports significant local and regional passenger vehicle movement. Traffic volumes at the intersection are anticipated to increase 40 to 50 percent by 2040 (see Appendix O, Transportation Discipline Report).

The Federal Highway Administration, Washington State Department of Transportation, and Cowlitz County are joint-lead agencies for the Industrial Way/Oregon Way Intersection Project. In partnership and consultation with 15 additional federal, state, and local agencies and Native American tribes, the lead agencies propose grade-separating and improving the existing intersection to address traffic congestion, travel reliability for vehicles, emergency response times, freight truck mobility, economic competitiveness and development, and safety issues.

This draft environmental impact statement (EIS) evaluates a No Build Alternative and two build alternatives (one grade-separated intersection and one partially grade-separated intersection), and their potential direct impacts and benefits to the built and natural environments. This analysis also considers construction, indirect, and cumulative effects of the project alternatives. This EIS also discusses environmental commitments that would be used to avoid, minimize, or mitigate adverse effects that may result from constructing, operating, or maintaining either build alternative. A preferred alternative will be identified after public input on this draft EIS is received and incorporated into a final EIS.

Submitted pursuant to:

National Environmental Policy Act
(42 United States Code (U.S.C.) 4332(2)(c))
State Environmental Policy Act
(Chapter 43.21C, Revised Code of Washington (RCW))

Submitted by:

U.S. Department of Transportation
Federal Highway Administration

Washington State Department of Transportation

COWLITZ COUNTY WASHINGTON

In cooperation with:

City of Longview
Federal Railroad Administration
U.S. Army Corps of Engineers

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Fact Sheet

Project Title

Industrial Way/Oregon Way Intersection Project

Project Description

The Industrial Way/Oregon Way Intersection Project proposes improvements to the critical connection of two highways, State Route (SR) 432 and SR 433. Both are designated as Highways of Statewide Significance, connect major communities across the state, and support the economy of the region and the state. The intersection, located in Longview, Washington, facilitates significant passenger and freight movement and is one of Washington State's busiest truck tonnage intersections. Congestion around the project intersection is anticipated to worsen substantially in the future as traffic volumes are projected to increase 40 to 50 percent by 2040 (see Appendix O, Transportation Discipline Report), resulting in reduced travel reliability and safety for emergency responders, freight truck traffic, and vehicle traffic. There are at-grade roadway/railroad crossings on three legs of the intersection, and a future extension of an existing railroad line is proposed to cross the remaining fourth leg. The number of trains crossing the intersection is also anticipated to increase considerably by 2040.

The proposed project is intended to address traffic congestion, travel reliability for vehicles, emergency response times, freight truck mobility, and safety issues that are currently occurring or expected to occur in the future. The project would improve travel reliability, resulting in fewer unexpected delays and more consistent travel time from day to day. Reduced congestion at the Industrial Way/Oregon Way intersection would improve overall safety in the study area. Emergency service response times would benefit from reduced congestion and fewer to zero roadway blockages due to train crossings. Completing the project is also an important component of the long-term economic vitality of Cowlitz County. Project improvements would maintain critical access to commercial and industrial areas, the Columbia River, regional employers, education sites, and recreational facilities in the SR 432 corridor. Reducing congestion would improve the economic competitiveness of existing large and small businesses through reliable and timely freight truck service.

This draft environmental impact statement (EIS) evaluates a No Build Alternative and two build alternatives: the Grade-Separated Option A (GSA) and Partial Grade-Separated Option B (PGSB) Alternatives. Under the No Build Alternative, no major changes would be made to the roadway network. Under the GSA Alternative, a fully elevated signalized intersection would be constructed southwest of the existing intersection and local surface streets would be added to provide access and circulation to surrounding properties. The PGSB Alternative would construct a new grade-separated intersection southwest of the existing intersection with some movements elevated and other movements retained on the surface through a new roundabout. The PGSB Alternative would also include local surface street improvements to provide access and circulation to surrounding properties. The GSA and PGSB Alternatives would not add rail capacity or make any significant improvements to the rail infrastructure.

The draft EIS evaluates each alternative's potential to directly impact and benefit the built and natural environments. The analysis also considers construction, indirect, and cumulative effects of the project alternatives. A preferred alternative will be identified after public input on this draft EIS is received and incorporated into a final EIS.

Following the review of the National Environmental Policy Act (NEPA) process and resulting draft EIS, WSDOT has determined the NEPA analysis is adequate for the Washington State Environmental Policy Act (SEPA). No separate statement is required to comply with the procedural requirements of SEPA.

Lead Agencies

Federal Highway Administration
Washington Division
711 S. Capitol Way, Suite 501
Olympia, WA 98501

Washington State Department of Transportation
Kelso Area Engineering Office
2400 Talley Way
Kelso, WA 98626

Cowlitz County
Department of Public Works
1600 13th Avenue South
Kelso, WA 98626

The Federal Highway Administration (FHWA), Washington State Department of Transportation (WSDOT), and Cowlitz County are joint-lead agencies under NEPA.

Document Availability

The draft EIS can be accessed at:
www.IndustrialOregonWay.org

The draft EIS is also available on CD and can be obtained by contacting:

Joanna Lowrey, Kelso Area Engineer
Washington State Department of Transportation
Kelso Area Engineering Office
2400 Talley Way
Kelso, WA 98626
360-442-1350 or toll free 1-800-545-1393

Printed copies of the draft EIS are available for review at:

- Cowlitz County Department of Public Works
- Kelso Longview Chamber of Commerce
- Kelso Public Library
- Longview Public Library
- Washington State Library
- WSDOT Headquarters Library
- WSDOT Kelso Area Engineering Office

Related appendices (discipline reports and technical memoranda) are available on the CD attached to each printed copy of the draft EIS.

CDs are available at no charge. This document is also available for purchase at WSDOT, Kelso Area Engineering Office, 2400 Talley Way, Kelso, WA 98626. The price for the printed copy of the draft EIS is $43, which does not exceed the cost of reproduction or distribution.

Comment Period

The 45-day comment period on the draft EIS will begin on March 2, 2018 when the notice of availability is published in the Federal Register. WSDOT, Cowlitz County, and FHWA will accept comments through April 16, 2018.

Review Comments and Contact Information

All written comments should be sent to:

Joanna Lowrey, Kelso Area Engineer
Washington State Department of Transportation
Kelso Area Engineering Office
2400 Talley Way
Kelso, WA 98626

or

Claude Sakr, Project Manager
Cowlitz County Department of Public Works
1600 13th Avenue South
Kelso, WA 98626

or

Liana Liu, South Central and Southwest Area Engineer
Federal Highway Administration
711 S. Capitol Way, Suite 501
Olympia, WA 98501

Comments can be emailed to:
IndustrialOregonWay@co.cowlitz.wa.us

The public can access the draft EIS and comment online at:
www.IndustrialOregonWay.org.

Public Hearings

A public hearing to provide information and accept comments on the draft EIS will be held on:

March 20, 2018
St. Helens Elementary School
431 27th Avenue
Longview, WA 98632
5:00pm–7:00pm

Anticipated Permits and Approvals

Anticipated permits and approvals that may be required for the project include the following:

Federal

- Clean Water Act, Section 404 permit from the U.S. Army Corps of Engineers
- Endangered Species Act, Section 7 consultation with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration – National Marine Fisheries Service
- Conditional Letter of Map Revision based on Fill (CLOMR-F), Federal Emergency Management Agency
- National Historic Preservation Act, Section 106 consultation with the Washington State Department of Archaeological and Historic Preservation (DAHP), WSDOT, Cowlitz Indian Tribe, and Chinook Tribe
- U.S. Department of Transportation Act, Section 4(f) compliance for FHWA

State and Regional

» Clean Water Act, Section 401 water quality certification from the Washington State Department of Ecology
» National Pollutant Discharge Elimination System construction stormwater general permit from the Washington State Department of Ecology
» Notice of Intent for installing, modifying, or decommissioning wells from the Washington State Department of Ecology

Local

» Critical Areas Ordinance approval from the City of Longview and/or Cowlitz County
» Consolidated Diking Improvement District No. 1 (CDID #1) encroachment review and permit
» Floodplain review by the City of Longview and Cowlitz County to comply with floodplain regulation ordinances

Authors and Principal Contributors

See the list of preparers in Chapter 7 of the draft EIS.

Date of Issue of Draft EIS

March 2, 2018

Subsequent Environmental Review

The comment period ends April 16, 2018. After the comment period ends, the lead agencies will respond to all substantive comments. A preferred alternative will be identified, and issuance of a final EIS is anticipated in late 2018 or 2019. The final EIS will include copies of all comments submitted during the comment period and responses from FHWA, WSDOT, and Cowlitz County. Following issuance of the final EIS, a record of decision will be issued by the FHWA.

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Appendix O Transportation Discipline Report

Appendix P Utilities Memorandum

Appendix Q Visual Quality Discipline Report

Appendix R Wetland Delineation Report

List of Acronyms and Abbreviations

ADA	Americans with Disabilities Act
CDID #1	Consolidated Diking Improvement District No. 1
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DAHP	Washington State Department of Archaeology and Historic Preservation
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FHWA	Federal Highway Administration
GSA Alternative	Grade-Separated Option A Alternative
IRC	Industrial Rail Corridor
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NO_X	Nitrogen Oxides
PGSB Alternative	Partial Grade-Separated Option B Alternative
$PM_{2.5}$	Particulate Matter 2.5 micrometers or less in size
PM_{10}	Particulate Matter 10 micrometers or less in size
RCW	Revised Code of Washington
SEPA	Washington State Environmental Policy Act
SR	State Route
U.S.C.	Unified States Code
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

Chapter 1. Introduction to the Project

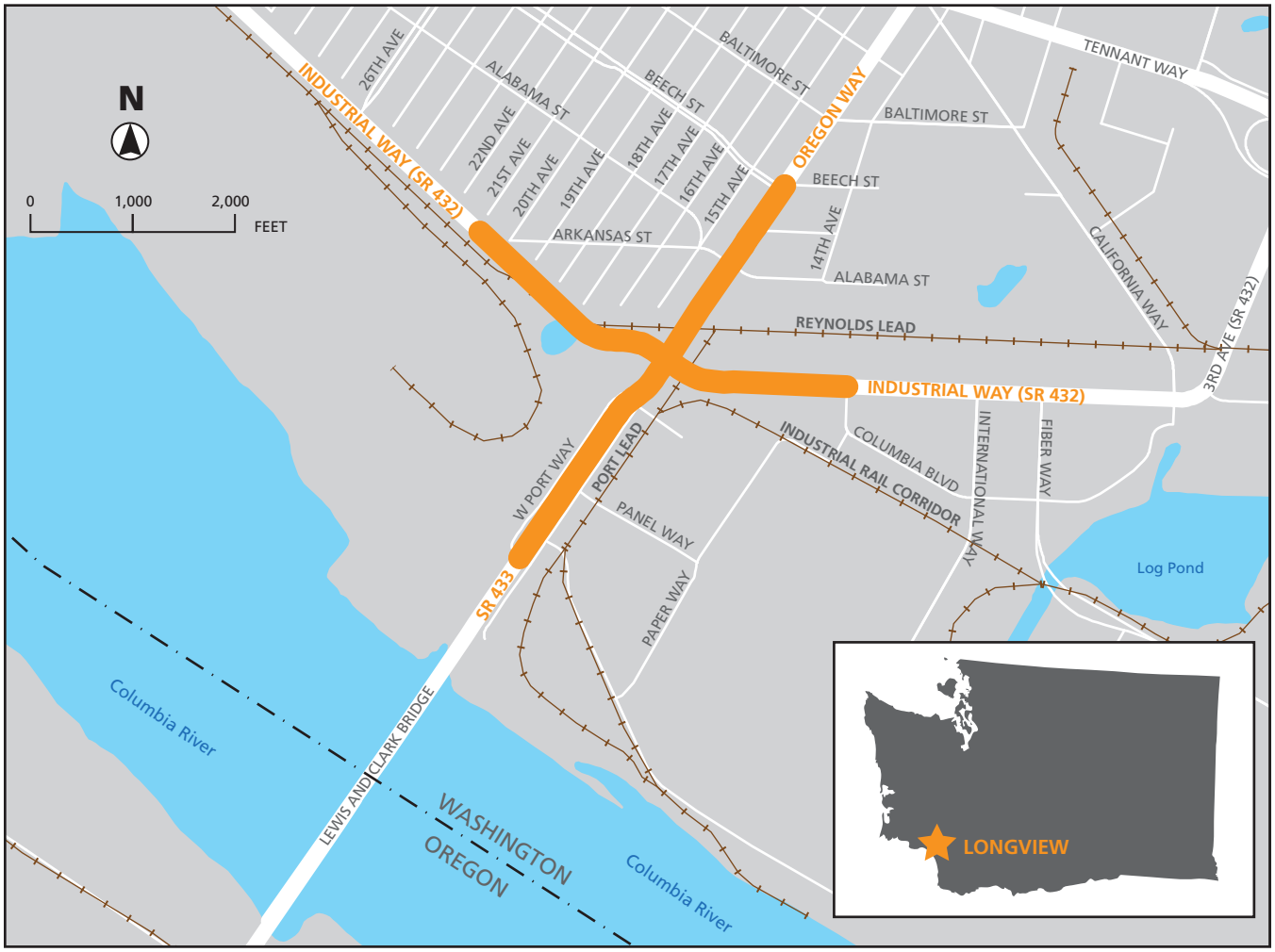
Chapter 1 introduces the Industrial Way/Oregon Way Intersection Project and describes the project context, location, purpose and need, and joint-lead agencies. It also introduces the environmental review process for the project, public involvement activities, next steps, and ways to become involved.

1.1 What is the project and where is it located?

Longview, Washington, was established in the early 1900s to support the bustling timber industry in the Pacific Northwest. Since then, Longview's waterfront has undergone dramatic physical modifications with its long history of industrial development, connecting road and rail-based industries with marine transport on the Columbia River. The Industrial Way/Oregon Way Intersection Project is located in the heart of Longview's industrial waterfront area where State Route (SR) 432 and SR 433 intersect (Figure 1-1). SR 432 and SR 433 are both Highways of Statewide Significance and part of the National Highway System, which support regionally-significant passenger and freight truck movement and connect major communities across the state of Washington.

The Industrial Way/Oregon Way intersection is an economically-critical junction within the Washington-Oregon bistate trade corridor, and is one of Washington State's busiest truck tonnage intersections. Located on the Columbia River and joining major highway and rail freight routes, this location provides businesses with access to local, state, national, and international markets that attract businesses and economic development to the area. The past three decades

Figure 1-1: Project Intersection Vicinity Map

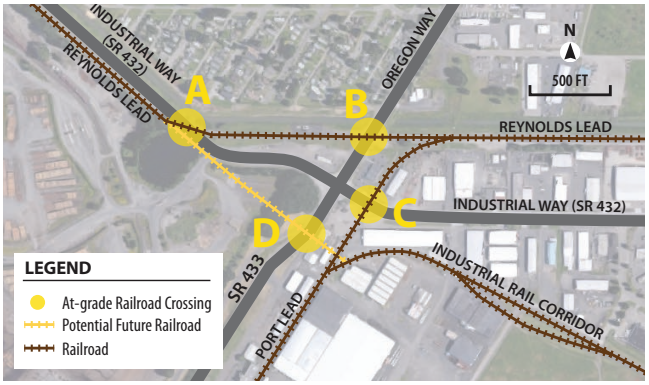


have seen continual investments by local municipalities and businesses that have incrementally enhanced the area's industrial- and manufacturing-driven economy, including the dredging of the Columbia River Channel. Completed in 2010, the deeper channel enhances navigation access and waterborne commerce, which has since spurred billions in regional economic growth and resulted in companies investing hundreds of millions of dollars in company infrastructure along the Columbia River. Industrial development in the Longview area is anticipated to continue growing as large vacant lands are primarily planned for industrial development. The largest vacant lands would likely involve multimodal transfer of imported and exported goods from the rail and roadway network to/from the marine network.

Existing highway infrastructure deficiencies were identified by the State of Washington Department of Highways (predecessor to WSDOT) along the SR 432 corridor as early as 1968. Several studies followed in the 1980s through 2014 when the SR 432 Highway Improvements and Rail Realignment Study identified over $356 million dollars in improvements along the SR 432 corridor. The study identified significant traffic operational and safety deficiencies along the SR 432 corridor and selected the Industrial Way/Oregon Way Intersection Project to move forward through environmental review, design, and construction because it would have the greatest benefit to congestion, freight truck mobility, and safety.

The Industrial Way/Oregon Way intersection is a four-legged intersection with Industrial Way (SR 432) as the east and west legs, Oregon Way as the north leg, and SR 433 as the south leg. SR 433 crosses the Lewis and Clark Bridge south of the intersection and terminates at US 30 in Rainier, Oregon. Additionally, there are three at-grade roadway/railroad crossings in the vicinity of the intersection (Figure 1-2): the Reynolds Lead (owned jointly by the BNSF Railway and Union Pacific Railroad) crosses Industrial Way just west of the intersection (Crossing A) and crosses Oregon Way just north of the intersection (Crossing B); the Port Lead crosses Industrial Way just east of the intersection (Crossing C). A future extension of the Port of Longview's Industrial Rail Corridor (IRC) is proposed to cross SR 433 south of the intersection (Crossing D) and connect to the Reynolds Lead. The specific alignment for the IRC extension has not yet been established, so a conceptual crossing alignment is shown in Figure 1-2.

Figure 1-2: Rail Crossings at the Industrial Way/ Oregon Way Intersection



Logical Project Termini

The Industrial Way/Oregon Way Intersection Project would address intersection deficiencies that are degrading traffic operations and causing significant congestion, travel delay, and safety issues. Project improvements would improve safety and emergency access for first responders, reduce congestion, and facilitate regional economic development by keeping freight trucks, employees, residents, and tourists moving through the corridor. More reliable and timely freight truck service would support the area's business base, keeping it financially healthy and vibrant. As a result, the Industrial Way/Oregon Way Intersection Project would enhance the area's regional and national economic competitiveness.

The scope of the proposed improvements is limited to the intersection as well as several nearby surface streets to retain access to as many properties in the vicinity of the intersection as possible. Thus, the project termini, which serve as logical end points, are defined to capture all proposed project improvement locations under each project alternative and include the area where most impacts and benefits to the environment would occur. As shown in Figure 1-1, the project termini are defined as:

- Beech Street – northern location where the elevated roadway and rerouted traffic would reconnect with the existing Oregon Way
- Columbia Boulevard – eastern location where the elevated roadway and rerouted traffic would reconnect with the existing Industrial Way
- Lewis and Clark Bridge – southern location where the bridge structure begins and no further intersection improvements would be proposed
- 21st Avenue – western location where the elevated roadway would reconnect with the existing Industrial Way.

Independent Utility

FHWA considers an action to have independent utility or independent significance when that action would be useable and be a reasonable expenditure even if no additional transportation improvements in the area are made (23 CFR 771.111(f)). The proposed improvements for the Industrial Way/Oregon Way intersection have independent utility from other proposed actions for the following reasons.

The scope of the two build alternatives presented in the draft EIS comprise the full build-out of the intersection improvements, and no staggered phasing of the project outside this scope is proposed. The scope of the build alternatives includes all necessary elements to construct and operate the proposed action, such as right-of-way acquisition, utilities relocation, temporary road closures and traffic detours, railroad realignment (GSA Alternative only), access provisions for affected properties, stormwater management, and environmental mitigation measures for adverse impacts. Modifications to local surface streets would be implemented to reconnect or redirect traffic as a result of the intersection improvements; these improvements are also included in the scope of the project. Therefore, both build alternatives do not require any other transportation improvements for the project to be fully usable upon completion of construction. Moreover, this project would comply with the Interstate Commerce Commission Termination Act of 1995 (49 United States Code §10101 et seq.) as it would not have any effects that would prevent or unreasonably interfere with railroad transportation.

Both of the two build alternatives evaluated in the draft EIS would reconstruct the intersection and provide independent benefit to vehicular traffic operations regardless of whether any other transportation projects are undertaken. In particular, two other transportation projects were questioned as potentially having some interdependence with the Industrial Way/Oregon Way Intersection Project during the public scoping process and subsequent public outreach.

» **Lewis and Clark Bridge:** The Lewis and Clark Bridge is located directly south of the intersection and acts as a traffic bottleneck that meters traffic heading northbound from US 30 and entering the Industrial Way/Oregon Way intersection as well as frequently causes southbound traffic to spillback into the intersection as traffic merges onto the bridge. Some public commenters questioned whether improvements that would alleviate the bridge capacity constraint would also resolve the congestion at the intersection. Although no agency or other entity has any plans to address the constrained capacity of the Lewis and Clark Bridge, a traffic analysis was undertaken for the project to evaluate the effect of sequencing intersection improvements and any future bridge improvements. As presented in Section 3.1 of the draft EIS, implementing intersection improvements before any bridge improvements would yield significant reductions in congestion (40–60 percent compared to the No Build Alternative). In contrast, if bridge improvements were implemented before any improvements to the intersection, average vehicle delay would be reduced by 15 percent. Furthermore, improvements to the bridge would not address other project needs such as maintaining or improving emergency service response times, addressing impairments to freight truck mobility, and increasing safety for all vehicles traveling through the intersection. The cost of implementing intersection improvements is substantially less than adding capacity to the Lewis and Clark Bridge. Thus, there is a greater benefit to the intersection operations to make the intersection improvements; and, the intersection improvements provide a significant operational benefit to the transportation system even if no further action is taken on the Lewis and Clark Bridge.

» **Industrial Development on Nearby Waterfront Properties:** The project is located along the Columbia River and in the Longview industrial area, serving as a multimodal transportation hub for freight movement and transfers by truck, rail, and ship. Current planning actions are being undertaken for two large, waterfront industrial properties that are within 4 miles of the Industrial Way/Oregon Way Intersection: 1) the Port of Longview is in the process of completing a master plan for its 282-acre Barlow Point site which is expected to support one large liquid or dry bulk commodities operation with several smaller operations (Port of Longview 2016); and 2) the Millennium Bulk Terminals-Longview private development is in its planning/permitting phase to establish a 190-acre coal export terminal at the former location of the Reynolds Metal Company facility. Both developments are anticipated to export bulk commodities, which would be transported to the sites by rail. Rail service to these sites would occur on the existing Reynolds Lead and the future extension of the Port of Longview's Industrial Rail Corridor (IRC). Up to 24 new unit trains are projected to operate on these rail facilities when these industrial properties are developed, either by the proposed operations or by other bulk commodity operations. The additional trains would cause more roadway blockages to three of the four legs of the intersection in its current configuration with surface roadways and at-grade roadway/railroad crossings. The vehicular congestion at the intersection is projected to severely fail by 2040 based on traffic volumes alone, resulting in 194 seconds (3.2 minutes) of average delay per vehicle. When roadway blockages by train crossings at the intersection are factored in, the average delay per vehicle is further exacerbated to 247 seconds (4.1 minutes). The intersection improvements proposed by the project would

address the 40–50 percent increase in traffic volumes[1] and resulting failing congestion that are independent from any roadway blockages by trains. Recognizing that the increased rail service in the future would further deteriorate congestion and other traffic operations at the intersection, the draft EIS expanded the traffic analysis to consider two vehicular traffic scenarios: 1) a 'no train crossing' scenario presents the vehicular traffic operations when no trains interrupt roadway traffic; and 2) a 'with train crossing' scenario presents the vehicular traffic operations when one or more trains cross through the intersection and block the roadway (see Section 3.1 for more detail). The results of this analysis demonstrate that vehicular traffic operations would deteriorate to an unacceptable level for the community by 2040 even when no trains pass through the intersection (the 'no train crossing' scenario).

No Restriction of Other Reasonably Foreseeable Transportation Improvements

The Industrial Way/Oregon Way Intersection Project considers past, present and future transportation improvements, which are incorporated into the assumptions for the No Build Alternative (Section 2.1) and/or evaluated in the cumulative effects analysis (Section 3.19). Moreover, the intersection project would not preclude or restrict future transportation improvements to roadway, bridge, or rail facilities implemented by other agencies or private development.

1.2 What is the purpose of the project and why is it needed?

Purpose of the Project

The purpose of the Industrial Way/Oregon Way Intersection Project is to develop an affordable long-term solution that:

- Maintains or improves emergency response
- Improves travel reliability for all vehicles
- Accommodates current and future freight truck and passenger vehicle movement through the intersection and across the region and states.

Needs for the Project

Growing Vehicular Demand and Congestion

The Industrial Way/Oregon Way intersection generally accommodates the existing number of vehicles using the roadway; however, the intersection experiences heavy congestion during the afternoon (PM) peak period with backups that are longer than available turn lanes for most turn movements. The westbound dual left turn backups are so long that vehicles frequently use the two-way left turn lane in the median that begins at Columbia Boulevard to bypass the queues that have formed in the westbound through lanes. Traffic volumes are expected to increase 40 to 50 percent by 2040, which results in failing conditions where vehicle drivers experience significant backups that develop from a high number of vehicles attempting to move through a signalized intersection. In the scenario where no trains are crossing on the rail facilities on any leg of the intersection, drivers would experience an average delay per vehicle (slowing or stopping time) of 3.2 minutes, which can be equated to two or more signal cycles to pass through the intersection. This congestion adversely affects local travel along Industrial Way within Longview for all vehicle types. Furthermore, the intersection is unable to accommodate the number of vehicles traveling between Washington State and Oregon via the Lewis and Clark Bridge (see Appendix O, Transportation Discipline Report).

Reduced Reliability for Vehicles

Much of the land south of Industrial Way is zoned industrial and abuts the Columbia River (City of Longview Comprehensive Plan 2006; City of Longview Municipal Code 2015b), which is compatible with manufacturing and export/import operations due to the river's deep-draft navigation channel. Approximately 70 percent of these waterfront properties have active industrial operations whereas the

1 Projected traffic volumes are based on based on the Cowlitz-Wahkiakum Council of Governments travel demand model, which considers population and employment growth.

remaining 30 percent are expected to develop within the next 5 to 20 years. With projected industrial growth and development of these waterfront properties, including lands west of the intersection as noted in the Port of Longview's Master Plan Phase I Feasibility for Barlow Point (2016) and the Millennium Bulk Terminals-Longview SEPA Final EIS (Cowlitz County and Washington State Department of Ecology 2017), an increase in train operations on the railroads in the vicinity is similarly anticipated. Currently, an average of 4 trains cross Industrial Way (Crossing A, Figure 1-2) and Oregon Way (Crossing B, Figure 1-2) per day. By 2040, 28 to 30 trains per day are anticipated to cross the intersection and will be unable to avoid the peak periods. Trains will routinely block the roadways for 5 to 11 minutes depending on train speed and length. This blockage and the time it takes to recover will substantially increase vehicle travel times compared to travel times when no trains are present. The frequency of this train activity increases the probability that freight truck and passenger vehicles will be blocked or encounter congestion. All travel through this intersection and throughout the industrial corridor and nearby roadways will be less reliable, including commuting to and from work, making freight deliveries, and providing school bus and transit service.

Delayed Response for Emergency Service Providers

Emergency service providers routinely travel through the Industrial Way/Oregon Way intersection. The Longview Fire Department (located 1 mile north of the intersection) travels Oregon Way to respond to fire and emergency calls in the industrial areas southwest and southeast of the intersection; ambulance service returns through the intersection to transport patients to the PeaceHealth St. John Medical Center located approximately 1 mile north of the intersection. Additionally, Columbia River Fire & Rescue frequently transports patients from Columbia County, Oregon across the Lewis and Clark Bridge (SR 433) and travels north on Oregon Way to PeaceHealth. Increased congestion at the Industrial Way/Oregon intersection will impede and delay critical response and transport times for emergency service providers.

Impaired Freight Truck Movement

The Industrial Way/Oregon Way intersection is one of Washington State's busiest freight intersections with over 20 million annual gross truck tonnage. Trucks typically comprise over 20 percent of the traffic volume on Industrial Way and the intersecting SR 433, both designated as Highways of Statewide Significance by the Washington State Legislature. Freight truck movement will become increasingly impaired as roadway traffic volumes grow in the future, overall congestion worsens, roadway blockages due to train crossings become more frequent, and travel times become less reliable. Costs and travel times associated with freight truck movement will increase and have an adverse impact on truck-dependent business operations and viability. This adverse impact to freight truck travel reliability will be detrimental to the financial health of local industries, Port of Longview, and Pacific Northwest businesses that are dependent on truck travel through this corridor, which in turn will impact local and regional employment.

WHAT HAPPENS IF NOTHING IS DONE AT THE INTERSECTION?

By 2040, congestion during the afternoon rush hour would be **four times worse** than today's conditions.

Average Delay per Vehicle
(when no trains cross through the intersection)

2015 PM Peak Hour: **49** seconds

2040 PM Peak Hour: **194** seconds (3.2 minutes)

Decreased Safety

The Industrial Way/Oregon Way intersection serves the largest volume of vehicles and has the highest number of reported crashes on the Industrial Way corridor between Tennant Way and Washington Way. Seventy-five (75) crashes were documented at the Industrial Way/Oregon Way intersection from 2012 to 2016, which averages 15 crashes per year. Most are rear-end, angle, and sideswipe crashes. Congestion at intersections has been shown to correlate to increased vehicle crashes. As projected growth of traffic volumes occurs and the number of train crossings substantially increases over the next 20 years, drivers' risk-taking and crash rates and severity may increase, resulting in an overall decrease in safety for all travel modes.

1.3 Who is involved in the environmental process?

For the Industrial Way/Oregon Way Intersection project, the Federal Highway Administration (FHWA), Washington State Department of Transportation (WSDOT), and Cowlitz County are joint-lead agencies under the National Environmental Policy Act (NEPA). The lead agencies oversee the environmental review process and coordinate input from other partners, including the following cooperating and participating agencies and tribes:

Cooperating Agencies

- City of Longview
- Federal Railroad Administration
- U.S. Army Corps of Engineers

Participating Agencies

- Chinook Tribe
- Consolidated Diking Improvement District No. 1 (CDID #1)
- Cowlitz Indian Tribe
- Cowlitz-Wahkiakum Council of Governments
- National Oceanic and Atmospheric Administration
- Port of Longview
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Department of Historic and Archaeological Preservation (DAHP)
- Washington Utilities and Transportation Commission

The lead agencies also coordinate with the project's Technical Advisory Committee and the Executive Committee, which provide technical direction, leadership, and decision-making for the project. The Technical Advisory Committee is comprised of senior technical staff representing the public agencies and local port most immediately affected by the project, including Cowlitz County, City of Longview, City of Kelso, Port of Longview, and WSDOT. The Executive Committee is represented by one elected official and senior administrators from the same agencies and port involved on the Technical Advisory Committee as well as the Cowlitz-Wahkiakum Council of Governments and Cowlitz Economic Development Council.

FHWA and WSDOT will address concerns of the Cowlitz Indian Tribe and Chinook Tribe by following the process specified by Section 106 of the National Historic Preservation Act, the 2003 WSDOT Tribal Consultation Policy, and the 2008 WSDOT Model Comprehensive Tribal Consultation Process for NEPA.

1.4 Why was an environmental impact statement developed?

NEPA requires projects with potential for significant adverse environmental effects be reviewed through the environmental impact statement (EIS) process.

The EIS identifies a range of alternatives for meeting the project's purpose and need, evaluates the beneficial and adverse effects of these alternatives on the community and environment, and identifies measures to avoid, minimize, or mitigate negative effects. This process allows decision-makers to consider effects on the environment along with other important factors, such as need, feasibility, and cost. The EIS process is intended to disclose the likely effects of a project at an early stage in project development so that decisions can still consider the results of the environmental analysis and public and agency review comments.

This draft EIS summarizes a series of technical analyses prepared for the project. It is designed to be easily accessible to readers and to present information concisely in text, graphics, and tables. Readers interested in more detailed information on a particular topic can refer to the technical analyses in the appendices, which cover the topics addressed in this draft EIS.

This draft EIS is organized by the following major topics:

- **Introduction to the project (Chapter 1)** – project description, purpose and need for the project, EIS process, public involvement
- **Developing the alternatives (Chapter 2)** – development of the alternatives, description of alternatives considered but dismissed from further review, identification of alternatives for study in the EIS
- **Comparing the alternatives (Chapter 3)** – existing resource conditions, project direct and indirect impacts and benefits on resources, including temporary construction effects, cumulative effects, and other considerations such as irreversible and irretrievable commitments of resources
- **Environmental commitments (Chapter 4)** – mitigation measures
- **Supporting materials (Chapters 5 to 8)** – references, glossary, list of project team members (EIS preparers), and index
- **Additional project detail and technical analyses (Appendices)** – range of alternatives report, public involvement summary, and resource technical analyses.

Following the review of the NEPA process and resulting draft EIS, WSDOT has determined the NEPA analysis is adequate for the Washington State Environmental Policy Act (SEPA). No separate statement is required to comply with the procedural requirements of SEPA.

1.5 How have stakeholders, agencies, and the public been involved in the project?

The project team has regularly engaged residents, businesses, public agencies, and other stakeholder groups, such as emergency service providers, public schools, business groups, and social service providers, to develop a project that involves the community. All public involvement activities have provided information (sharing information and updates) and gathered input (collected comments and feedback). Moreover, the project team has published contact information at all events so the public can request additional time with the project team to discuss any concerns. Public involvement efforts and results are summarized below and described in detail in the Public Involvement Summary Report (Appendix B).

Scoping

Scoping is an open process involving agency and public outreach and a public comment period early in the development of a project. Scoping shares preliminary information about the proposed action and the range of possible alternatives to seek input on potential issues, concerns, and the overall technical scope of analysis that should be considered for the project.

The project's 30-day scoping period began on September 10, 2015, when the Notice of Intent was published in the Federal Register, and ended on October 12, 2015. The project team held an agency scoping meeting followed by a public open house on September 17, 2015. Flyers, public service announcements, a newspaper advertisement, and a press release were used to advertise the public open house.

Appendix B provides a summary of scoping comments received from agencies and the public during the project's 30-day scoping period. Topics raised in these comments included:

- Potential direct and indirect impacts on environmental justice (low income and minority) populations, natural resources (e.g., surface waters, air quality, fish and wildlife), children's health and safety, residential and business properties, induced growth, economy, public transportation, and contaminated site cleanup
- Project purpose and need
- Indirect and cumulative effects
- Mitigation and monitoring
- Range of alternatives, including options other than grade-separation of the project intersection
- Other potential future projects in the area, including Lewis and Clark Bridge upgrades, Barlow Point, and Millennium Bulk Terminals
- Future growth, traffic, and safety-related projections for the intersection and surrounding area
- Opportunities for expanding project benefits, including visual improvements and Highlands Trail extension
- Safety and emergency access
- Construction impacts

Engagement Activities

Public engagement activities have included materials in both English and Spanish. Activities conducted to date include:

- Project website (www.industrialoregonway.org)
- Project mail and email distribution list
- Project flyers distributed at local businesses, St. Rose de Viterbo Catholic Church, and mobile food bank
- 12 project updates distributed via project website, mail, and email between January 2016 and November 2017
- 4 public open houses
- 47 stakeholder meetings with businesses/business groups (26); emergency service providers (3); public school transportation /transit providers (3); mobile home park (3); community groups/residents (8); service/political organizations (6)
- 5 meetings with Highlands Neighborhood Association including attendance at their National Night Out event
- 4 interviews conducted with ethnic food retailers
- 1 residential survey and 2 business surveys

A detailed summary of public engagement activities is provided in the Relocation, Social, Economic, Public Services, and Environmental Justice Technical Analysis (Appendix L).

Project website homepage (www.IndustrialOregonWay.org)

Comments/Issues Raised by Stakeholders and the Public

Substantive comments and issues raised during these public engagement activities are summarized into major topics below. Public comments have been considered, addressed, and/or incorporated into the project process and/or design. All substantive comments received to date are included in Appendix B.

The Relocation, Social, Economic, Public Services, and Environmental Justice Technical Analysis (Appendix L) itemizes and addresses a subset of these public comments relevant to traditionally underserved populations (low-income, racial or ethnic minority, disabled, elderly, youth, transit-dependent, or limited English proficient).

Process-Related Concerns

- Conduct a fair and transparent decision-making process that provides the most overall benefit to the community
- Consider a range of alternatives to address the purpose of and need for the project

Construction-Related Concerns

- Minimize construction duration and cost, and describe the benefits of expending taxpayer resources
- Provide advanced notification of construction schedules and detour routes
- Continue to prioritize emergency responder movement
- Minimize adverse impacts to public transit and school bus travel
- Minimize adverse impacts to quality of life such as noise, vibration, dust, exposure to hazardous materials, visual impacts, cut through traffic and disruption to bicycle and pedestrian facilities
- Minimize adverse impacts to natural areas such as infill, runoff, sedimentation or fragmentation
- Maintain business viability and minimize delays to freight trucks
- Maintain reasonable access to/from neighborhoods and businesses
- Create construction jobs, especially for locals

Long-Term Concerns

- Provide congestion relief and travel reliability for people and goods
- Consider whether improvements to the Lewis and Clark Bridge would resolve congestion at the intersection
- Improve safety and enhance connectivity for all vehicles, trains, pedestrians, and bicyclists
- Minimize residential displacements from neighborhoods and mobile home parks
- Minimize business displacements and maintain reasonable access to businesses and industrial areas
- Minimize disproportionate, adverse effects to low-income and minority residents and minority-owned businesses
- Avoid or minimize adverse effects to natural resources including water, plants and animals, soil and air
- Maintain access to/from neighborhoods, including the Alabama Street connection at Oregon Way
- Support economic development opportunities and economic competitiveness
- Consider the cumulative effects of this project with other reasonably foreseeable projects

Tribal Consultation

FHWA, WSDOT, and Cowlitz County have followed the federally mandated tribal consultation process for this project. Early on, a Tribal Coordination Plan was shared with seven tribes that have an interest in the project area, and those tribes were invited to engage as participating agencies. The Chinook Tribe and Cowlitz Indian Tribe accepted the invitation to serve as participating agencies while the Confederated Tribes of Grand Ronde Community of Oregon, Confederated Tribes of the Umatilla, Confederated Tribes of Warm Springs, Nez Perce Tribe, and Yakama Nation declined this invitation. All seven tribes have been asked to review and provide comments on the area of potential effects for cultural resources, the methodology for assessing impacts to cultural resources, and a draft copy of the cultural resources report. In addition, the two tribes serving as participating agencies have received regular project updates and been asked to review and provide comments on the range of alternatives considered for the project. None of the tribes

Project information distributed at a mobile food bank in Highlands Neighborhood

September 2016 open house

have submitted substantive comments to-date; the Cowlitz Indian Tribe confirmed that the project would not affect any tribal housing.

1.6 What are the next steps?

Public Review of Draft Environmental Impact Statement

The draft EIS will be available for public review and comment for 45 days (March 2, 2018 through April 16, 2018). Section 1.3 lists the agencies and tribes involved and to whom the document will be distributed. The Fact Sheet at the beginning of this draft EIS lists the locations where copies will be available for review by the public and describes how the public can obtain and provide comments on the document.

Selection of the Preferred Alternative

Comments on the draft EIS from agencies, tribes, and the public will be an important factor in the selection of a preferred alternative by the lead agencies. The lead agencies will also consider input received from the Technical Advisory Committee and the Executive Committee.

Final Environmental Impact Statement

A final EIS will be prepared to identify and evaluate the preferred alternative, which may incorporate additional design refinements. Additional environmental studies, if needed, will also be completed and specific environmental commitments will be developed. The final EIS will include and address comments received on the draft EIS received during the public comment period.

Record of Decision and Project Implementation

After the final EIS is issued, a record of decision will be prepared to document the course of action for implementation. The record of decision identifies the selected preferred alternative, the other alternatives considered, and the plan for environmental commitments. The environmental commitments stipulated in the record of decision will become a formal part of the project record as obligations required for the project owner or contractor to implement.

After the record of decision is issued and funding becomes available, right-of-way acquisition, final design, and construction will occur.

1.7 How can I be involved and how will the project continue to communicate with the public?

The project team will continue to share information with stakeholders and the public throughout the duration of the project. General ways to get connected and/or be involved with the project include:

- Visit the project website for the latest project updates (www.industrialoregonway.org)
- Join the project mailing list by completing the "Contact Us" form on the project website or by calling Cowlitz County at (360) 577-3030
- Email the project team directly at IndustrialOregonWay@co.cowlitz.wa.us
- Send a letter via U.S. Postal Service to the project lead agencies (refer to the Fact Sheet for agency contacts and mailing addresses)
- Visit the local WSDOT and Cowlitz County offices (refer to the Fact Sheet for agency office locations)

As detailed in the Fact Sheet, the project team will hold a public hearing and open house during the 45-day public comment period for this draft EIS. Comments on the draft EIS can be submitted by mail, email, via the project website, or at the public hearing during the public comment period. After the public comment period, the project will proceed as previously described in Section 1.6. The publication of the final EIS and record of decision will be advertised in advance.

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Chapter 2. Developing the Alternatives

Chapter 2 provides information about the three alternatives studied in detail in this EIS, project construction, and additional alternatives that were considered for the project but were dismissed from further analysis.

2.1. What solutions are being considered?

Three alternatives are being evaluated to address the project's purpose and need:

» No Build Alternative
» Grade-Separated Option A (GSA) Alternative
» Partial Grade-Separated Option B (PGSB) Alternative.

Each alternative is summarized in Table 2-1 and described in more detail in the following sections.

No Build Alternative

Under the No Build Alternative, no major changes would be made to the roadway network with the exception of signal timing revisions implemented at the intersection of Industrial Way and Oregon Way. The No Build Alternative also assumes that other nearby transportation-related improvements and developments identified in the City of Longview's Comprehensive Plan and Zoning Code, Cowlitz-Wahkiakum Council of Government's travel demand model, the Port of Longview's Barlow Point Master Plan, and the Millennium Bulk Terminals – Longview Project Environmental Impact Statement (EIS) would be constructed. Thus, future (2040) conditions associated with the No Build Alternative would include:

» **Vehicular traffic growth:** Vehicle traffic (passenger and freight truck) is anticipated to increase approximately 1–2 percent annually due to regional growth based on projected population and land use changes. This increase translates to an overall growth in traffic demand (volume on most major arterials in the area) of approximately 40 to 50 percent by 2040 compared to existing conditions (2015).
» **Increased rail service on the Reynolds Lead:** The Reynolds Lead crosses Industrial Way west of the intersection and Oregon Way north of the intersection (Crossings A and B in Figure 1-2). Both crossings are at-grade. Rail service on the Reynolds Lead is expected to increase from up to four trains per day (two inbound, two outbound) under existing conditions to up to 20 trains per day (10 inbound, 10 outbound) prior to 2040 based on other private and public development proposals (Table 2-2). The types of trains operating on the Reynolds Lead are also anticipated to change over time. Currently, industry trains operate on the Reynolds Lead (4 trains per day), whereas by 2040 rail service would include 4 industry trains per day and 16 unit trains per day. An industry train, or manifest train, comprises rail cars that haul various commodities and have different origins and destinations. For this project, typical industry trains are assumed to be 2,000 feet or less in length. A unit train comprises rail cars that haul the same commodity and have a single origin and destination. For this project, typical unit trains are assumed to be 6,800 to 8,000 feet in length.
» **No change to rail service on the Port Lead:** The Port Lead crosses Industrial Way at-grade east of the intersection (Crossing C in Figure 1-2). Rail traffic on the Port Lead is anticipated to remain at current levels with up to six industry trains per week (three inbound, three outbound) through 2040 (Table 2-2).
» **Extension of the Industrial Rail Corridor (IRC) and new rail service:** The Port of Longview plans to extend the IRC to provide rail service west of the existing IRC terminus to the Port's Barlow Point property. This extension would create a new at-grade roadway/railroad crossing on State Route (SR) 433 south of Industrial Way although the exact location of the crossing has not been determined (Table 2-2; Crossing D in Figure 1-2). The IRC extension is assumed to connect to the Reynolds Lead west of the intersection. Rail service is anticipated to involve up to eight unit trains per day (four inbound, four outbound) by 2040.

Grade-Separated Option A (GSA) Alternative

The GSA Alternative would include all changes in the future conditions as described for the No Build Alternative. In addition, a fully elevated signalized intersection would be constructed southwest of the existing intersection as shown in Figure 2-1. Under the GSA Alternative, the Reynolds Lead rail line would be realigned to pass under the new elevated intersection. All turning and through movements for the Industrial Way/Oregon Way intersection would be accommodated on the elevated intersection that would cross over the Reynolds Lead (Figure 2-1, Detail 1). A new surface roundabout at the Oregon Way/Alabama Street intersection (Figure 2-1, Detail 2) would allow through and turning movements in all directions. In addition, a new one-way surface road for houses facing onto the west side of Oregon Way and properties on the east side of Oregon Way south of Alabama Street would be constructed and provide local access. This surface road would loop under the elevated structure and connect back to Oregon Way on the east side of the new

Table 2-1: Summary Comparison of Key Elements of Alternatives

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Industrial Way/Oregon Way Intersection	» Surface signalized intersection	» Elevated signalized intersection	» Elevated signalized intersection » Surface roundabout
Oregon Way/Alabama Street Intersection	» Unsignalized, surface intersection with all through and turning movements	» Surface roundabout with all through and turning movements	» Unsignalized, surface intersection with right-in/ right-out turn movements only
Local Roads	» No changes to local roads	» New one-way road to access properties along Oregon Way between Industrial Way and Alabama Street » New one-way road to access businesses on north and south sides of Industrial Way between Oregon Way and Columbia Boulevard » West Port Way and East Port Way reconstructed to one-way loop road	» 14th Street improved to two-way local street » New two-phase signalized intersection added on Industrial Way between Oregon Way and Columbia Boulevard » West Port Way and East Port Way reconstructed to one-way loop road
Reynolds Lead	» No realignment or change to existing at-grade crossings	» Realigned to cross Oregon Way and Industrial Way under elevated intersection	» Widened at-grade crossings of Oregon Way and Industrial Way
Industrial Rail Corridor	» Port of Longview plans a west extension across SR 433	» Port of Longview plans a west extension across SR 433	» Port of Longview plans a west extension across SR 433
At-grade Rail Crossings	» 4 at-grade crossings on intersection approach legs	» 0 at-grade crossings on intersection approach legs	» 0 at-grade crossings on approach legs for elevated portion of the intersection (higher traffic volumes) » 3 at-grade crossings on approach legs for surface portion of the intersection (lower traffic volumes)
Access to Weyerhaeuser Industrial Complex	» Gates 3 and 4 remain open	» Gates 3 and 4 consolidated and reconfigured	» Gates 3 and 4 consolidated and reconfigured
Pedestrian/Bicycle Facilities	» No changes; non-contiguous sidewalks; no bicycle lanes or paths	» New shared-use path and contiguous sidewalks	» New shared-use path and contiguous sidewalks

Table 2-2: Existing and Future Frequency of Rail Service

	EXPECTED FREQUENCY OF TRAINS		
Rail Facility	Existing Conditions (2015)	Year of Project Opening (2020)	Future Conditions (2040)
Reynolds Lead	4 industry trains per day	8 trains per day (4 industry and 4 unit trains)	20 trains per day (4 industry and 16 unit trains)
Port Lead	6 industry trains per week	6 industry trains per week	6 industry trains per week
IRC Extension	Not in service	Not in service	8 unit trains per day

Note: The future increases in rail service are based on other private and public development proposals that are independent of the Industrial Way/Oregon Way Intersection Project.

roundabout. On-street parking along the west side of Oregon Way would be eliminated south of Alabama Street; on the east side of Oregon Way on-street parking would be eliminated approximately 90 feet south of Alaska Street to Industrial Way. Existing driveways within 130 feet of the new roundabout would be closed or relocated.

A new local surface road would provide a northbound to eastbound connection from East Port Way to Columbia Boulevard. This surface road would serve businesses located on the north side of Industrial Way and would pass under the east leg of the elevated intersection to provide access to the properties on the south side of Industrial Way west of Columbia Boulevard (Figure 2-1, Detail 3). Driveways along Industrial Way between Columbia Boulevard and Oregon Way would be changed to right-in/right-out only.

West Port Way and East Port Way would be reconstructed to provide a one-way loop road with access to the Port of Longview and businesses south of the Industrial Way/Oregon Way intersection. Access to the Weyerhaeuser industrial complex would be consolidated and reconfigured: the existing access on West Port Way (Gate 3) would be converted to an emergency-only access gate; the existing access on Industrial Way just west of Oregon Way (Gate 4) would be permanently closed; and, a new gate would provide access from the north end of West Port Way, which would consolidate all traffic that currently uses Gate 3 and Gate 4. On-street parking along East Port Way would be eliminated to accommodate the shared-use path.

One at-grade roadway/railroad crossing of the Port Lead rail line would exist for the new surface roadway that connects East Port Way to Columbia Boulevard. The GSA Alternative would accommodate the planned extension of the Port of Longview's IRC under a bridge structure for SR 433, but this extension would likely result in a second at-grade roadway/railroad crossing with East Port Way.

The GSA Alternative would include the following bicycle and pedestrian network improvements, all of which would be compliant with the standards of the United States Access Board Revised Draft Guidelines Accessible Public Rights-of-Way (2005) to meet the Americans with Disabilities Act (ADA):

- A new shared-use path along East Port Way that runs north-south, crosses under the east leg of the elevated intersection, runs east-west and crosses under the north leg of the elevated intersection, and connects to the Highlands Trail on the west side of Oregon Way
- Reuse or reconstruction of the existing Oregon Way sidewalk (west side) on the one-way surface roadway that runs along the west side of Oregon Way from Highlands Trail to the Oregon Way/Alabama Way roundabout
- New sidewalk on the new surface roadway that runs along the east side of Oregon Way from the new shared-use path to the Oregon Way/Alabama Way roundabout
- Reuse or reconstruction of the existing Industrial Way sidewalk (north side) on the north side of the new surface road along Industrial Way from the shared-use path to Columbia Boulevard
- New sidewalk on south side of Industrial Way from the point where Industrial Way touches down on the surface to Columbia Boulevard

Partial Grade-Separated Option B (PGSB) Alternative

The PGSB Alternative would include all changes in the future conditions as described for the No Build Alternative. In addition, a new grade-separated intersection would be constructed with some movements elevated and other movements retained on the surface as shown in Figure 2-2. A new elevated signalized intersection would be constructed southwest of the existing intersection. The new elevated intersection would accommodate all northbound and southbound turning and through movements, as well as all eastbound and westbound turning movements. All westbound and eastbound through movements on Industrial Way would occur at the new surface roundabout that would be constructed where the existing intersection is located. This

surface roundabout would also provide northbound and eastbound/westbound circulation from the south side of the intersection. Southbound movements would have to use the elevated intersection to access the Port of Longview and other locations south of the Industrial Way/Oregon Way intersection (Figure 2-2, Detail 1). Emergency service providers would be able to use the elevated structure for westbound and eastbound through movements if needed to quickly navigate through the intersection (for example, during train crossings).

The elevated north leg of the new intersection would touch down on to the surface just north of the intersection of Oregon Way and Alabama Street, limiting turning movements along the surface roadway and at the intersection with Alabama Street to right-in/right-out only (Figure 2-2, Detail 2). On-street parking along the west side of Oregon Way would be eliminated south of Alabama Street; on the east side of Oregon Way on-street parking would be eliminated approximately 90 feet south of Alaska Street to Industrial Way. To improve circulation for properties located on Alabama Street east of Oregon Way, the PGSB Alternative would include improvements to 14th Avenue between Alabama Street and Beech Street, which would allow for one northbound and one southbound travel lane.

A new two-phase signal on Industrial Way east of the intersection with Oregon Way would accommodate the merge of eastbound surface traffic on Industrial Way with eastbound traffic coming off the elevated intersection, and across westbound traffic on Industrial Way (Figure 2-2, Detail 3). Driveways along Industrial Way between Columbia Boulevard and Oregon Way would be changed to right-in/right-out only.

Similar to the GSA Alternative, West Port Way and East Port Way would be reconfigured to provide a one-way loop road and the access locations to the Weyerhaeuser industrial complex would be consolidated and reconfigured. On-street parking along East Port Way would be eliminated to accommodate the shared-use path.

No rail lines would be realigned under this alternative. At-grade roadway/railroad crossings of the Reynolds Lead and the Port Lead would be located on the surface roadway segments of Oregon Way and Industrial Way. The PGSB Alternative would accommodate the planned extension of the Port of Longview's IRC under a bridge structure for SR 433. This rail extension would likely create an additional at-grade roadway/railroad crossing with the northbound surface roadway connection from East Port Way to eastbound Industrial Way.

The PGSB Alternative would include the following ADA-compliant bicycle and pedestrian network improvements:

» A new shared-use path along East Port Way that runs north-south, crosses at the new surface roundabout with a crosswalk, connecting to the Highlands Trail on the west side of Oregon Way
» Reuse or reconstruction of the existing Oregon Way sidewalk (west side) on the new one-way surface roadway that runs along the west side of Oregon Way from the Highlands Trail to just north of the Oregon Way/Alabama Way intersection
» New sidewalk on the new surface roadway that runs along the east side of Oregon Way from the new shared-use path to the Oregon Way/Alabama Way roundabout
» New sidewalk on the north and south sides of Alabama Street from Oregon Way to 14th Avenue
» New sidewalk on the east and west sides of 14th Avenue from Alabama Street to Beech Street
» Reuse or reconstruction of the existing Industrial Way sidewalk (north side) on the north side of the new surface road along Industrial Way from the shared-use path to Columbia Boulevard
» New sidewalk on south side of Industrial Way from the point where Industrial Way touches down on the surface to Columbia Boulevard.

Project Construction

Both the GSA Alternative and the PGSB Alternative would involve the construction of an elevated intersection, new surface roadways, a new roundabout, and new ramps to connect to SR 433. Table 2-3 provides a summary and comparison of key construction activities required for the two build alternatives, which are further described below.

Construction Duration and Phasing

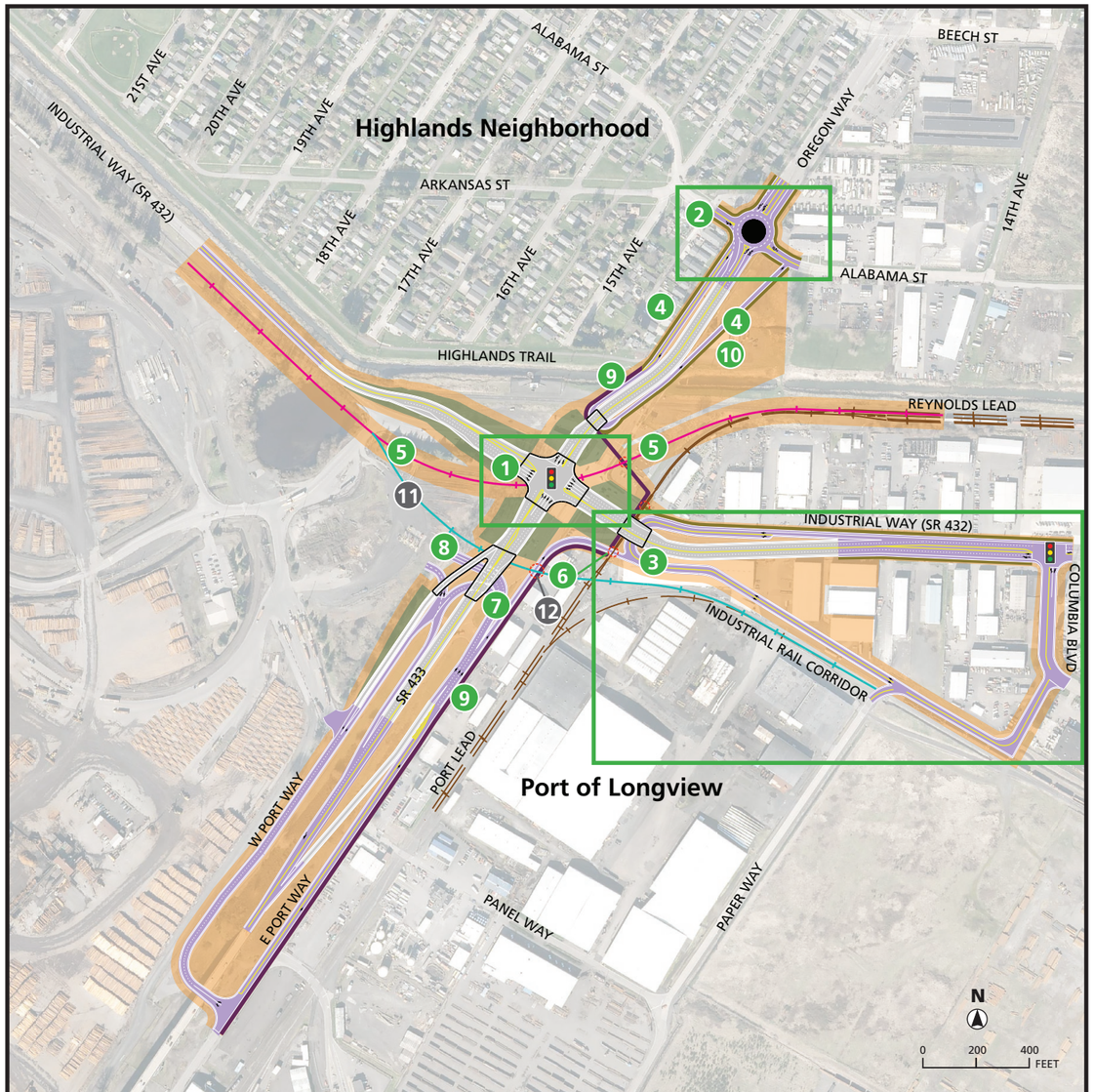
The GSA Alternative would be constructed in four phases spread over 5 years. The PGSB Alternative would be constructed in three phases spread over 3.5 years.

Construction Approach

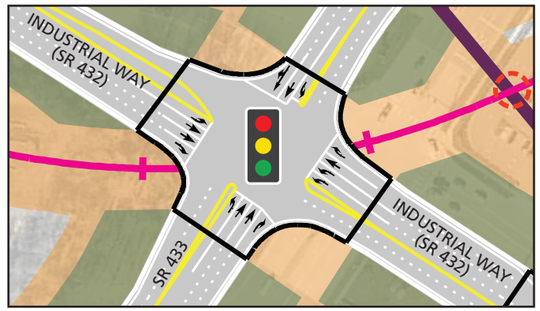
GSA Alternative

Constructing the elevated intersection would require a combination of embankment, retaining walls, and bridges to raise the structure and to accommodate the surface roadway network. Early activities would include utility relocations, constructing several of the features on the perimeter of the intersection, establishing temporary roads, and realigning access points/driveways. Once these elements are in place, construction of the elevated features would be undertaken, which would involve rerouting traffic to temporary roads or using detour routes. The final stages of construction would include finishing all the connecting ramps and remaining surface roads.

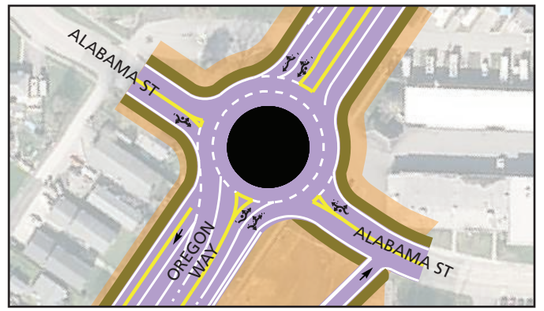
Figure 2-1: GSA Alternative



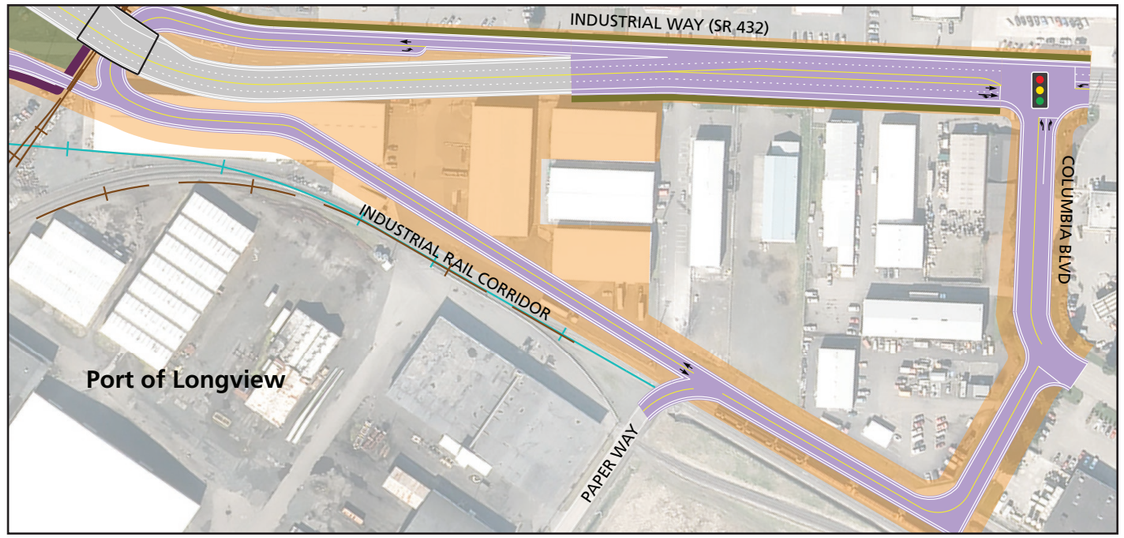
1 Fully elevated signalized intersection



2 New roundabout at Oregon Way/Alabama Street intersection



3 East leg of intersection, including Industrial Way/Columbia Blvd intersection and local access roads



4 New one-way local access road providing access to residences on Oregon Way

5 Reynolds Lead realigned under new elevated intersection

6 Surface roadway/rail crossing

7 One-way local access road providing access to properties south of Industrial Way

8 New access to Weyerhaeuser replacing closed access on Industrial Way

9 New shared-use path providing connectivity between residential and industrial employment areas

10 Water treatment ponds and staging area

11 Future planned extension of the Port of Longview's Industrial Rail Corridor Line

12 Future surface roadway/rail crossing

This graphic is conceptual in nature and subject to change.

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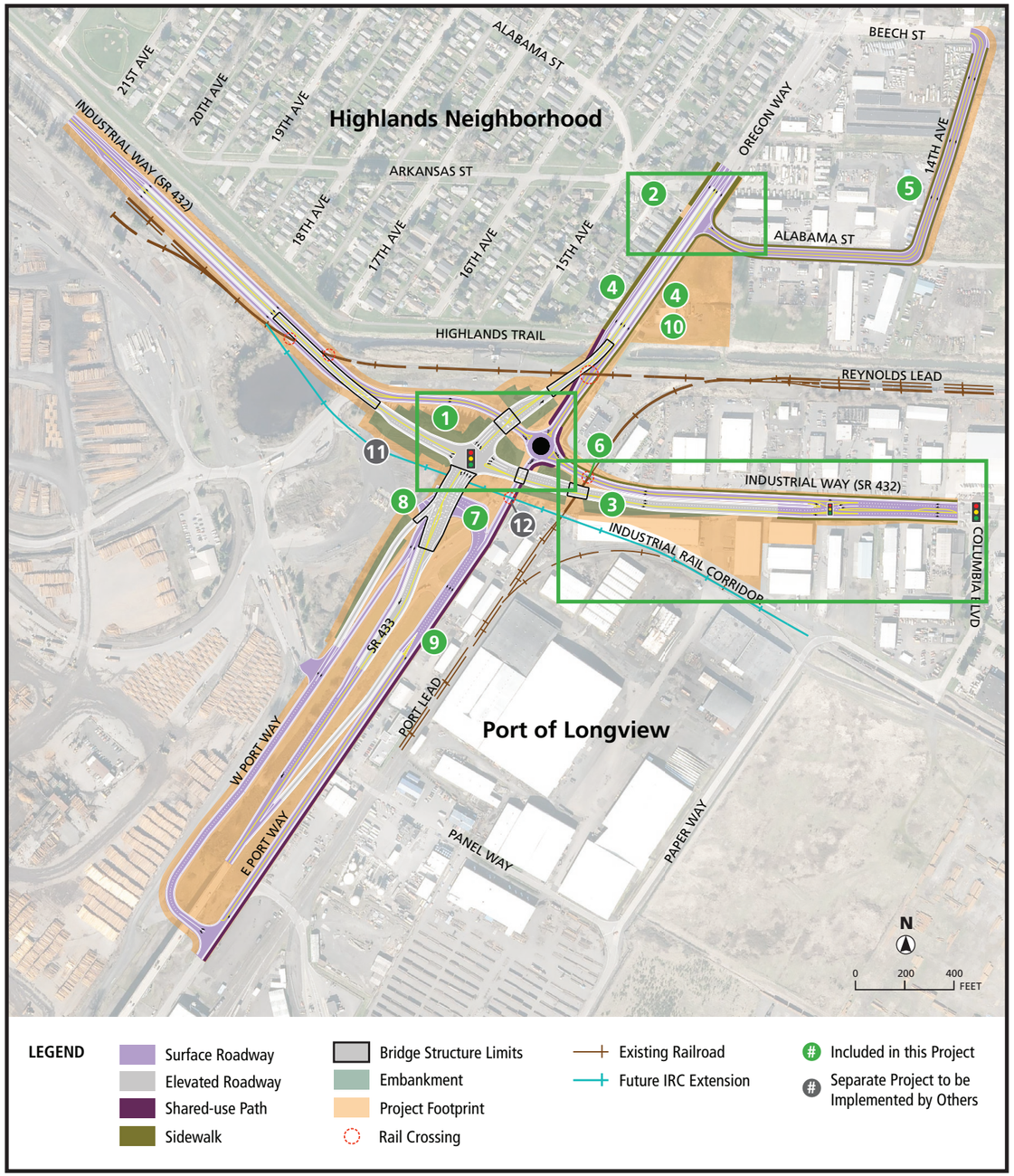
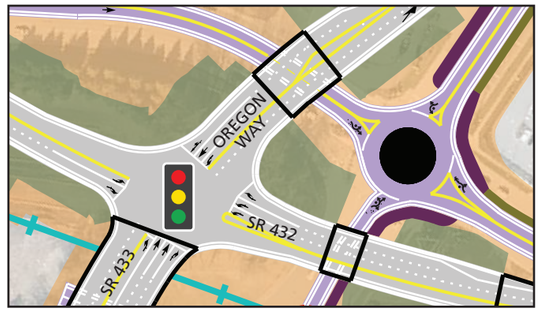
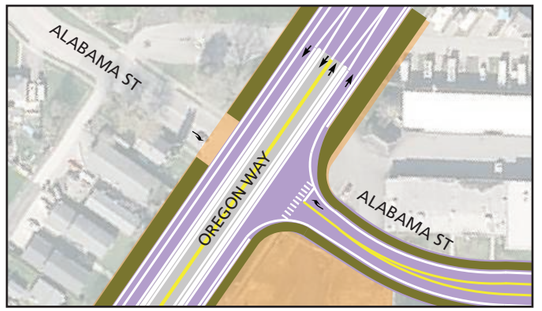
Figure 2-2: PGSB Alternative



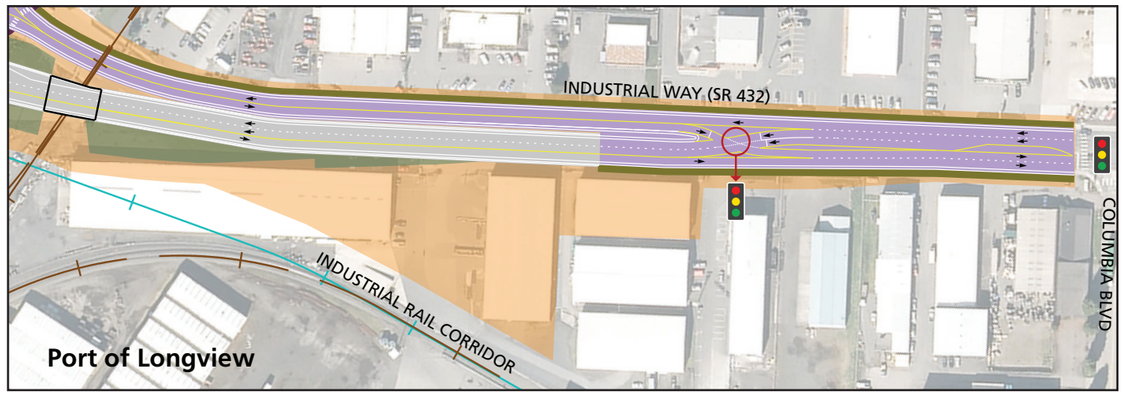
1 New elevated roadway intersection and surface roadway roundabout



2 Oregon Way/Alabama Street intersection revised to right-in/right-out only



3 East leg of intersection, including a new signal on Industrial Way



4 New one-way local access road providing access to residences on Oregon Way

5 14th Ave improved to local road standards

6 Surface roadway/rail crossing of existing rail lines

7 One-way local access road providing access to properties south of Industrial Way

8 New access to Weyerhaeuser replacing closed access on Industrial Way

9 New shared-use path providing connectivity between residential and industrial employment areas

10 Water treatment ponds and staging area

11 Future planned extension of the Port of Longview's Industrial Rail Corridor Line

12 Future surface roadway/rail crossing

This graphic is conceptual in nature and subject to change.

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Table 2-3: Summary of Construction Activities

	GSA ALTERNATIVE	PGSB ALTERNATIVE
Construction Duration	5 years	3.5 years
Detours and/or Temporary Roads	Yes	Yes
Closure of Oregon Way	Up to 1.5 years	No closure
Realignment of Reynolds Lead	Yes	No
Utility Relocations	Yes	Yes
Realigned Access Points/Driveways	Yes	Yes
Property Acquisitions	15 full acquisitions 26 partial acquisitions	12 full acquisitions 21 partial acquisitions
Easements	59 temporary easements 2 permanent easements	71 temporary easements 2 permanent easements

The GSA Alternative would also require relocating a segment of the Reynolds Lead, which would involve constructing the new alignment while rail service continues to use the existing track. Upon completion, rail service would start using the realigned track and the existing track would be removed.

In the vicinity of the intersection, traffic on Oregon Way would be detoured for 1 to 1.5 years to other routes, such as utilizing Tennant Way to 3rd Avenue to Industrial Way. Local access to properties on Oregon Way would be provided during construction, although no on-street parking would be available. No additional right-of-way would need to be acquired for this detour.

The GSA Alternative would acquire property from approximately 41 parcels of which 15 parcels may be fully acquired and 26 parcels may be partially acquired. In the case of partial acquisitions, a portion of the property would be acquired and the remainder would be retained by the current owner. In addition, new and expanded easements would be needed from railroad parcels and approximately 59 temporary easements would be needed during project construction.

PGSB Alternative

The PGSB Alternative would follow the general sequence of construction activities similar to the GSA Alternative. However, travel on Oregon Way would be retained and reduced to one lane in each direction for most of the construction duration. No realignment of the Reynolds Lead would occur.

The PGSB Alternative would require property acquisition from approximately 33 parcels of which 12 parcels may be fully acquired and 21 may be partially acquired. Expanded easements would be obtained from the railroad parcels and approximately 71 temporary easements would be needed during project construction.

2.2. What other alternatives were looked at?

The project undertook a practical design approach to developing alternatives that would seek the most reasonable low cost solutions to meet the project's purpose and need statement. The practical design approach started from the ground and built up by seeking alternatives that provide solutions fitting the context of the area while adding the best value to the overall project. This approach first considered what could be done "on the ground" such as improving lane channelization, changing signal timing, implementing travel demand management/transportation systems management solutions, and even rerouting traffic to other roads to reduce the vehicular demand on the intersection. Three traffic rerouting concepts were developed and analyzed. Each concept was eliminated from further analysis because it could not sufficiently reduce traffic congestion at the intersection.

The next step taken by the project team was to develop and analyze incremental strategic capital solutions, starting with preliminary alternatives that would make roadway capacity improvements at the existing intersection, then developing more complex preliminary alternatives by adding grade-separated design elements for the heaviest vehicular movements, and eventually building up to preliminary alternatives with a fully grade-separated intersection. The project team identified a preliminary range of alternatives that included nine preliminary design alternatives (one at-grade alternative, two grade-separated alternatives, and six partial grade-separated alternatives) and the No Build Alternative. The preliminary design alternatives were developed by the project team and incorporated feedback gathered through stakeholder input, the public scoping process, and four public open houses. Using a two-step screening process, the preliminary design alternatives were evaluated against screening criteria to

determine which alternatives should be advanced for further consideration and which should no longer be considered. The first screening focused on operational performance of each preliminary design alternative. The screening criteria for this step included:

- Congestion relief: average vehicle delay without train blockages
- Congestion relief: average vehicle delay with train blockages
- Travel reliability: average vehicle recovery time after train blockage ends
- Travel reliability: probability any vehicle trip is interrupted by train blockage
- Travel reliability: probability emergency response trip is interrupted by train blockage

The second screening focused on context and cost. Screening criteria for this step included:

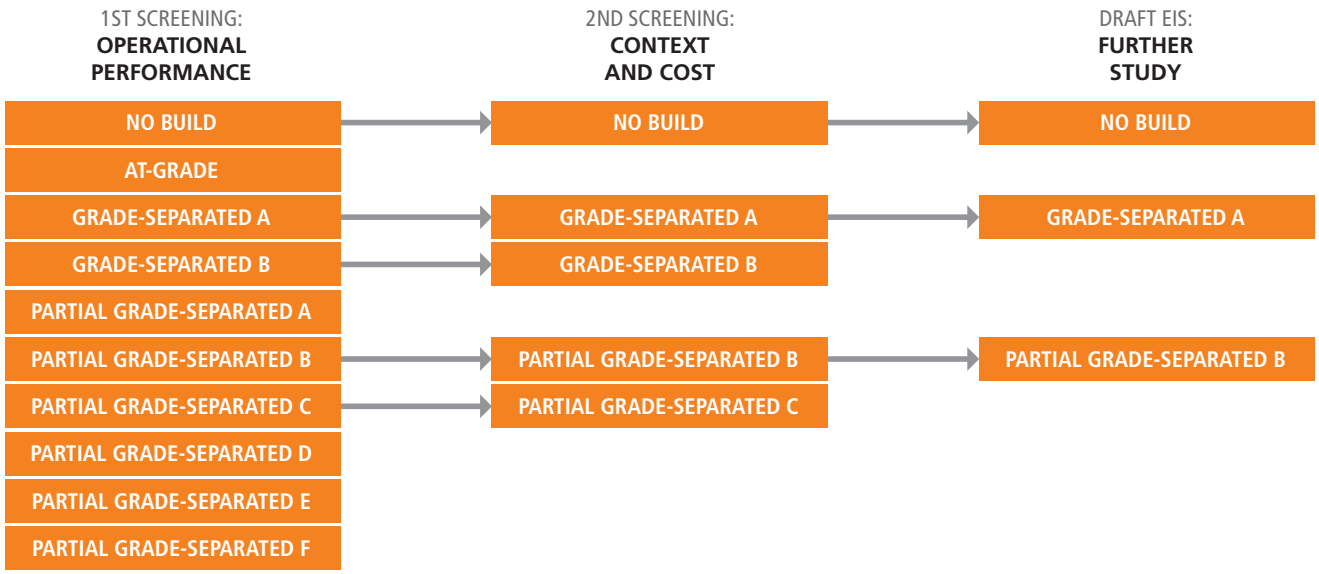
- Safety: number and severity of conflict points
- Local economy: impacts to business properties
- Local travel circulation connectivity: out of direction travel
- Community: impacts to residential properties
- Construction staging/phasing: feasibility and likelihood of approval
- Bicycle and pedestrian connectivity: safe, connected routes
- Third-party approvals: likelihood of approvals and permits
- Environmental: impacts/benefits to air quality, noise and visual resources
- Cost: comparative costs

Four of the nine preliminary design alternatives (two grade-separated alternatives and two partial grade-separated alternatives) advanced from the first screening to the second screening. The other five alternatives were withdrawn from further consideration because they did not offer the same level of benefits for improved travel reliability (e.g. access for emergency service providers and recovery time after train blockages) as the four alternatives that were advanced.

The four alternatives that were advanced were then further developed to refine the location for major bridge structures, railroad alignments, local access connections, and vertical clearances. This further-developed range of alternatives underwent the second-step screening, which resulted in two of the remaining four preliminary design alternatives (Grade-Separated Option A Alternative and Partial Grade-Separated Option B Alternative) advancing from the second screening to be recommended for further study in the draft EIS. The other two alternatives (Grade-Separated Option B and Partial Grade-Separated Option C) were not advanced because they would have more complicated construction (staging, longer duration, greater traffic disruptions, additional right-of-way for detours, greater geotechnical risk). In addition, the Partial Grade-Separated Option C Alternative provided fewer benefits to traffic operations than the Grade-Separated Option A, which had a similar construction cost. The No Build Alternative was evaluated in both screenings and advanced, as required, for further analysis in the draft EIS.

Figure 2-3 identifies the preliminary design alternatives evaluated during each screening. Additional details regarding the practical design process, traffic rerouting concepts, and preliminary design alternatives, including descriptions and figures, as well as information on the overall screening process, results, and rationale for decisions to advance or dismiss alternatives is provided in Appendix A.

Figure 2-3: Preliminary Design Alternatives Evaluation and Screening Process



Chapter 3. Comparing the Alternatives

Chapter 3 looks at the beneficial and adverse effects of the project on transportation operations, environmental resources, and the community. Each section begins with a description of the existing conditions for a specific resource and then compares how the resource would benefit or be affected in the future by the No Build Alternative, Grade-Separated Option A (GSA) Alternative, and Partial Grade-Separated Option B (PGSB) Alternative. A comparison between the No Build, GSA and PGSB Alternatives is provided for each resource. The study area for each resource is illustrated in the respective appendix and impact assessment methodology memoranda (also included in the appendices).

3.1 How would the project affect roadway traffic operations?

Located along the Columbia River and connected to the mainline highway and rail networks, Longview is strategically positioned as an intermodal transportation hub, including freight movement by truck, rail, and ship modes and passenger vehicles. State highways and local streets crisscross Longview to support the locally-, statewide-, and regionally-significant industrial uses along the river as well as provide an interstate connection to Oregon. Over time, population and employment growth has led to increased levels of vehicle congestion in the study area, particularly at the Industrial Way/Oregon Way intersection.

The project intersection experiences periods of high traffic volumes throughout the day. Therefore, the traffic analysis examined three 3-hour peak traffic periods throughout the day when traffic volumes were high: morning (AM; 6:00am to 9:00am), midday (11:30am to 2:30pm), and afternoon (PM; 3:00pm to 6:00pm) peak periods. Nearby intersections, rail operations, and the Lewis and Clark Bridge capacity were also included in the analysis.

Existing Conditions

Congestion – Delay: A common metric for analyzing the effectiveness of traffic operations is determining the level of congestion that occurs. Congestion is often measured by the average time a vehicle must slow down or stop in traffic compared to freely-flowing conditions, which is referred to delay and is measured in seconds. Current vehicle congestion levels and peak period delays are moderate and deemed manageable during typical conditions, except when a train crosses. During a train crossing, traffic delays approach roadway capacity thresholds because the train blocks the roadway for 5 minutes on average. Up to four industry trains[1] per day cross the north and west leg of the intersection; up to six industry trains per week cross the east leg of the intersection. As the presence of trains crossing legs of the project intersection has a distinctly different effect on roadway operations compared to operations when no trains are present, two traffic scenarios were analyzed: 'no train crossing' and 'with train crossing.'

Industrial Way/Oregon Way Intersection

METRICS USED TO ANALYZE TRAFFIC OPERATIONS

Delay: the additional time that a vehicle must slow down or stop in traffic compared to freely-flowing traffic conditions; used to measure congestion levels.

Queue: the number of vehicles (measured in distance) lined up and stopped in travel lanes at an intersection or railroad crossing.

Recovery Times from Train Crossings: the time it takes for traffic to return to traffic flow conditions that were occurring prior to the train crossing.

Travel Time: the total time spent traveling from one point to another point.

Travel Time Reliability: the level of consistency in travel times for repeated trips (same time of day but different day).

1 An industry train, or manifest train, is made up of rail cars that haul various commodities that have different origins and destinations. For this project, typical industry trains are assumed to be 2,000 feet or less in length.

Table 3-1: Average Delay per Vehicle for the Existing Conditions and No Build Alternative

	EXISTING CONDITIONS (2015)		NO BUILD ALTERNATIVE (2040) Compared to existing conditions	
Peak Hour/Train Scenario	No Train[1]	With Train[2]	No Train[1]	With Train[3]
AM **7:00 am – 8:00 am**	**38** seconds	**47** seconds	**49** seconds (**30%** more)	**99** seconds (**110%** more)
Midday **12:30 pm – 1:30 pm**	**42** seconds	**54** seconds	**61** seconds (**45%** more)	**146** seconds (**170%** more)
PM **4:00 pm – 5:00 pm**	**49** seconds	**71** seconds	**194** seconds (**300%** more)	**247** seconds (**250%** more)

Note: Traffic simulation reflects the 3-hour peak period from 3:00pm–6:00pm with average delay per vehicle results shown for the peak hour of 4:00pm–5:00pm. The presence of trains crossing legs of the project intersection has a distinctly different effect on roadway operations compared to operations when no trains are present, so two traffic scenarios were analyzed: 'no train' crossing and 'with train' crossing.

1. Analysis assumes no trains are traveling on either the Reynolds Lead or IRC.
2. Analysis assumes one industry train traveling westbound on the Reynolds Lead.
3. Analysis assumes one unit train traveling westbound on the Reynolds Lead during the AM peak period. Analysis assumes two unit trains during the Midday and PM peak periods; one westbound train on the Reynolds Lead and one eastbound train on the IRC; trains' travel time separated by 1 hour.

The existing traffic conditions (2015) for the project intersection during the peak hour (4:00pm–5:00pm) of the PM peak period indicate that each car typically experiences approximately 50 seconds of average vehicle delay. However, when an industry train crosses Oregon Way during the PM peak hour, this average delay increases to over 70 seconds per vehicle, which translates to overall congestion increasing 45 percent during the PM peak hour (Table 3-1).

Queuing: Another metric used to analyze traffic operations is the length of vehicle queues that are lined up or stopped in travel lanes at an intersection or railroad crossing. During the PM peak period, the existing vehicle queues are fairly consistent across the PM peak period with only slight peaks in all through and turning movements (Figure 3-1).

When trains cross the intersection legs, queuing results for all travel movements due to the roadway being blocked by the train crossing (Figure 3-2). The time needed for stopped traffic to recover to pre-train crossing conditions during the PM peak hour is up to 15 minutes after the train clears the roadway and the railroad crossing gates have been raised. Trains crossing the intersection are not a regular occurrence today; therefore, vehicle trips during the daytime hours (6:00am to 7:00pm) are infrequently interrupted by roadway blockages when trains cross.

Project Impact and Benefits

No Build Alternative (2040)

Based on the Cowlitz-Wahkiakum Council of Government's travel demand model, which considers population and employment projections, forecasted traffic volumes are expected to grow 1 to 2 percent per year. This growth translates to an estimated 40 to 50 percent increase in traffic volumes by 2040 compared to existing (2015) traffic volumes. At these 2040 traffic levels and not considering roadway blockages caused by train crossings, the resulting congestion would cause gridlocked conditions (greater than 80 seconds of average delay per vehicle) at the project intersection during the PM peak period if no improvements are made (Table 3-1).

To further exacerbate these future conditions, the number of trains expected to operate on the railroad crossing the intersection legs are expected to substantially increase by

Industry train crossing Oregon Way just north of the project intersection

Figure 3-1: Existing Conditions (2015) Approach Queues without Industry Train Crossing Oregon Way

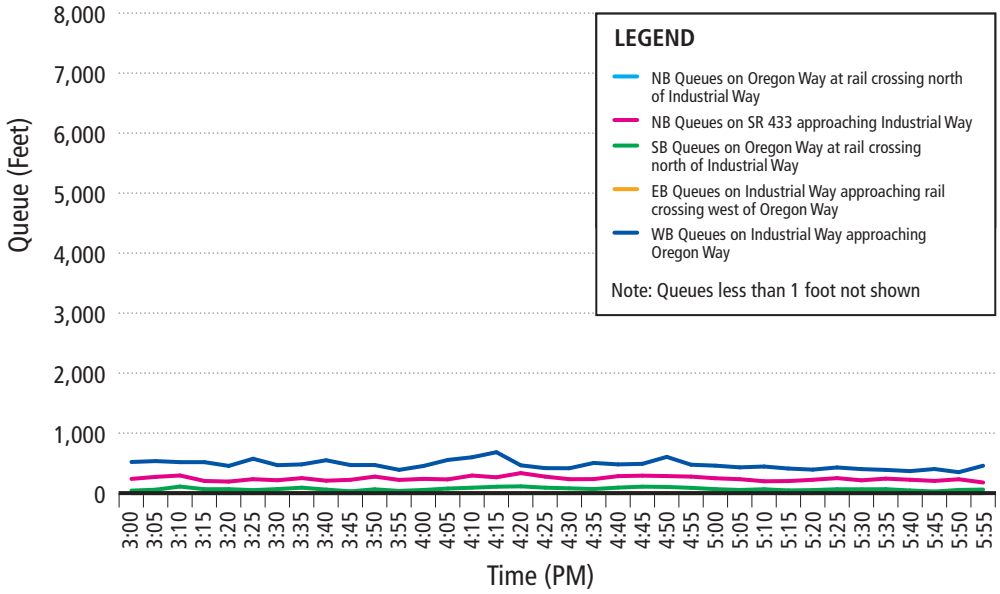
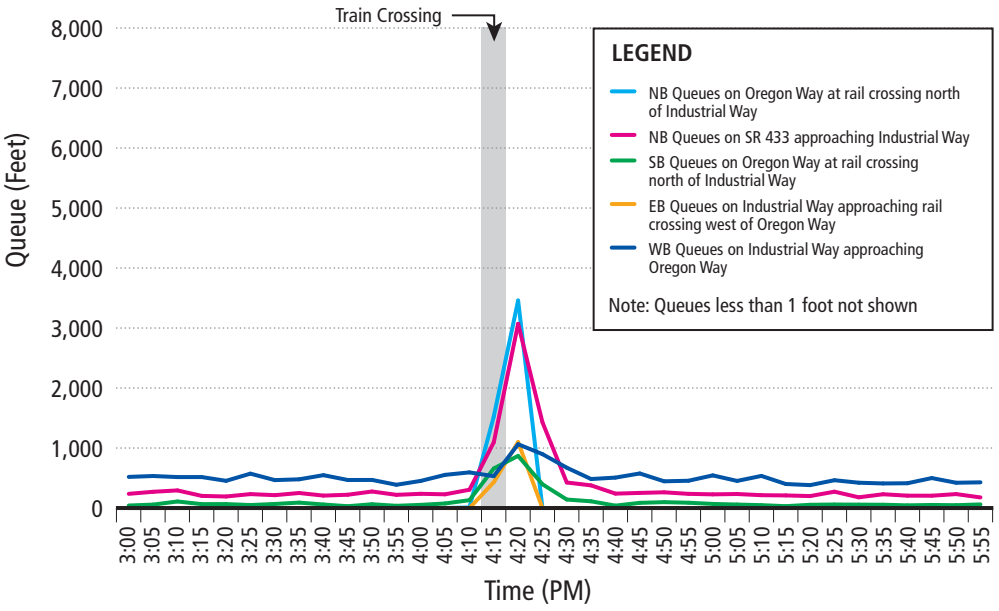


Figure 3-2: Existing Conditions (2015) Approach Queues with Industry Train Crossing Oregon Way



2040 (as previously described in Table 2-2). Rail service on the Reynolds Lead that crosses Oregon Way to the north of the intersection and crosses Industrial Way to the west is expected to add 16 unit trains[2] to the existing 4 industry trains per day (a total of 20 trains per day). Moreover, the Port of Longview anticipates extending its Industrial Rail Corridor (IRC) west, which would add a new rail crossing on the south leg of the project intersection. Up to 8 unit trains per day could operate on this new rail facility. With the continued 6 trains per week operating on the Port Lead, a total of 28 to 30 trains per day could be crossing one or more legs of the intersection by 2040, resulting in multiple train crossings occurring during peak traffic periods.

2 A unit train is made up of rail cars that haul the same commodity and have a single origin and destination. For this project, typical unit trains are assumed to be 6,800 to 8,000 feet in length.

Congestion – Delay: Average delay per vehicle would increase over time as demonstrated by comparing the existing conditions (2015) to the future No Build Alternative (2040) (Table 3-1). In the 'no train' scenario, congestion would have modest increases over time in the AM and midday peak hours (30–45 percent more than existing conditions). However, congestion during the PM peak hour would substantially worsen and become four times more than today's conditions, increasing from 49 seconds to 194 seconds (3.2 minutes).

With the increase in rail service projected by 2040, the intersection operations during all peak hours in the 2040 No Build Alternative would result in double or even triple the congestion levels experienced today. In the PM peak hour, each vehicle would experience a 247 second (4.1 minute) delay on average.

Queuing: In future 2040 conditions, with no trains present, intersection queues for the westbound and southbound approaches would be severe due in part to the Lewis and Clark

Figure 3-3: Future No Build Conditions (2040) Approach Queues without Unit Trains Crossing Oregon Way and SR 433

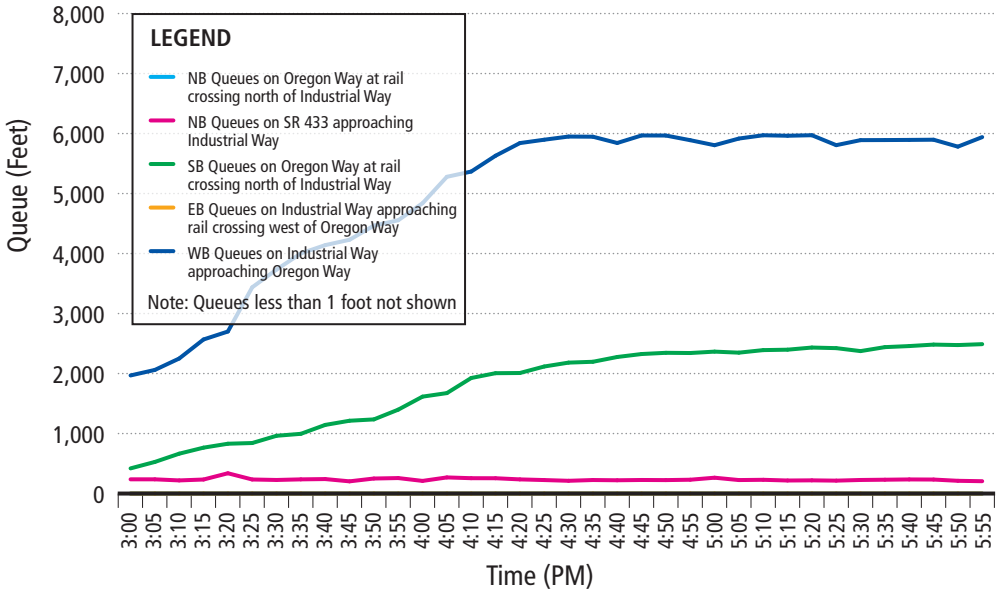
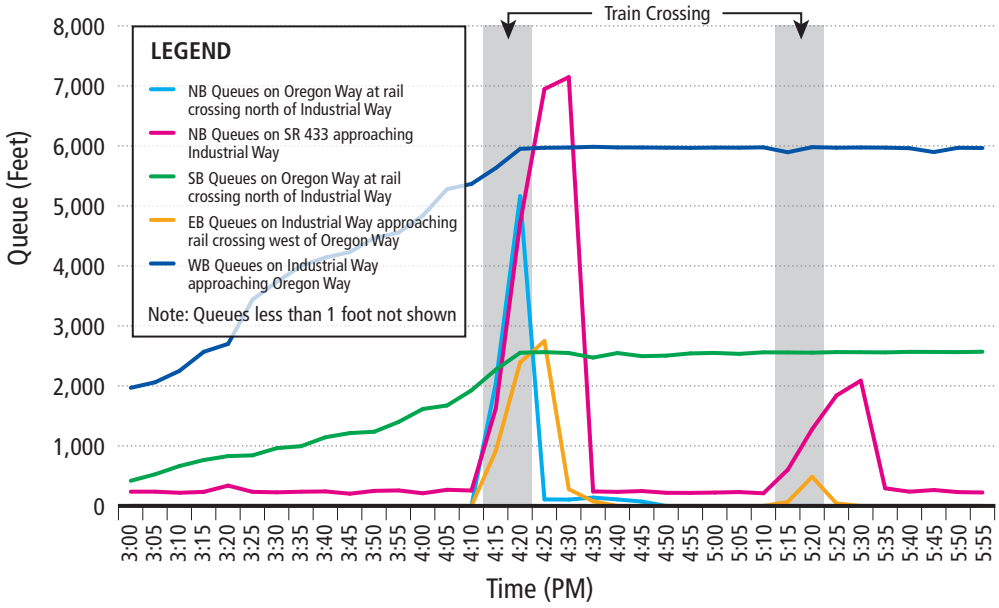


Figure 3-4: Future No Build Conditions (2040) Approach Queues with Unit Trains Crossing Oregon Way and SR 433



Bridge capacity constraint, which limits the number of vehicles that can travel southbound across the bridge (Figure 3-3). This queueing would worsen for most travel directions when trains cross through the intersection as shown by the spikes illustrated in (Figure 3-4). Average queue lengths for vehicles traveling westbound on Industrial Way and approaching the intersection would be over 1 mile (6,000 feet), which extends back to 3rd Street. Vehicles traveling eastbound on Industrial Way and approaching the Reynolds Lead at-grade crossing would have average queues of 2,800 feet (roughly 26th Avenue); vehicles traveling southbound on Oregon Way and approaching the Reynolds Lead at-grade crossing would have average queues of 2,500 feet (roughly Baltimore Street).

Significant queues would also occur for vehicles traveling northbound on the Lewis and Clark Bridge when trains cross the intersection. These queues would begin when approaching the bridge from US 30 and continuing north until vehicles clear all at-grade roadway/rail crossing on the intersection legs. Northbound queues are estimated to extend the full length of the Lewis and Clark Bridge and spill back onto US 30 in Oregon.

Travel Reliability: By 2040, the number of trains crossing the four legs of the intersection is expected to increase from 4–6 trains per day to 28–30 trains per day, including longer trains with longer blockage times. On average, 28–30 trains per day would translate to one train approximately every 50 minutes. However, freight train service does not typically follow a predictable schedule. To analyze how train crossings affected traffic operations at the intersection, the following elements were considered:

» **Frequency of trains crossing the intersection legs:** A random distribution of train service times was applied over a 24-hour period.

» **Vehicle traffic operations prior to the train crossing:** The average vehicle delay prior to the train crossing.

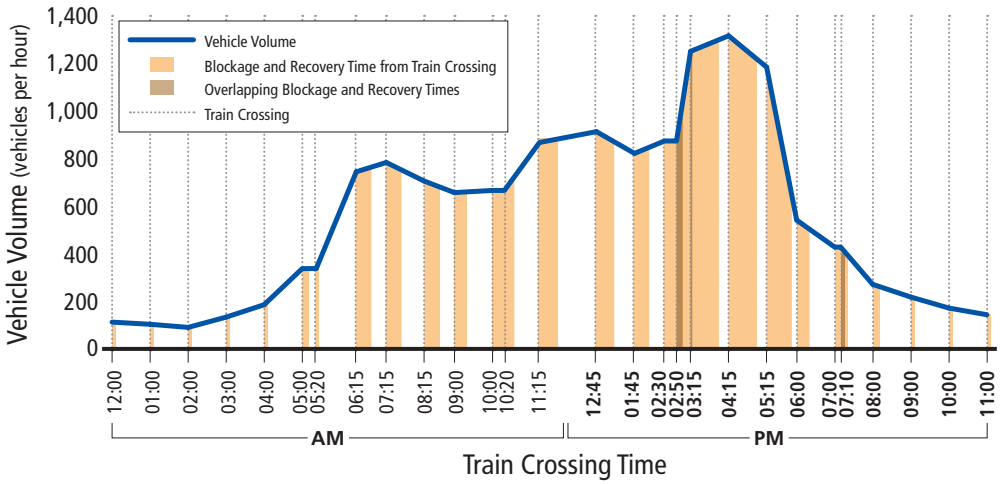
» **Roadway blockage time when trains cross:** The 4–6 industry trains were assumed to block the roadway for 5 minutes, which is based on observation data collected in March 2016; the 24 unit trains were assumed to block the roadway for 8 minutes, which is estimated in consideration of existing rail facility geometrics and standard operating procedures (Appendix O, Attachment B). Roadway blockage time begins when the railroad crossing gates are lowered (activated) to the time when the crossing gates are raised (deactivated).

» **Recovery times from train crossings:** The recovery time begins when the crossing gates are raised and traffic can begin to flow. Recovery time is the length of time that it takes for the vehicular traffic to return to the same traffic flow condition (based on the average vehicle delay) that was occurring prior to the train crossing.

Under the No Build Alternative, the growth in vehicle volumes traveling through the intersection coupled with the increase in train crossings would create intolerable driving conditions for freight trucks and passenger vehicles, as illustrated in Figure 3-5 by the proportion of blockage and recovery time that vehicles would experience. On a typical weekday, vehicles traveling through the intersection would be blocked (8 minutes per train crossing) or in recovery time conditions (an additional 25–45 minutes per train crossing) for approximately 55 percent of the daytime period (6:00am–7:00pm).

With drivers experiencing roadway blockages or extensive delays, the daily travel needs of the community would be severely affected. Drivers and commercial/industrial/public vehicle dispatchers could not reliably plan their trips to avoid train crossings and the associated recovery times because the

Figure 3-5: Estimated Roadway Blockage and Recovery Times for the Westbound Movement under the No Build Alternative



Note: The westbound approach to the intersection, which would be the heaviest traffic movement, is shown.

Figure 3-6: Sample Trips through the Project Intersection

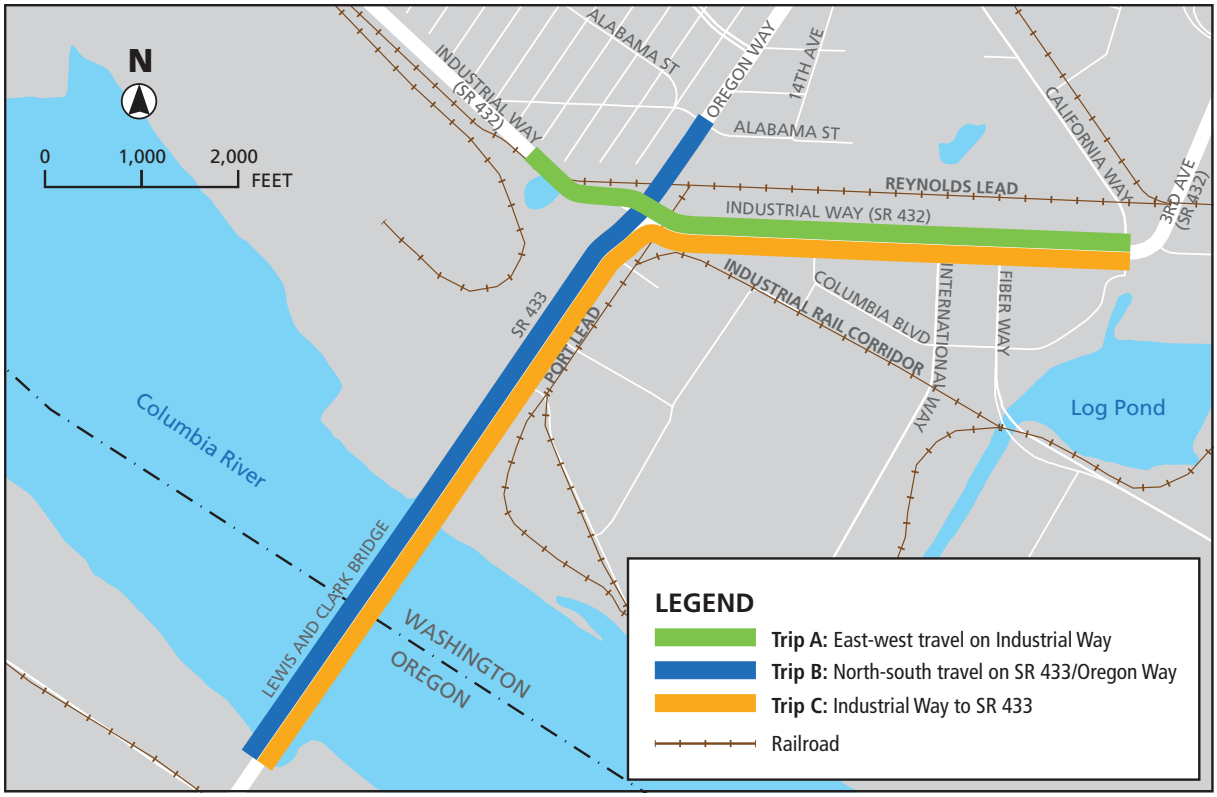


Table 3-2: Average Travel Time with Train Crossing(s) for Existing Conditions and the No Build Alternative (PM Peak Hour)

TRIP	TRAVEL ROUTE	EXISTING CONDITIONS (2015)	NO BUILD ALTERNATIVE (2040) Compare to existing conditions
Trip A[1]	Eastbound	**4.9** minutes	**6.2** minutes (**25%** more)
	Westbound	**4.8** minutes	**24.2** minutes (**400%** more)
Trip B[2]	Northbound	**4.7** minutes	**5.9** minutes (**25%** more)
	Southbound	**4.7** minutes	**8.2** minutes (**75%** more)
Trip C[3]	Northbound to Eastbound	**6.8** minutes	**8.5** minutes (**25%** more)
	Westbound to Southbound	**6.8** minutes	**23.7** minutes (**250%** more)

Note: Traffic simulation reflects the 3-hour peak period from 3:00pm–6:00pm with average peak hour travel time results shown for the peak hour of 4:00pm–5:00pm.

1. Trip A: East-west travel on Industrial Way; western terminus is just west of Oregon Way/SR 433; eastern terminus is just east of California Way; trip is 1.55 miles.
2. Trip B: North-south travel on SR433/Oregon Way: southern terminus is the south end of the Lewis and Clark Bridge; northern terminus is Alabama Street; trip is 1.75 miles.
3. Trip C: Industrial Way to SR 433: southern terminus is the south end of the Lewis and Clark Bridge; eastern terminus is just east of California Way; trip is 2.67 miles.

trains do not operate on a set timetable. Thus, trip travel times made through the intersection would have little consistency from day-to-day since some trips would be stopped or slowed by train crossings and other trips would not. This lack of consistency would create highly unreliable travel conditions, particularly for regular users (e.g., commuters, trucks, transit, school buses) and emergency service providers.

Travel Times: Three sample trips are illustrated in Figure 3-6, and the estimated average travel times for these trips during the PM peak hour are listed in Table 3-2.

Average travel times are based on all trips completed within 1 hour in the peak period, which are then averaged. Some trips would be substantially longer for a vehicle stopped first in the queue compared to a vehicle that enters the intersection after traffic conditions have nearly recovered from the train crossing. For the No Build Alternative, average travel times would be 1.25 to 5 times longer in duration compared to the existing conditions. The time needed to recover to pre-train crossing conditions during the PM peak period could approach 1 hour depending on the direction of travel. Similar increases in travel times would occur in the AM and midday peak periods (see Appendix O for more detail).

GSA Alternative (2040)

Under this alternative, all vehicle movements traveling through the intersection would be elevated above the rail facilities.

Congestion – Delay: The GSA Alternative would reduce congestion during AM, midday, and PM peak hours of the day compared to the No Build Alternative (Table 3-3). This reduction, measured in average delay per vehicle, would be 15–30 percent less than the No Build Alternative when no trains are operating on the railroads. Substantially more reduction would result when trains are operating; the average delay per vehicle would be 40–70 percent less than the No Build Alternative.

Queuing: In the AM and midday peak periods, queues in all directions would be significantly reduced compared to the No Build Alternative. During the PM peak period, average queue lengths would be similar to the No Build Alternative when no trains are present (Figure 3-7). Eastbound and northbound queuing would be minimal; however, the westbound and southbound movements would continue to be severe. Average queues lengths for vehicles traveling westbound could extend from the project intersection to 3rd Avenue; queues for vehicles traveling southbound could extend past Alabama Street. These queues would occur primarily due to the two lanes to one lane merge on the southbound approach to the Lewis and Clark Bridge and would cause queue spillback through the intersection.

By elevating the intersection over all railroads, the GSA Alternative would prevent any additional queuing from occurring as a result of trains operating on the railroads. Under this alternative the presence of trains would not affect

Table 3-3: Average Delay per Vehicle, GSA and PGSB Alternatives Compared to the No Build Alternative

	NO BUILD ALTERNATIVE (2040)		GSA ALTERNATIVE (2040) Compared to No Build		PGSB ALTERNATIVE (2040) Compared to No Build	
Peak Hour/Train Scenario	No Train[1]	With Trains[2]	No Train[1,3]	With Trains[2,3]	No Train[1]	With Trains[2]
AM 7:00 am – 8:00 am	**49** seconds	**99** seconds	**42** seconds (**15%** less)	**42** seconds (**60%** less)	**25** seconds (**50%** less)	**25** seconds (**75%** less)
Midday 12:30 pm – 1:30 pm	**61** seconds	**146** seconds	**42** seconds (**30%** less)	**42** seconds (**70%** less)	**27** seconds (**55%** less)	**27** seconds (**80%** less)
PM 4:00 pm – 5:00 pm	**194** seconds	**247** seconds	**148** seconds (**25%** less)	**148** seconds (**40%** less)	**99** seconds (**50%** less)	**100** seconds (**60%** less)

Note: Traffic simulation reflects the 3-hour peak period from 3:00pm–6:00pm with average delay per vehicle results shown for the peak hour of 4:00pm–5:00pm. The presence of trains crossing legs of the project intersection has a distinctly different effect on roadway operations compared to operations when no trains are present, so two traffic scenarios were analyzed: 'no train' crossing and 'with train' crossing.

1. Analysis assumes no trains are traveling on either the Reynolds Lead or IRC.
2. Analysis assumes one unit train traveling westbound on the Reynolds Lead during the AM peak period. Analysis assumes two unit trains during the Midday and PM peak periods; one westbound train on the Reynolds Lead and one eastbound train on the IRC; trains' travel time separated by 1 hour.
3. Due to all the intersection legs being grade-separated from railroads under the GSA Alternative, average delay per vehicle is the same for the 'no train' and 'with train' scenarios.

roadway operations so the 'no train' (Figure 3-7) and 'with train' (Figure 3-8) queuing conditions would be the same. Similarly, there would be no recovery time since pre-train and post-train conditions would not be influenced by any roadway blockage by trains (Figure 3-9).

Travel Reliability: Although the rail service would increase to 28–30 trains per day crossing through the intersection as in the No Build Alternative, there would be no impacts from these train crossings on the intersection traffic operations under the GSA Alternative. All vehicular traffic movements would be elevated and isolated from the train operations. Thus, no vehicles traveling through the intersection would be in stopped conditions associated with the roadway blockages from train crossings or in recovery time conditions (slower traffic flow than before the train) (Figure 3-9). Drivers and commercial/industrial/public vehicle dispatchers would have more reliable conditions to plan trips; day-to-day travel conditions would be substantially more reliable under the GSA Alternative compared to the No Build Alternative. One of the surface roadways that provide access to adjacent properties near the intersection would have at-grade roadway/rail crossings. Vehicles traveling on these surfaces roadways would

Figure 3-7: GSA Alternative (2040) Queues without Unit Trains Crossing Oregon Way and SR 433

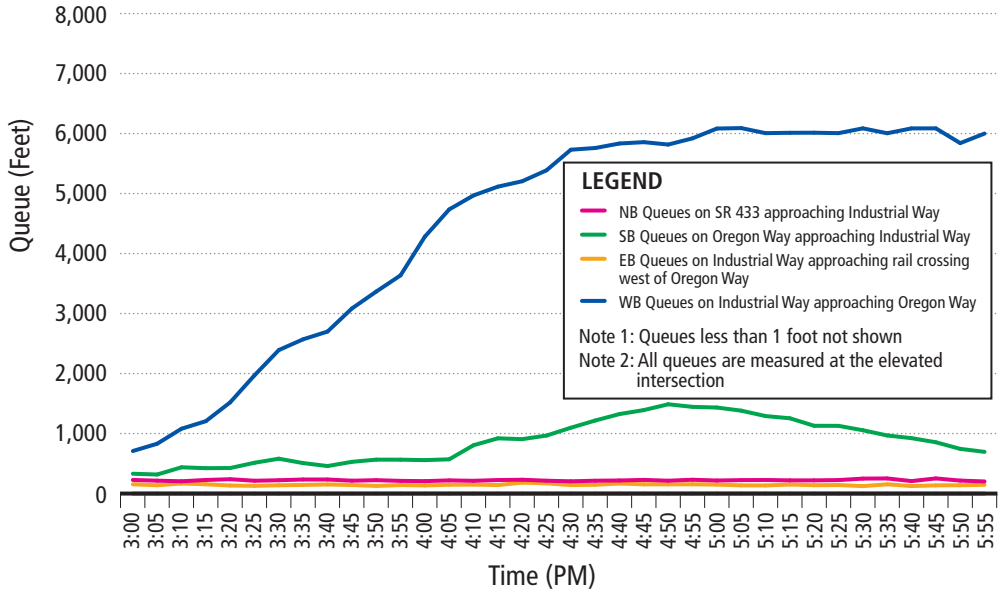
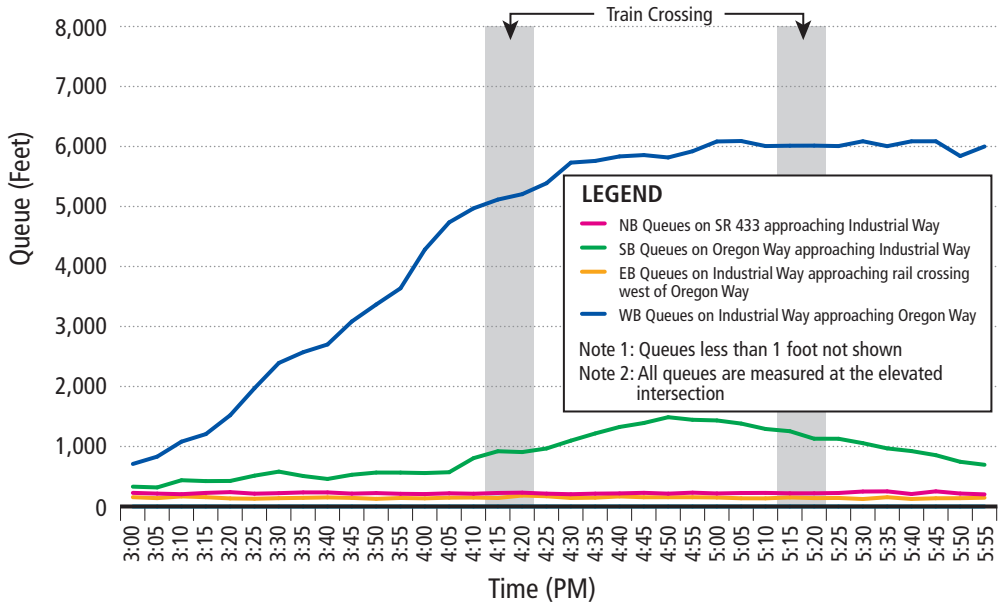


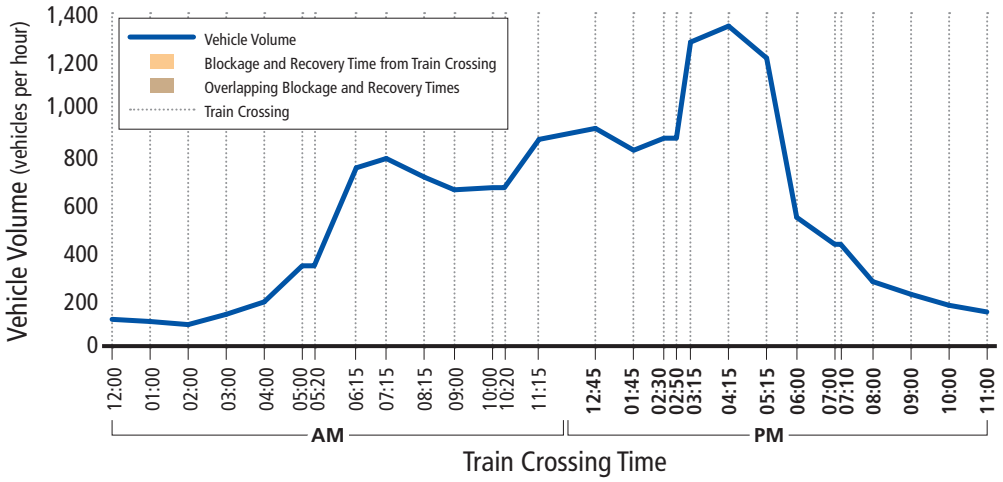
Figure 3-8: GSA Alternative (2040) Queues with Unit Trains Crossing Oregon Way and SR 433



be blocked during train crossings; however, with low traffic volumes on these surface roadways, the recovery times would be minor.

Travel Times: Although delays would still occur under the GSA Alternative, average travel times would generally improve compared to the No Build Alternative as demonstrated in the example trips listed in Table 3-4 and illustrated in Figure 3-4. Trips that involve traveling southbound over the Lewis and Clark Bridge would have similar average travel time compared to the No Build Alternative due to the merging conditions on the bridge approach, which would cause queueing and spillback into the intersection for both the GSA Alternative and the No Build Alternative.

Figure 3-9: Estimated Recovery Times for the Westbound Movement under the GSA Alternative



Note: The westbound approach to the intersection, which would be the heaviest traffic movement, is shown.

Table 3-4: Average Travel Time with Train Crossing(s) for the GSA and PGSB Alternatives (PM Peak Hour)

TRIP	TRAVEL ROUTE	NO BUILD ALTERNATIVE (2040)	GSA ALTERNATIVE (2040) Compared to No Build	PGSB ALTERNATIVE (2040) Compared to No Build
Trip A[1]	Eastbound	**6.0** minutes	**4.7** minutes (**22%** less)	**5.1** minutes (**15%** less)
	Westbound	**24.2** minutes	**18.3** minutes (**24%** less)	**7.0** minutes (**71%** less)
Trip B[2]	Northbound	**5.9** minutes	**4.4** minutes (**25%** less)	**4.2** minutes (**29%** less)
	Southbound	**8.2** minutes	**8.9** minutes (**9%** more[4])	**5.8** minutes (**29%** less)
Trip C[3]	Northbound to Eastbound	**8.5** minutes	**6.9** minutes (**19%** less)	**6.7** minutes (**21%** less)
	Westbound to Southbound	**23.7** minutes	**24.1** minutes (**2%** more[4])	**15.3** minutes (**35%** less)

Note: Traffic simulation reflects the 3-hour peak period from 3:00pm–6:00pm with average peak hour travel time results shown for the peak hour of 4:00pm–5:00pm.

1. Trip A: East-west travel on Industrial Way; western terminus is just west of Oregon Way/SR 433; eastern terminus is just east of California Way; trip is 1.55 miles.
2. Trip B: North-south travel on SR433/Oregon Way: southern terminus is the south end of the Lewis and Clark Bridge; northern terminus is Alabama Street; trip is 1.75 miles.
3. Trip C: Industrial Way to SR 433: southern terminus is the south end of the Lewis and Clark Bridge; eastern terminus is just east of California Way; trip is 2.67 miles.
4. Due to slight variations in the traffic volumes between the No Build and GSA Alternatives as well as the standard randomized modeling techniques applied, the travel times for Trip B southbound and Trip C westbound to southbound are relatively equivalent. Thus, in these two movements, the No Build and GSA Alternative would operate similarly.

PGSB Alternative (2040)

Under the PGSB Alternative, all heavy traffic volume movements, such as north-south, westbound-to-southbound, and northbound-to-eastbound, would use the elevated structures to travel through the intersection and avoid being stopped when trains pass. Lesser volume movements, such as east-west travel, and vehicles accessing properties located adjacent to the intersection would travel on surface streets and use the surface roundabout. There are some movements that could choose to use surface streets or the elevated structure, which may benefit trucks that want to avoid steeper grades, with the risk that they could be stopped when trains pass.

Congestion – Delay: The PGSB Alternative would reduce congestion during AM, midday, and PM peak hours of the day compared to the No Build Alternative (Table 3-3). This reduction, measured in average delay per vehicle, would be 50–55 percent less than the No Build Alternative when no trains are operating on the railroads. Additional congestion

Figure 3-10: PGSB Alternative (2040) Queues without Unit Trains Crossing Oregon Way and SR 433

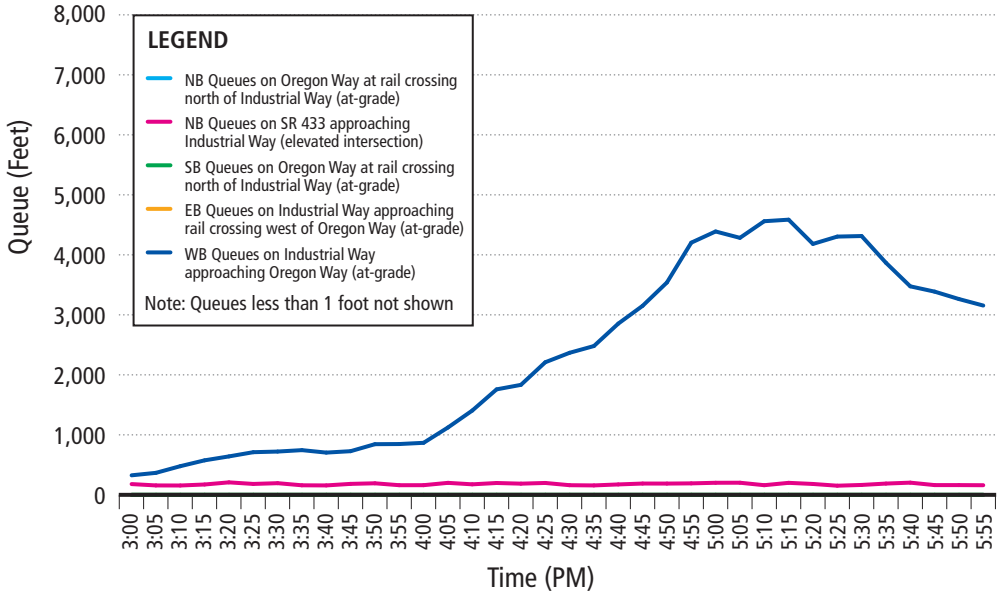
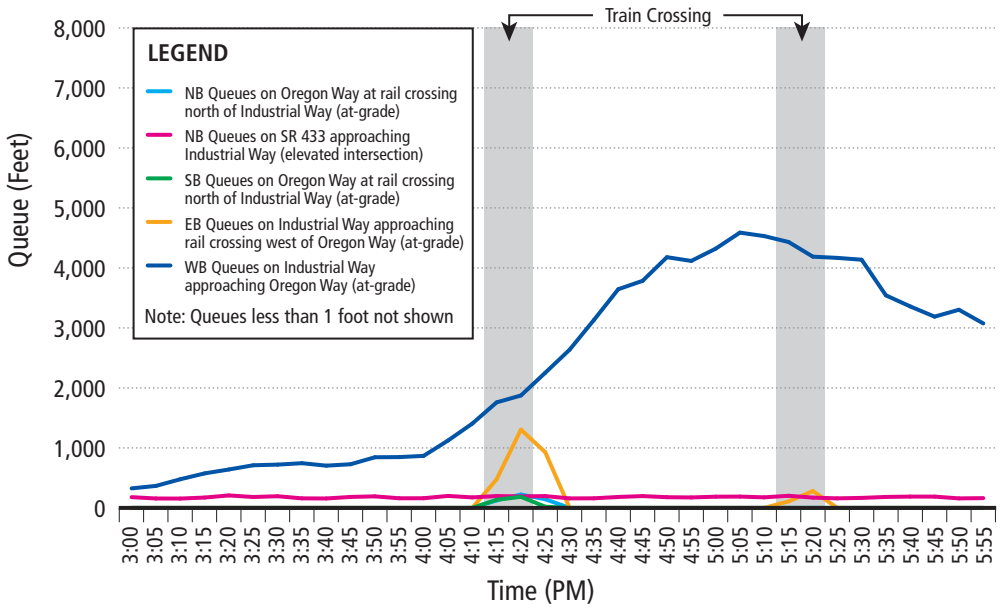


Figure 3-11: PGSB Alternative (2040) Queues with Unit Trains Crossing Oregon Way and SR 433



reduction would result when trains are operating; the average delay per vehicle would be 60–80 percent less than the No Build Alternative.

Queuing: Similar to the GSA Alternative, significant reductions in queuing would occur under the PGSB Alternative compared to the No Build Alternative during the AM and midday peak periods. In the PM peak period, traffic volumes would be higher than AM and midday volumes. PM peak period queues for vehicles traveling westbound would be much shorter than the westbound queues under the GSA Alternative because the PGSB Alternative separates the westbound through movement (would use the surface roundabout) and the westbound left turn movement (would use the elevated structure) (Figure 3-10). The westbound queues under the PGSB Alternative would extend through the new signalized intersection west of Columbia Boulevard and back to Fibre Way (compared to 3rd Avenue under the GSA Alternative). This westbound queue would result from the spillback into the elevated portion of the intersection from the merge on the southbound approach to the Lewis and Clark Bridge. No measurable southbound queues forming at the Reynolds Lead crossing on Oregon Way would occur. Southbound queuing on SR 433 would extend from the merge point on the Lewis and Clark Bridge approach through the elevated intersection onto Oregon Way just north of Industrial Way.

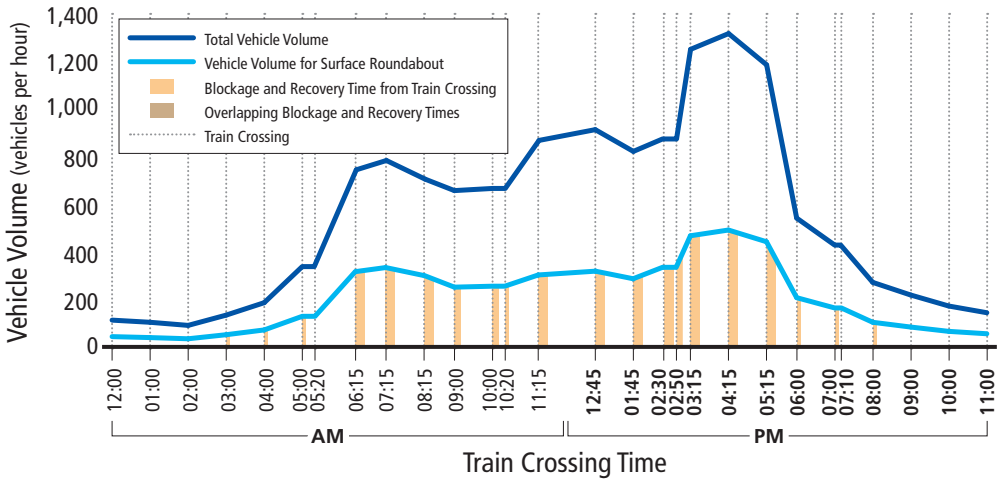
By elevating the heaviest traffic volume movements over all railroads and retaining the lower traffic volume movements on the surface, the PGSB Alternative would result in less queuing when trains operate on the railroads (Figure 3-11). Queuing associated with this alternative would be relatively manageable and avoid the severe pulses and spikes due to train crossings as seen in the No Build Alternative (Figure 3-4).

Travel Reliability: Since the heaviest traffic volume movements would be elevated and isolated from train crossings under the PGSB Alternative, only the surface roadways leading into and out of the surface roundabout would be affected by train crossings. With lower traffic volumes using the surface roundabout, the recovery time would range from 10–15 minutes for westbound traffic movements, which would be substantially less than the No Build Alternative (25–45 minutes) and would affect a lower volume of westbound traffic.

As illustrated in Figure 3-12, travel reliability for westbound traffic would be greater under the PGSB Alternative than the No Build Alternative because an estimated 55–65 percent traffic would avoid being blocked by a train. The remaining 35–45 percent of westbound traffic would travel through the surface roundabout and have periodic blockages with shorter recovery times. Approximately 25 percent of the travel time for these surface trips would be in stopped conditions when roadways are blocked by train crossings or in recovery time conditions (slower traffic flow than before the train) during the daytime period (6:00am–7:00pm). Travel times for vehicles using the elevated intersection would not be affected by blockages from train crossings or the associated recovery time. Overall, trips through the intersection under the PGSB Alternative would be substantially more reliable than the No Build Alternative. Trip reliability for vehicles using the elevated portion of the intersection would have the same reliability as the GSA Alternative; however, trips using the surface roundabout would have slightly less reliability than the GSA Alternative since these trips would be interrupted by at-grade train crossings.

Similar to the GSA Alternative, the PGSB Alternative would include several of the surface roadways that would provide access to adjacent properties near the intersection. These surface roadways would have at-grade roadway/rail crossings and would be blocked by train crossings. The recovery time on these low volume roadways would be minor.

Figure 3-12: Estimated Recovery Times for the Westbound Movement under the PGSB Alternative



Note: The westbound approach to the intersection, which would be the heaviest traffic movement, is shown.

Travel Times: Overall travel times under the PGSB Alternative would improve for all vehicles traveling through the intersection compared to the No Build Alternative (Table 3-4).

Lewis and Clark Bridge Capacity Constraint

The Lewis and Clark Bridge spans the Columbia River between Longview, Washington and Rainier, Oregon. This bridge is one of the primary interstate connections between Washington and Oregon; the closest alternative crossings are 42 miles upstream and 51 miles downstream. The bridge serves as a critical link to medical services, urban services, employment and industry, and access to the interstate highway system for the City of Rainier and Columbia County, Oregon.

Bottleneck Function: Both the northbound and southbound approach roadways require merging prior to getting onto the Lewis and Clark Bridge, which is two lanes with one lane in each direction. The northbound approach has the ramp from westbound US 30 merge into the free-flow ramp from eastbound US 30. And, the southbound approach requires the two southbound lanes on SR 433 to merge into one lane before the bridge.

As a result of traffic merging to one lane in each direction to get onto the bridge and limited travel route alternatives, the Lewis and Clark Bridge functions as a bottleneck that restricts traffic flow onto the bridge. Due to its proximity to the Industrial Way/Oregon Way intersection, the bridge has the potential to influence operations of the intersection. All northbound traffic on the bridge except a small volume of vehicles that exit to East Port Way, enters the intersection; and, all traffic heading southbound on the bridge travels through the intersection except for a small volume of vehicles (mainly trucks) that enter from West Port Way. The heaviest traffic movements through the intersection and using the bridge are the westbound Industrial Way to southbound SR 433 and the reverse northbound SR 433 to eastbound Industrial Way. The other high volume traffic movements are the northbound SR 433 to northbound Oregon Way and southbound Oregon Way to southbound SR 433.

Bridge Capacity Scenarios: The two travel lanes on the bridge have historically limited traffic volumes to no more than 1,300 vehicles per hour per lane, which factors into the flow of the northbound and southbound traffic moving through the Industrial Way/Oregon Way intersection. Currently, neither Washington nor Oregon have plans to address the capacity limitations of the Lewis and Clark Bridge. Improvements to the Lewis and Clark Bridge are beyond the scope of this intersection project. However, a 'bridge capacity improvement' scenario was analyzed during the PM Peak hour that considered the possibility that some future improvement could be made to the bridge that adds capacity and improves traffic flow, such as widening the bridge and adding more travel lanes. The current bridge capacity scenario that limits traffic volumes to 1,300 vehicles per hour per lane is referred to as 'bridge capacity constrained.'

Lewis and Clark Bridge

Sequencing Intersection and Bridge Improvements: WSDOT and Cowlitz County considered whether different sequencing of improvements to the intersection or bridge would yield different benefits. The 2040 PM peak hour under the 'with train crossing' scenario was investigated since it comprised the heaviest traffic volumes, included projected vehicle and rail service growth, and demonstrated how the bottleneck function of the bridge influenced intersection operations. For the GSA and PGSB Alternatives, there would be substantial benefit in implementing the intersection improvements first. The GSA Alternative would reduce average vehicle delay by 40 percent when intersection improvements are done first, whereas only a 15 percent reduction in average vehicle delay would result if the bridge capacity improvements were implemented first (Figure 3-13). Similar results would occur under the PGSB Alternative although the results are more beneficial with a 60 percent reduction in average vehicle delay with the intersection improvements compared to a 15 percent reduction if the bridge improvements are made first (Figure 3-14). Under the No Build Alternative, no intersection improvements would be made, so implementing improvements only to the bridge would yield a 15 percent reduction in average vehicle delay at the intersection. These results indicate that the intersection would continue to be influenced by at-grade train crossings conflicting with intersection traffic movements unless some grade-separation between the roadway and railroads was done.

The Industrial Way/Oregon Way Intersection Project would substantially reduce congestion as a stand-alone project as demonstrated by a 40 percent or 60 percent reduction in average vehicle delay by the GSA Alternative or PGSB Alternative, respectively. However, if future improvements were made to the bridge that increased its capacity after the intersection improvements were made, then there would be additional benefits to vehicle operations at the intersection.

As illustrated in Figure 3-13 and Figure 3-14, the total reduction in average vehicle delay would be 79 percent for the GSA Alternative plus bridge improvements, and 87 percent for the PGSB Alternative plus bridge improvements.

Construction-related Impacts

Under both the GSA and PGSB Alternatives, temporary construction impacts to the transportation network would be similar although impacts would be for a longer duration under the GSA Alternative (5 years) compared to the PGSB Alternative (3.5 years). Impacts would include lane reductions, lane closures, and traffic detours, which would likely increase delay and reduce travel time reliability for all vehicular traffic (passenger, truck and emergency service). Some vehicles may divert from their normal travel patterns, which could result in vehicles cutting through the Highlands and St. Helens Neighborhoods and thereby increasing the possibility of conflicts with bicyclists and pedestrians.

Indirect Impacts and Benefits

Under the No Build Alternative, longer travel times and less travel reliability would have an adverse indirect effect on businesses. Delay and unreliable travel would increase costs for businesses, which could adversely affect existing business viability as well as future economic development opportunities for the local area. The GSA and PGSB Alternatives would avoid these adverse indirect impacts.

Figure 3-13: Comparison of Intersection and Bridge Improvements Sequence for the GSA Alternative

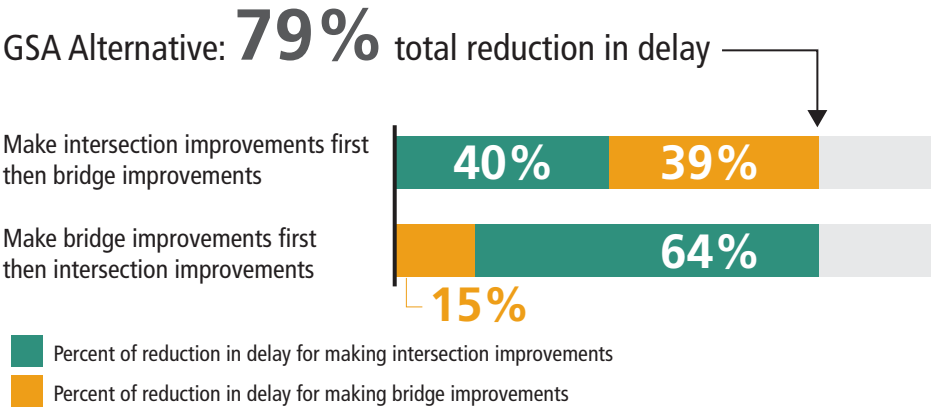
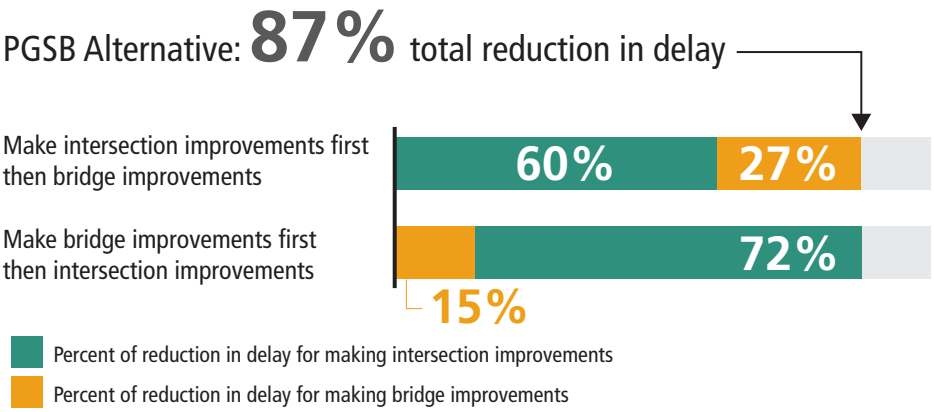


Figure 3-14: Comparison of Intersection and Bridge Improvements Sequence for the PGSB Alternative



Additional detail on roadway traffic operations is provided in the Transportation Discipline Report (Appendix O).

3.2 How would the project affect roadway safety and emergency response?

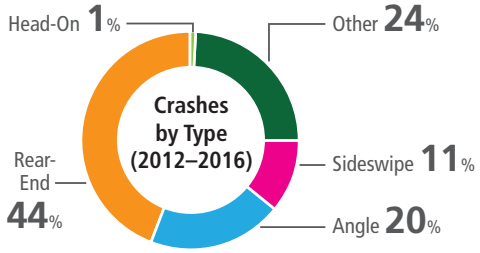
Existing Conditions

Regional growth in population and employment over time have contributed to increased levels of traffic and congestion, which adversely affect roadway safety and emergency response. Between 2012 and 2016, the Industrial Way/Oregon Way intersection experienced 75 crashes with 33 percent injury-related and 67 percent involving property-damage only. Nearly half were rear-end crashes likely due to traffic congestion and/or driver behavior (Figure 3-15).

Four emergency service providers operate in the study area and have at least one critical route that passes through the project intersection:

- Longview Fire Department
- Columbia River Fire & Rescue
- Cowlitz 2 Fire & Rescue
- Clatskanie Rural Fire Protection District

Figure 3-15: Crash History at the Industrial Way/ Oregon Way Intersection



With current congestion at the project intersection, the Longview Fire Department is achieving a 6-minute response 70 to 75 percent of the time to the industrial area south of Industrial Way, which is below the target response time of 6 minutes or less for 90 percent of the calls. Ambulances, fire trucks, and police can use signal preemption, lights and sirens, and counter-flow travel to move faster than non-emergency vehicles in congested conditions; however, all vehicles, including emergency vehicles, must stop while trains are passing through at-grade rail/roadway crossings.

Project Impacts and Benefits

As congestion worsens over time at the Industrial Way/Oregon intersection, the likelihood of crashes under the No Build Alternative would increase with more vehicles on the roadway, less space to maneuver, and higher risk-taking behavior by drivers (e.g., running red lights, using smaller gaps in traffic to turn or merge). The GSA and PGSB Alternatives would reduce congestion through added capacity and reduced vehicle conflicts with train crossings, thereby improving roadway safety compared to No Build conditions (Table 3-5). Similarly, emergency service response times under the GSA and PGSB Alternatives would be better than the No Build Alternative due to separation of roadway/railroads and additional roadway capacity. All emergency vehicle movements would use the elevated roadways under the GSA Alternative. The PGSB Alternative would similarly allow emergency vehicles to use the elevated structure for all travel movements to avoid at-grade rail crossings, while some general traffic movements would have to use the surface roundabout. During construction, emergency service routes may be required to use temporary detours and may experience longer response times when servicing industrial areas south of Industrial Way.

Table 3-5: Summary of Impacts and Benefits to Roadway Safety and Emergency Response

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Roadway Safety	» Likely increase in vehicle crashes » Increased potential for vehicle-train conflicts	» Likely reduction in vehicle crashes » Elimination of nearly all vehicle-train conflicts	» Likely reduction in vehicle crashes » Elimination of many vehicle-train conflicts
Emergency Response for Critical Routes	» Slower response times » All routes blocked 5 to 8 minutes when trains are present	» Improved response times compared to No Build » No emergency vehicle movements blocked when trains are present	

Additional detail on roadway safety and emergency response is provided in the Transportation Discipline Report (Appendix O).

3.3 How would the project affect pedestrian, bicycle, and regional transit access?

Existing Conditions

Pedestrian, bicycle, and transit options in the study area provide various connectivity to jobs, services, and other community resources. Project intersection roadways have limited, noncontiguous sidewalk facilities and no bike lanes. Pedestrian and bicycle use of the intersection is minimal, likely due to the limited sidewalks and bike lanes combined with the high volumes of truck traffic and industrial corridor environment. Non-motorized access is limited between neighborhoods north of Industrial Way to employment south of the roadway. Pedestrians and bicyclists use the Highlands Trail to travel west of Oregon Way. Beyond the project intersection, Longview has no dedicated bicycle lanes and few roadways have shoulders with adequate space for bicycle use. In Rainier, US 30 does not have a dedicated bicycle lane, but there are road shoulders and signs to warn drivers about sharing the road with frequent bicyclists. The Lewis and Clark Bridge does not have sidewalks or bike lanes.

RiverCities Transit and Columbia County Rider serve Longview and Rainier. Bus routes operate along multiple streets within the study area, including routes through the Highlands and St. Helens Neighborhoods via Oregon Way (every 30 to 60 minutes) and from US 30 across the Lewis and Clark Bridge to SR 433 and Oregon Way (three times per day). Bus routes are subject to the same delays and decreases in travel time reliability that are experienced by other vehicles traveling through the Industrial Way/Oregon Way intersection.

Highlands Trail, signed as a bike route, is used by pedestrians and bicyclists

Project Impacts and Benefits

Bicyclists and pedestrians would continue to experience safety hazards and delay, while transit riders would experience reduced travel reliability under the No Build Alternative. Construction-related impacts from the GSA or PGSB Alternative could include pedestrian, bicycle, and transit detours to avoid temporary closures, and increased safety hazards to pedestrians and bicyclists from cut-through traffic in neighborhoods surrounding the project intersection. Over the long term, the GSA and PGSB Alternatives could also require out-of-direction travel on or under elevated structures depending on the pedestrian or bicyclist's origin and destination (Table 3-6). Project benefits would occur as a result of improved facilities and future traffic conditions, including improved pedestrian crossings and additional sidewalks, enhanced safety from more contiguous pedestrian and bicycle connectivity, and improved on-time bus performance. RiverCities Transit's bus facility at the northeast corner of Alabama Street and Oregon Way could be impacted by the closure of key access points under the GSA Alternative.

Table 3-6: Summary of Impacts and Benefits to Pedestrian, Bicycle, and Regional Transit Access

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Construction Impacts	Not applicable	» Detours to avoid temporary lane/road closures » Potential safety impacts to pedestrians and bicyclists in neighborhoods from cut-through traffic during construction	
Long-term Impacts/ Benefits for Bicyclists and Pedestrians	Increased delays and safety hazards	» Improved pedestrian crossings and additional sidewalks that meet standards of the United States Access Board (2005) for compliance with the ADA » Enhanced safety from more contiguous connectivity » Better north-south connectivity for pedestrians and bicyclists » Potential out-of-direction travel on or under elevated structures	
Long-term Impacts/ Benefits to Transit	Increased delays and reduced travel reliability	» Improved on-time bus performance due to decreased congestion and increased travel time reliability » Closure of key access points at RiverCIties Transit facility	

Additional detail on pedestrian, bicycle, and transit access is provided in the Relocation, Social, Economic, Public Services, and Environmental Justice Technical Analysis (Appendix L) and the Transportation Discipline Report (Appendix O).

3.4 How would the project affect neighborhoods, community resources and environmental justice populations?

Existing Conditions

The study area is predominantly industrial with a distinct and cohesive residential area immediately northwest of the Industrial Way/Oregon Way intersection (Figure 3-16). Within this residential area are the Highlands and St. Helens Neighborhoods, consisting of older, single-family homes on tree-lined streets with extensive pedestrian and bicyclist use of existing sidewalks and streets. Several multifamily units front Oregon Way. Seven mobile home parks are also located in the study area and provide affordable housing options. Individual homes and small clusters of homes are also scattered throughout the study area, including Rainier, Oregon.

Residents in the study area are demographically diverse with concentrations of traditionally underserved populations, including individuals who are low-income, minority, disabled, elderly, youth, transit-dependent and/or those who have limited English proficiency. The Presidential Executive Order 12898 directs federal agencies, such as FHWA, to identify and address, as appropriate, disproportionately high and adverse effects to minority populations and low-income populations. And, other federal regulations, such as Title VI of the Civil Rights Act and Americans with Disabilities Act, prohibit discrimination of individuals on the basis of sex, race, color, national origin, and religion as well as individuals with disabilities.

The residential areas that are within and directly adjacent to the project footprint are the Highlands Neighborhood and the Columbia Trailer Court, which is included in the Industrial Way and California Way Neighborhood. These two neighborhoods have a higher proportion of racial or ethnic minority and low-income individuals compared to the overall study area composition (Figure 3-17). As reported in the U.S. Census Bureau data (2010 and 2016), the demographic composition of residents/households in Highlands Neighborhood and Industrial Way and California Way Neighborhood is characterized as low income (41 and 54 percent, respectively) and racial or ethnic minority (25 and 21 percent, respectively) compared to the study area population of 15 percent racial or ethnic minority and 26 percent low-income. In other traditionally underserved categories, the demographic composition of individuals living in the Highlands Neighborhood and Industrial Way and California Way Neighborhood[1] are shown in Table 3-7.

Local school demographics for children from the Highlands Neighborhood and Industrial Way and California Way Neighborhood that attend the public elementary schools indicate that 39-51 percent of the students are a racial minority and 27-38 percent are Hispanic/Latino (Washington Office of Superintendent of Public Instruction 2017). In addition, 82-95 percent qualify for the free/reduced lunch program, which further emphasizes the presence of low-income households in the Highlands Neighborhood

Residences in the Highlands Neighborhood

TRADITIONALLY UNDERSERVED POPULATIONS: individuals who are low-income, minority, disabled, elderly, youth, transit-dependent and/or those who have limited English proficiency.

All study area residents are considered traditionally underserved populations for the purpose of this project.

ENVIRONMENTAL JUSTICE POPULATIONS: individuals who are minority and/or low-income. Environmental justice populations are a subset of traditionally underserved populations.

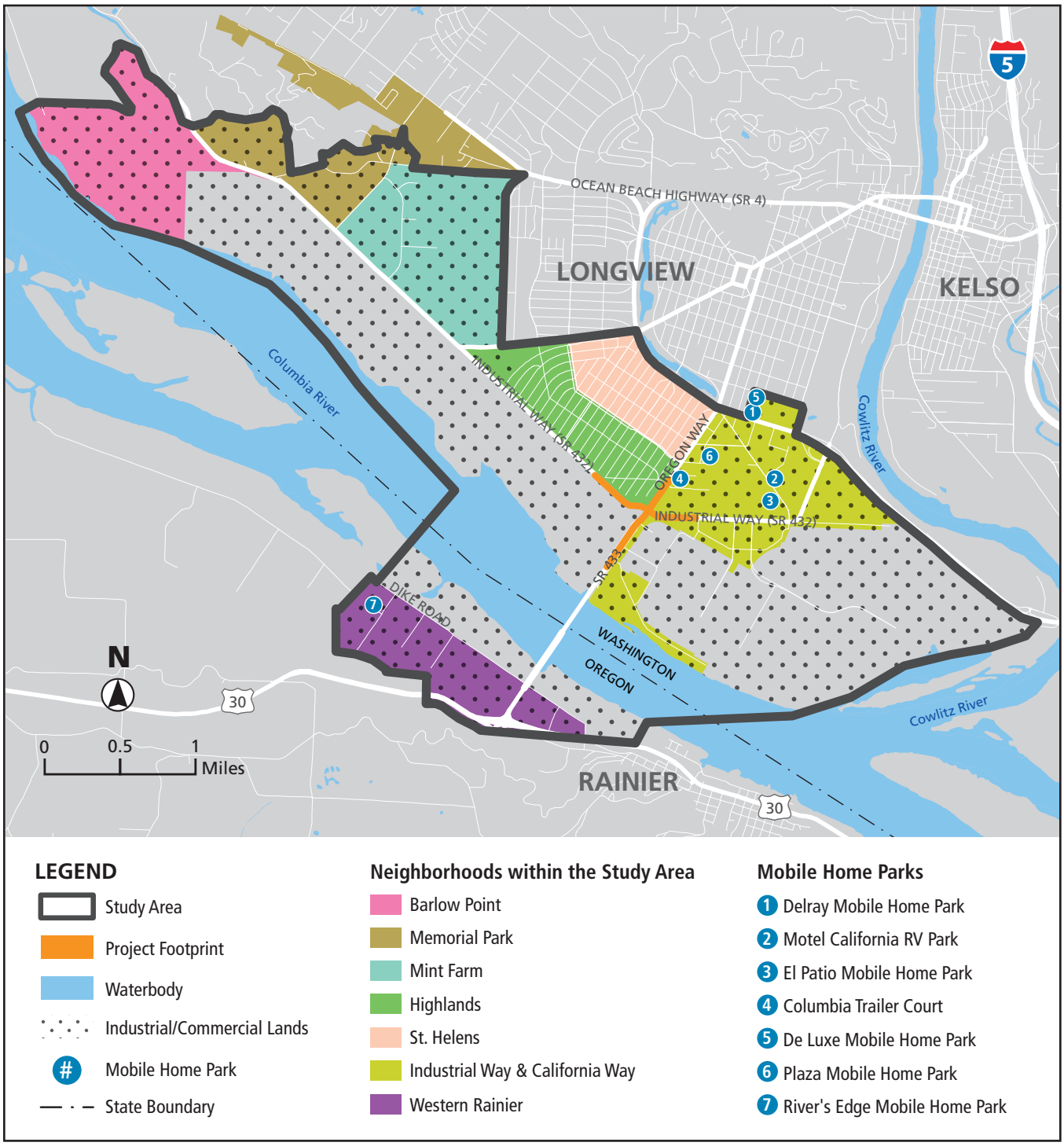
All residents of the Highlands Neighborhood and Industrial Way and California Way Neighborhood are considered environmental justice populations for the purpose of this project.

1 U.S. Census Bureau block group that contains the Industrial Way and California Way Neighborhood also includes the Mint Farm Neighborhood and all of the industrial/commercial lands east of Oregon Way between Tennant Way/SR 432 and the Cowlitz River, south Industrial Way between Oregon Way and approximately Memorial Park Drive (a map is provided in Appendix L, Figure 2). Due to the industrial uses of most of the land in this block group, all or nearly all of the residents live within the Industrial Way and California Neighborhood; thus, demographic data for this block group is summarized in the draft EIS as pertaining to this neighborhood.

and Industrial Way and California Way Neighborhood. A high proportion of residents in these two neighborhoods (55-69 percent) also live in rental units compared to owner-occupied housing.

The Highlands Neighborhood has the highest poverty rates and greatest number of households receiving public assistance in Longview (City of Longview 2015a). Approximately 200 households in the Highlands Neighborhood and St. Helens Neighborhood (directly north of Highlands Neighborhood) qualify for either federal or state rental assistance because of low incomes (Longview Housing Authority 2017). Residents identifying as one or more traditionally underserved

Figure 3-16: Neighborhoods and Mobile Home Parks



populations also reside in Rainier, Oregon, although at lower proportions.

Based on the demographic composition of individuals and households in the study area, all study area residents are considered traditionally underserved populations for the purpose of this project. The concentration of racial minority and low-income individuals located within the Highlands Neighborhood and the Industrial Way and California Way Neighborhood indicates that these two neighborhoods are considered environmental justice populations.

Community resources in the study area include schools and churches, parks, the Highlands Trail, ethnic food retailers, housing services, and public service providers. Currently, study area residents access local arterials and state highways via the local street network. There is minimal out-of-direction travel associated with right-in/right-out only access points.

Project Impacts and Benefits

No Build Alternative

Under the No Build Alternative, bicycle and pedestrian facilities would remain only partially connected and many are not ADA-compliant. The lack of bicycle/pedestrian facility connectivity and ADA-compliant accommodations would likely have a disproportionate impact on residents living in the Highlands Neighborhood and Industrial Way and California Way Neighborhood since they live closest to the intersection. Furthermore, congestion would result in longer travel times, higher commuting costs, and more delays to transit and public school bus schedules. The congestion-related impacts would affect all study area residents who travel by vehicle as well as people who live outside the study area and travel through the Industrial Way/Oregon Way intersection.

Figure 3-17: Minority and Low-income Composition of the Study Area

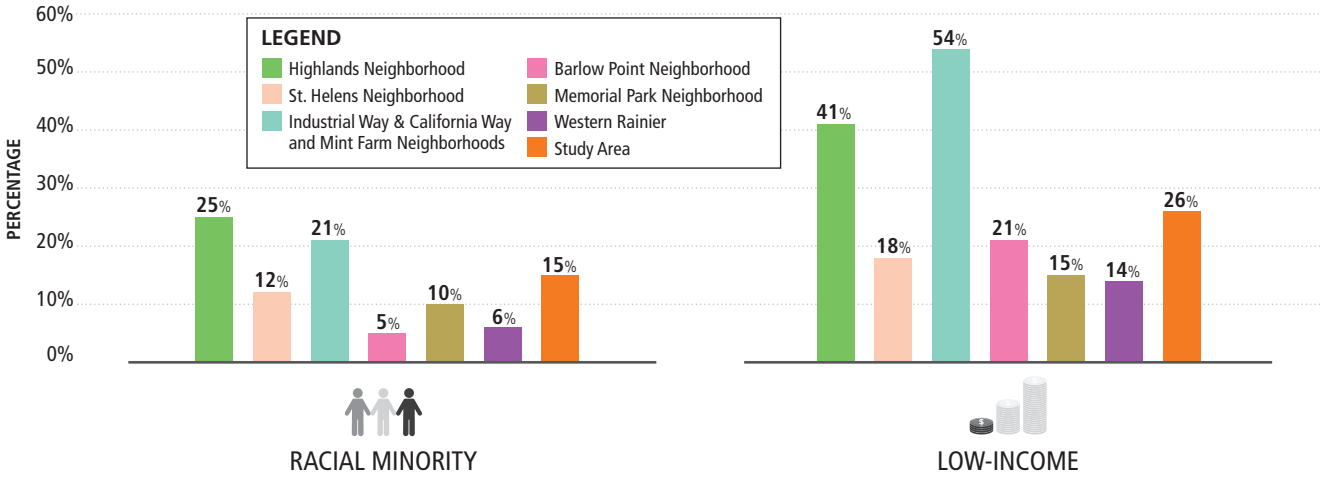


Table 3-7: Demographic Composition of the Highlands Neighborhood and Industrial Way and California Way Neighborhood

	HIGHLANDS NEIGHBORHOOD	INDUSTRIAL WAY AND CALIFORNIA WAY NEIGHBORHOOD	STUDY AREA
Racial or ethnic minority	25%	21%	15%
Low-income	42%	54%	26%
Disabled	39%	41%	32%
Elderly (over age 65)	6%	20%	13%
Youth (ages 0-17)	33%	18%	26%
Hispanic or Latino	21%	19%	12%
Transit dependent	15%	32%	8%
Limited English proficiency	**6%**	**22%**	**4%**

GSA and PGSB Alternatives

Construction Impacts and Benefits: Under the GSA and PGSB Alternatives, the primary adverse impacts affecting residents, including environmental justice populations, would occur during the construction phase. Under both build alternatives, construction-related impacts would be similar; however, they would occur for a longer duration under the GSA Alternative (5 years) than under the PGSB Alternative (3.5 years).

Construction impacts resulting from the build alternatives that would adversely affect all study area residents traveling through the intersection include:

- Detours and lane closures would likely result in some out-of-direction travel changes in travel routes to neighborhoods, and intermittent delays.
- Travel time through the Industrial Way/Oregon Way intersection would likely increase and be less reliable.
- Public transit and public school bus schedules could experience delay and increase in travel times for riders.

In addition to the construction-related impacts that would affect all study area residents, environmental justice populations would also be disproportionately affected by:

- Vehicles cutting through the Highlands and St. Helens Neighborhoods to bypass construction.
- Vehicle conflicts with bicycles and pedestrians traveling in neighborhood areas could increase, if cut through traffic increases.
- Equipment noise and vibration, airborne dust, and artificial lighting would temporarily diminish quality of life near the intersection.

Jobs would be created by project construction, as described in Section 3.5, and these construction job opportunities could benefit currently un- or under-employed workers who live nearby and who have the necessary skills for construction-related jobs. For additional information on other construction effects to quality of life, please see the air quality, noise and vibration, visual quality and hazardous materials sections of this draft EIS. Specific information about lane closures, delays and construction staging would be determined during the final design phase of the project.

Highlands Trail, west of Oregon Way

Long-term Impacts and Benefits: Over the long-term, the GSA and PGSB Alternatives would substantially benefit the community, including environmental justice populations, compared to the No Build Alternative.

Long-term benefits resulting from the build alternatives that would affect all study area residents, including environmental justice populations, include:

- Congestion at the intersection would be reduced and travel reliability would increase, benefitting commute travel.
- Transit and public school bus service would experience fewer delays and commute times would be more reliable.
- Costs incurred from waiting in congestion (for example, fuel and childcare) would be slightly reduced.
- New sidewalks and a shared-use path would enhance pedestrian and bicycle travel.
- Both the GSA and PGSB Alternatives were designed to avoid neighborhood and community resources to the extent possible, which resulted in no displacements to residences, community resources (churches, schools, parks, healthcare facilities or social service providers), or ethnic food retailers. In addition, neither build alternative would divide an existing neighborhood nor separate residents from services or community resources.

However, some long-term impacts to the community, including environmental justice populations, would result from the build alternatives, including:

- The project has minimized business displacements and less than 5 percent of study area business would be displaced. Under the GSA Alternative, ten businesses associated with 121 employees would be displaced, and seven businesses associated with 65 employees would be displaced under the PGSB Alternative.
- Approximately 57 spaces of on-street parking along East Port Way (from just south of Terminal Way to Industrial Way) would be removed to accommodate the new shared-use path. This loss of parking could cause a minor adverse impact on businesses along East Port Way.
- Approximately 38 spaces of on-street parking along Oregon Way and adjacent to industrial/commercial land uses would be removed. Twenty-five spaces between Industrial Way and Alabama Street would be removed on the east side of Oregon Way, and 13 spaces between Industrial Way and the Highlands Trail would be removed on the west side of Oregon Way.

Specific impacts experienced by environmental justice populations would include:

- Under the GSA Alternative, four of the ten businesses that would be displaced are minority-owned businesses.

Of the 121 total employees who would be displaced in these businesses, 24 percent are racial minorities (non-white), 11 percent are Hispanic/Latino, and 49 percent are low-income.

» Under the PGSB Alternative, three of the seven businesses that would be displaced are minority-owned. Of the 65 employees who would be displaced in these businesses, 15 percent are minority (non-white), 9 percent are Hispanic/Latino, and 42 percent are low-income.

» Vehicular access to and from residential areas would be maintained under both the GSA and PGSB Alternatives, but several travel routes would change as illustrated in Figure 3-18 and Figure 3-19. Highlands Neighborhood residents south of Alabama Street, immediately adjacent to Oregon Way, would be required to travel short distances out-of-direction to reach the elevated structure at Industrial Way/Oregon Way intersection. Local surface roads would be constructed (such as the new one-way surface street that loops under the elevated Oregon Way) or improved (such as the Alabama Street/14th Avenue route under the PGSB Alternative that would provide traffic connections between Oregon Way and Beech Street) to facilitate this out-of-direction travel.

» Under both alternatives, on-street parking along the west side of Oregon Way would be removed south of Alabama Street (approximately 15 parking spaces); on the east side of Oregon Way, on-street parking would be eliminated south of Alaska Street (3 parking spaces). This loss of on-street parking would affect Highlands Neighborhood residences that are adjacent to Oregon Way as well as any residents of the Columbia Trailer Court who park vehicles on Oregon Way. No replacement parking spaces would be provided, but all affected Highlands residences would retain parking that is currently available on the alley behind the homes and in driveways that connect to Oregon Way. However, driveways for one house and one multifamily housing unit immediately south of Alabama Street on Oregon Way would be closed under the GSA Alternative.

» The elevated portions of the intersection may create isolated spaces underneath that could attract crime, vandalism, and maintenance security concerns under both the GSA and PGSB Alternatives (WSDOT 2014).

» Views by residents located on the perimeter of the Highlands Neighborhood facing Oregon Way or Industrial Way would change under both build alternatives. The addition of the elevated structures would add manmade linear features such as retaining walls to foreground views and partially prevent views to mountains in the background (more detail is provided in Section 3.6). During final design, WSDOT and Cowlitz County would develop a range of options for wall textures consistent with local projects to reflect landscape context and to blend with the local environment; community members would be provided with an opportunity to review and provide input on these options.

Public transit and school buses would have more reliable travel times under both build alternatives in the long-term

Environmental Justice Finding

The Highlands Neighborhood and Industrial Way and California Way Neighborhood located near the intersection would experience the majority of the construction-related and long-term impacts from both the GSA and PGSB Alternatives as summarized in Table 3-8. Based on the demographic data presented earlier, these neighborhoods are considered to be environmental justice populations for the purpose of this project.

The impacts to minorities and low-income populations that would result from the project would be unavoidable when undertaking any type of substantial improvement to the Industrial Way/Oregon Way intersection due to the proximity of these two neighborhoods. Thus, no practicable alternative to the GSA and PGSB Alternatives would avoid similar social and economic impacts to these residents and households. Mitigation measures to minimize construction-related impacts, such as measures to control dust, limit construction noise, avoid exposure to contaminated materials, and minimize neighborhood cut-through traffic, are incorporated into the GSA and PGSB Alternatives and would lessen some of the impacts; however, not all construction-related impacts could be completely avoided. Additional mitigation is proposed to lessen long-term impacts stemming from permanent changes to some residents' views, noise impacts to residences along the perimeter of the Highlands Neighborhood and Columbia Trailer Court, and displacements of minority-owned businesses and businesses that employ minority and low-income staff. The mitigation for long-term changes could reduce some of the impact intensity, but affected residents, business owners, and employees would still experience substantive changes compared to existing conditions.

Community engagement opportunities were provided throughout the development of the project to provide information about the project and gather input from study area residents (owners and tenants) and businesses (owners

and managers). Specific opportunities for environmental justice populations, as well as other traditionally underserved populations, to provide input on the project included: comment form on the project website; flyers distributed at local businesses, a neighborhood church, a mobile foodbank event and a National Night Out event in the Highlands Neighborhood; project team presentations at the Highlands Neighborhood Association meetings; project team meetings with the Columbia Trailer Court manager; and residential and business surveys. Input from residents and business owners primarily asked about changes in travel routes that would result from the GSA and PGSB Alternatives, potential closures of driveways, creation of isolated spaces under the elevated portions of the intersection that could attract crime, and a concern about cut-through traffic that could occur during construction.

In conclusion, the project with incorporated mitigation measures would have an unavoidable and disproportionately high and adverse impact on the residential areas near the Industrial Way/Oregon Intersection, which have high concentrations of low-income and minority populations, as well as several minority-owned businesses and businesses that employ minority and low-income staff.

Table 3-8: Summary of Impacts and Benefits to Residences and Community Resources

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Construction-related impacts	Not applicable	Impacts to all travelers, including environmental justice populations: » Temporary road detours over 5 years » Some out-of-direction travel » Increased travel time and decrease in travel reliability Disproportionate impacts experienced by environmental justice populations: » Possible increase in neighborhood cut-through traffic » Diminished quality of life from equipment noise and vibration, airborne dust, and artificial lighting	Impacts to all travelers, including environmental justice populations: » Temporary road detours over 3.5 years » Some out-of-direction travel » Increased travel time and decrease in travel reliability Disproportionate impacts experienced by environmental justice populations: » Possible increase in neighborhood cut-through traffic » Diminished quality of life from equipment noise and vibration, airborne dust, and artificial lighting
Business and job displacements	No minority-owned businesses or ethnic food retailers displaced	Impacts to all study area businesses and employees, including environmental justice populations: » 10 businesses displaced » Approximately 121 employees displaced » Removal of 95 on-street parking spaces near industrial/ commercial land uses Disproportionate impacts experienced by environmental justice populations: » Of the 10 businesses displaced, 4 businesses are minority-owned » Of the 121 total employees who would be displaced, 24% are minority (non-white), 11% are Hispanic/Latino, and 49% are low-income	Impacts to all study area businesses and employees, including environmental justice populations: » 7 businesses displaced » Approximately 65 employees displaced » Removal of 95 on-street parking spaces near industrial/ commercial land uses Disproportionate impacts experienced by environmental justice populations: » Of the 7 businesses displaced, 3 businesses are minority-owned » Of the 65 total employees who would be displaced, 15% are minority (non-white), 9% are Hispanic/Latino, and 42% are low-income

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Residential displacements	No residences displaced		
North/South bicycle and pedestrian connectivity to employers south of Industrial Way	Limited and disconnected bicycle and pedestrian facilities	Expanded ADA-compliant bicycle and pedestrian facilities and enhanced and safer connectivity	
Access and on-street parking changes to neighborhoods	None	Disproportionate impacts experienced by environmental justice populations: » 0.6 miles out-of-direction travel for 12 Highlands Neighborhood residences south of Alabama Street » Removal of 18 on-street parking spaces near residential areas	Disproportionate impacts experienced by environmental justice populations: » 1.3 miles out-of-direction travel for 12 Highlands Neighborhood residences south of Alabama Street » Removal of 18 on-street parking spaces near residential areas
Views from neighborhoods	Increased congestion on roadways	Disproportionate impacts experienced by environmental justice populations: » Elevated roadway structure in foreground of views from Highlands residences along Oregon Way » Partial obstruction of views of mountains in background from Highlands residences along the Highlands Trail	
Security concern beneath structures	None	Disproportionate impacts experienced by environmental justice populations: » Creation of isolated spaces could attract crime or vandalism and require additional maintenance	
Environmental Justice Determination	Not applicable	Disproportionately high and adverse impact on an area with low-income and minority populations	

Additional detail on neighborhoods, community resources, and traditionally underserved populations is provided in the Relocation, Social, Economic, Public Services, and Environmental Justice Technical Analysis (Appendix L). Appendix L also documents the substantive concerns and issues raised by environmental justice populations and documents how those concerns and issues are being addressed by the project team. Additional detail about potential effects on quality of life can be found in the traffic (3.1), safety and emergency response (3.2), visual quality (3.6), hazardous materials (3.12), noise (3.13), and air quality (3.17) sections.

Figure 3-18: Access to and from Neighborhoods under the GSA Alternative

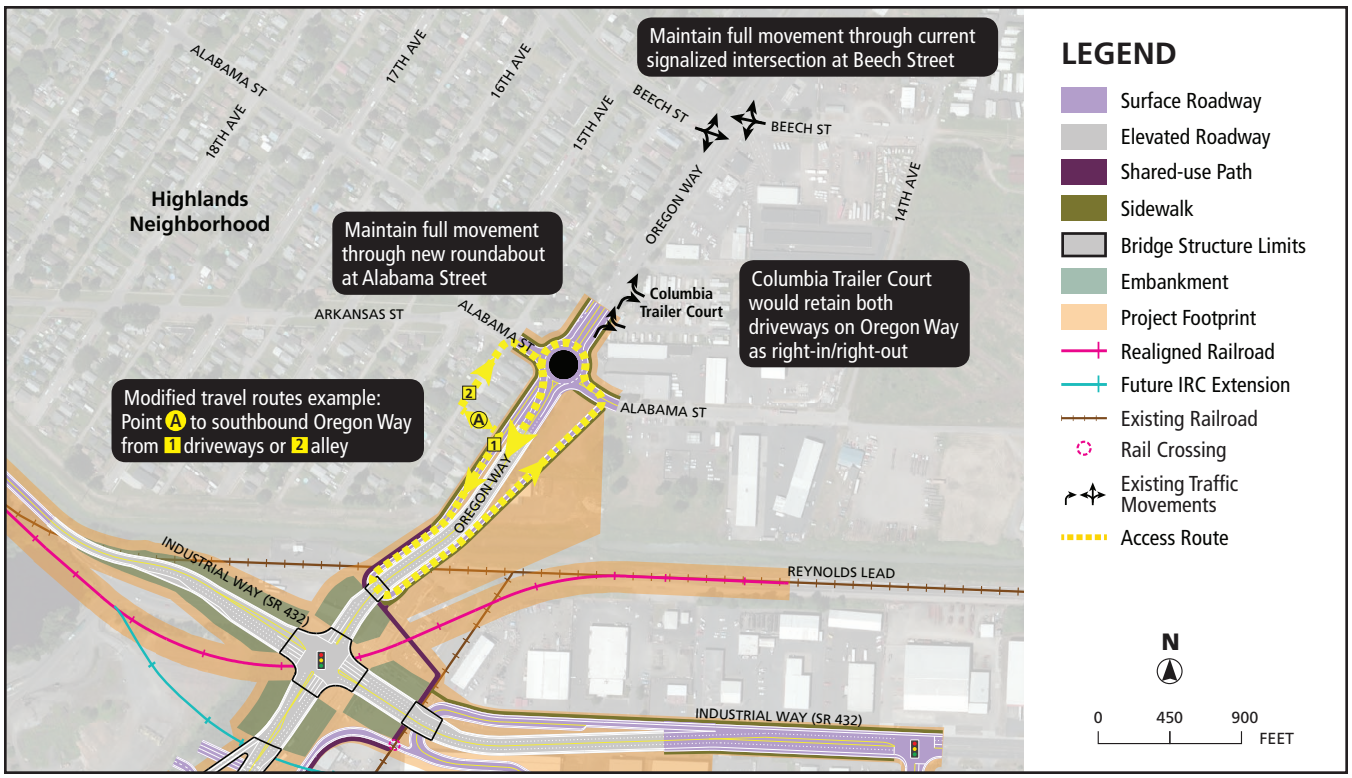
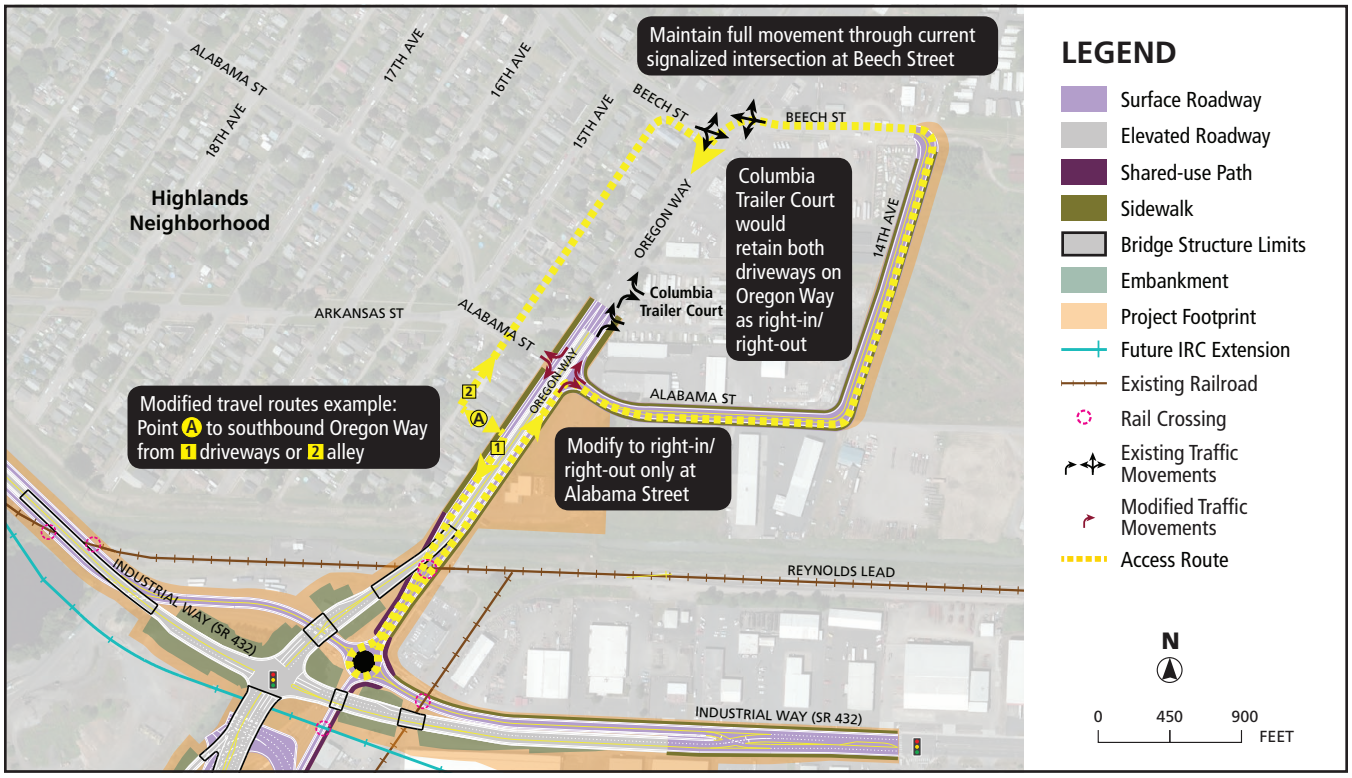


Figure 3-19: Access to and from Neighborhoods under the PGSB Alternative



3.5 How would the project affect businesses and the economy?

Existing Conditions

The Industrial Way/Oregon Way intersection is an economically critical junction within a bistate trade corridor and provides businesses with access to local, state, national and international markets. Businesses in the study area range from small, independently-owned businesses to large, international industrial operations representing heavy and light industry/manufacturing, import/export trade, and commercial/retail enterprises. In addition, 1,200 acres of vacant land are available in the study area, most of which are zoned for industrial development which position the area for future economic growth. The study area is predominantly industrial/commercial with businesses concentrated at the Port of Longview, Mint Farm, Memorial Park, and Industrial Way/California Way areas within Longview, Washington as well as businesses in Rainier, Oregon. Many of these businesses depend heavily on the efficient and reliable movement of freight trucks, service providers, customers, and employees through the Industrial Way/Oregon Way intersection, which has over 20 million tons of annual gross truck tonnage, making it one of Washington's busiest truck tonnage intersections. Currently, congestion at this intersection results in delay and unreliable travel times that adversely affect business operations.

Project Impacts and Benefits

Freight, customers, and employees would experience severe delays at the intersection, resulting in unpredictable travel times and higher material and product transportation costs under the No Build Alternative. Without the project, travel times for freight trucks would increase, which would likely lead to increased costs to transport freight by truck and adversely affect the financial health of businesses.

During construction of the build alternatives, temporary lane closures and detours would adversely affect business-related travel. These delays would occur for a longer duration with construction of the GSA Alternative (5 years) than with the PGSB Alternative (3.5 years) (Table 3-9). Both the GSA and PGSB Alternatives would generate jobs during construction. Skills gained through project construction jobs would grow and enhance the collective capabilities of employees for study area businesses. Over the long-term, reduced congestion and increased travel reliability at the Industrial Way/Oregon Way intersection would occur under both build alternatives, which would be economically beneficial to businesses within and outside the study area that rely on truck freight transport through this intersection. Employees and customers would have more reliable commute/travel times. Under the GSA and PGSB Alternatives, some travel routes to/from businesses would include out-of-direction travel (Figure 3-20 and Figure 3-21). Roadway improvements would support future industrial/commercial growth in study area, adding employment opportunities. Under the GSA Alternative, 10 businesses representing approximately 121 jobs would be displaced as compared with 7 businesses representing 65 jobs under the PGSB Alternative. There are over 1,200 acres of vacant land in the study area, most of which is zoned for industrial development (over 900 acres) or mixed use commercial/industrial (over 180 acres), where the displaced industrial and commercial businesses could potentially relocate.

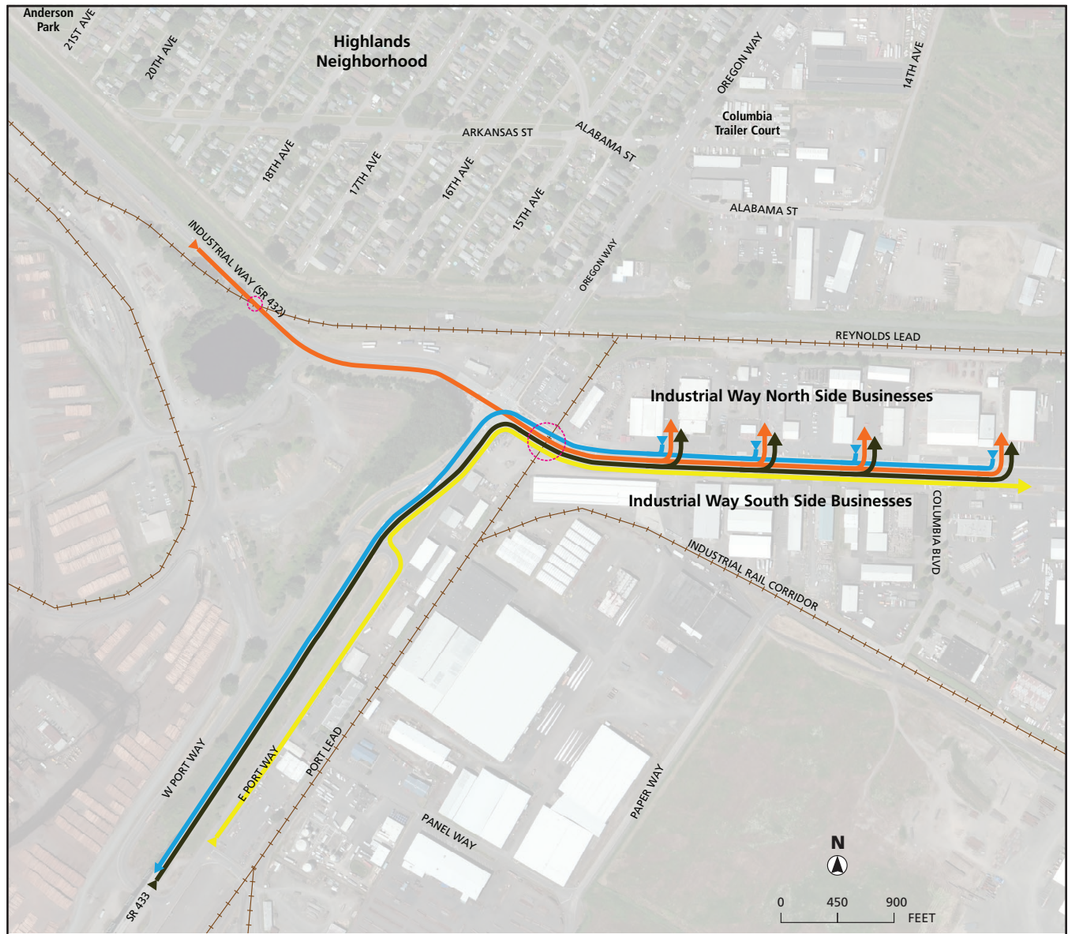
Table 3-9: Summary of Impacts and Benefits to the Businesses and the Economy

	NO BUILD ALTERNATIVE Compared to existing conditions	**GSA ALTERNATIVE** Compared to No Build	**PGSB ALTERNATIVE** Compared to No Build
Construction-Related Vehicular Traffic Delays	None	Intermittent delays for 5 years	Intermittent delays for 3.5 years
Travel Time Reliability for Truck Freight, Customers, and Employees	Worsened: all vehicular traffic would be affected by rail operations	Improved: all vehicular traffic would be separated from rail operations	Improved: most vehicular traffic would be separated from rail operations
Out-of-Direction Travel	None	Some out-of-direction travel	Some out-of-direction travel
Business Displacements	None	10 businesses	7 businesses
Job Displacements	None	121 jobs	65 jobs

Additional detail on businesses and the economy is provided in the Relocation, Social, Economic, Public Services, and Environmental Justice Technical Analysis (Appendix L).

Figure 3-20: Comparison of Existing Vehicle Travel Routes to and from Businesses and Vehicle Travel Routes under the GSA Alternative

Existing Travel Routes



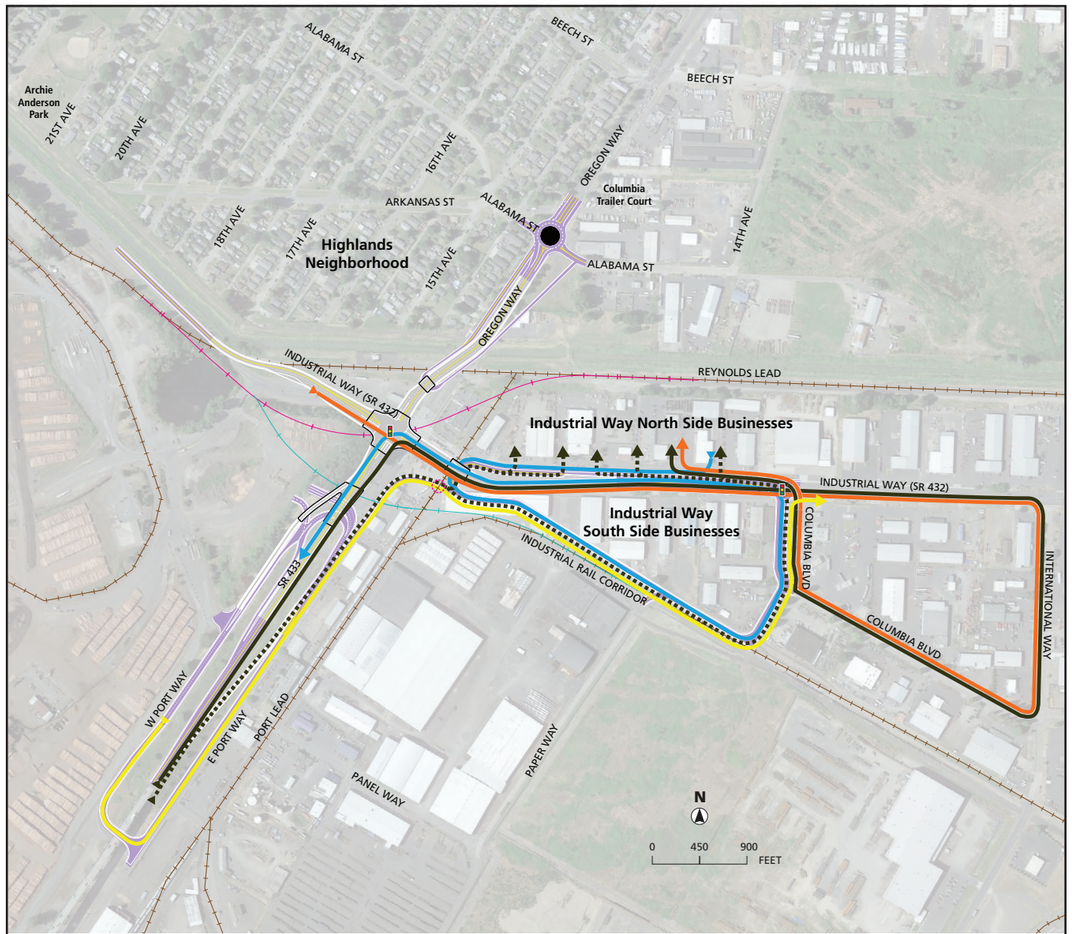
LEGEND

- Rail Crossing

BUSINESS ACCESS ROUTES

- From SR 433 to Industrial Way North Side Businesses
- From Industrial Way North Side Businesses to SR 433
- From west on Industrial Way to Industrial Way North Side Businesses
- From East Port Way to Industrial Way eastbound

GSA Travel Routes



LEGEND

- Surface Roadway
- Elevated Roadway
- Bridge Structure Limits
- Realigned Railroad
- Future IRC Extension
- Existing Railroad
- Rail Crossing

BUSINESS ACCESS ROUTES

- From SR 433 to Industrial Way North Side Businesses via elevated structure
- From SR 433 to Industrial Way North Side Businesses via surface streets
- From Industrial Way North Side Businesses to SR 433
- From west on Industrial Way to Industrial Way North Side Businesses
- From West/East Port Way to Industrial Way eastbound

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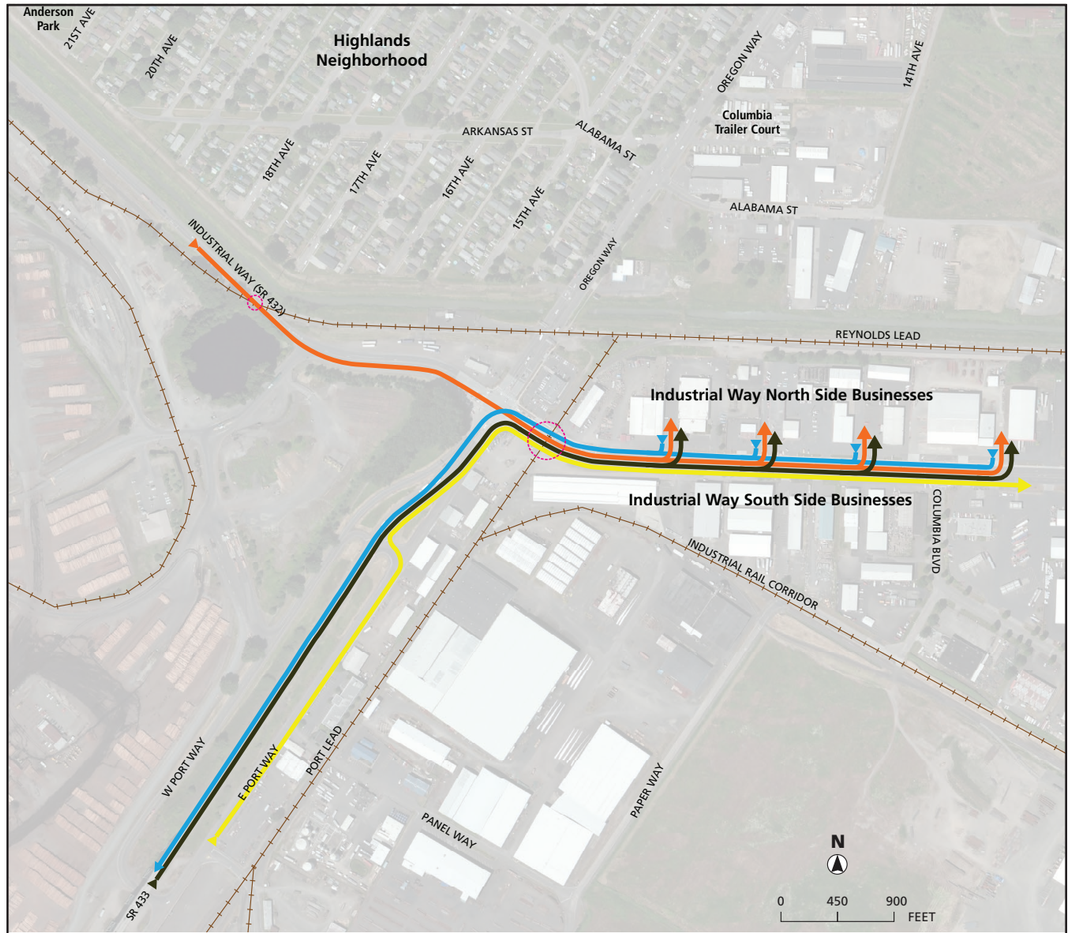
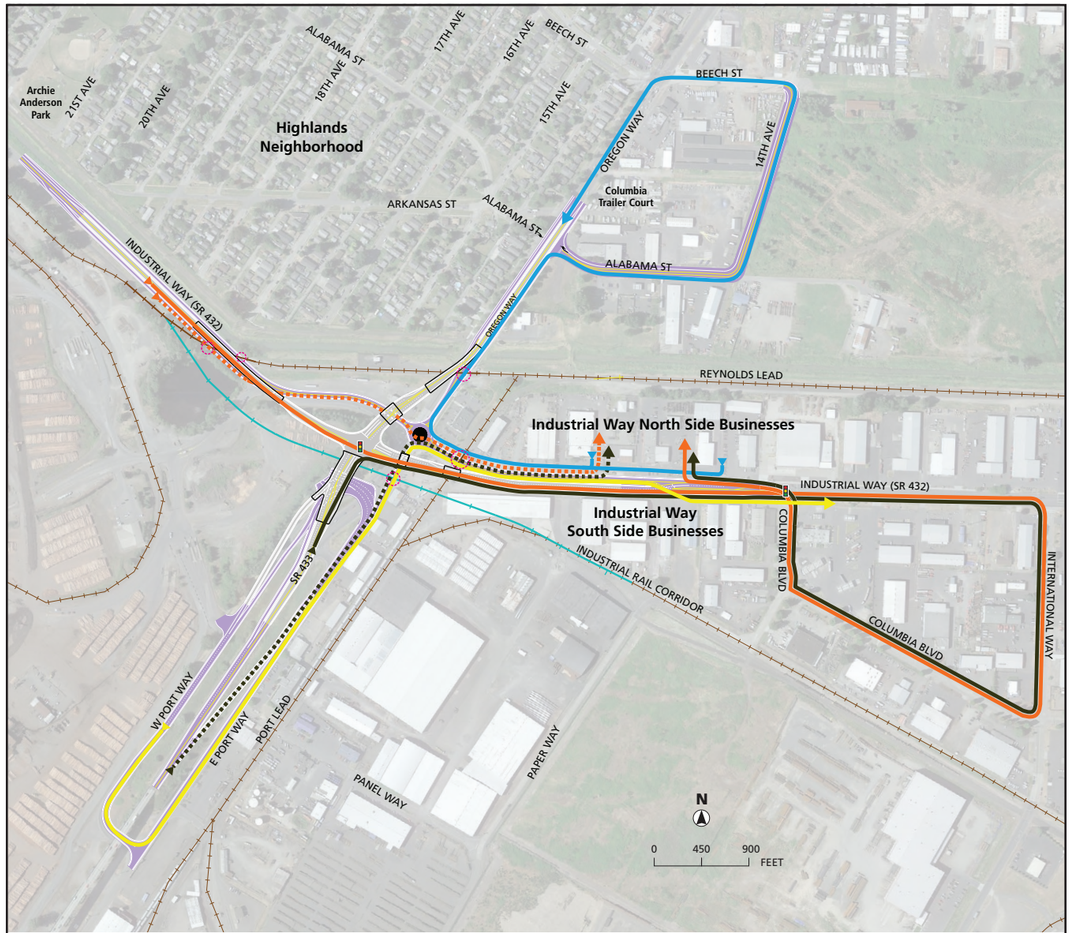
Figure 3-21: Comparison of Existing Vehicle Travel Routes to and from Businesses and Vehicle Travel Routes under the PGSB Alternative

Existing Travel Routes



PGSB Travel Routes



LEGEND

- Rail Crossing

BUSINESS ACCESS ROUTES

- From SR 433 to Industrial Way North Side Businesses
- From Industrial Way North Side Businesses to SR 433
- From west on Industrial Way to Industrial Way North Side Businesses
- From East Port Way to Industrial Way eastbound

LEGEND

- Surface Roadway
- Elevated Roadway
- Bridge Structure Limits
- Future IRC Extension
- Existing Railroad
- Rail Crossing

BUSINESS ACCESS ROUTES

- From SR 433 to Industrial Way North Side Businesses via elevated structure
- From SR 433 to Industrial Way North Side Businesses via surface streets
- From Industrial Way North Side Businesses to SR 433
- From west on Industrial Way to Industrial Way North Side Businesses via elevated structure
- From west on Industrial Way to Industrial Way North Side Businesses via surface streets
- From West/East Port Way to Industrial Way eastbound

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3.6 How would the project affect visual resources

Existing Conditions

The project's area of visual effect is comprised of one landscape unit, which is urban in character. The visual character of the natural and built environment within the study area has been shaped by the construction of a system of dikes and levees, a major earthwork project that opened the flat riverbank terrain for development and created nearby areas planned for residential and commercial uses. The flood management system infrastructure together with industrial buildings along the Columbia River waterfront are prominent components of the area's urbanized appearance. However, the built environment also includes smaller scale features including the Highlands Neighborhood and the Highlands Trail along the Consolidated Diking Improvement District No. 1 (CDID #1) Ditch No. 3.

Project Impacts and Benefits

The No Build Alternative would not include any new roadway structures. Over time, traffic congestion would worsen especially with increased roadway blockages during train crossings under the No Build Alternative, which would diminish visual quality for travelers (Table 3-10).

The primary visual change of both the GSA Alternative and PGSB Alternatives would be the grade-separation of the Industrial Way/Oregon Way intersection. The grade-separation would result in a new and visually dominant structure that would block and alter existing views. Under the PGSB Alternative some traffic movements through the intersection would use a new surface roundabout, which would visually appear as two roadways on two levels, while the GSA Alternative would elevate all traffic movements.

The Industrial Way/Oregon Way intersection, looking south towards the Lewis and Clark Bridge

The GSA Alternative would benefit most neighbors by providing visual separation from differing land uses, relocating the Reynolds Lead further away from residential and recreational areas, and improving local surface roads (Table 3-10). The PGSB Alternative would have an adverse effect on visual resources for most people living and working near the intersection because it would extend further west than the GSA Alternative; would include a bridge structure with vehicle and rail traffic traveling underneath; and would retain the current location of the Reynolds Lead adjacent to a neighborhood. Both alternatives would have an adverse impact to residences along Oregon Way that would have their views obstructed by the large wall in the immediate foreground.

From the perspective of people traveling through the study area, the new grade-separated intersection would improve visual quality under the GSA and PGSB Alternatives by reducing the visual distractions that occur at existing roadway/rail crossings and by providing new, elevated views of the surroundings hills. Under the PGSB Alternative, however, these benefits would be offset by the increase in visual uncertainty in navigating both the elevated and surface facilities. The GSA and PGSB Alternatives are not expected to have growth-inducing indirect effects that would cause further changes in the appearance of the study area. Over time as rail service frequency and traffic volumes increase, roadway blockages would be avoided for the elevated vehicular movements, benefiting visual resources for those traveling and working and living nearby.

Table 3-10: Summary of Visual Quality Impacts and Benefits to Different Groups of Viewers

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Changes in Visual Environment	» Views of increased traffic queuing and roadway traffic would be more visually prominent	» Views altered or blocked by new visually dominant structure » Large retaining wall viewed by residences along Oregon Way » Mature trees removed » Views of industrial lands blocked by embankments from residences and trail	
		» Trains on Reynolds Lead no longer seen from residences and trail between the intersection and 17th Avenue	» Visual uncertainty for travelers navigating roadways

more info Additional detail on visual conditions is provided in the Visual Quality Discipline Report (Appendix Q).

3.7 How would the project affect historic and archaeological resources?

Existing Conditions

The City of Longview was established in the 1920s and subsequent development included construction of transportation and stormwater infrastructure. Two historic properties in the project's area of potential effects were found eligible for listing on the National Register of Historic Places:

- CDID Ditch No. 3 was part of the system of dikes, levees, and stormwater ditches established to protect the city from flooding
- The Reynolds Lead was part of the rail alignment originally built to service the growing industrial infrastructure along the Columbia River

No archaeological resources were identified within the area of potential effect during the database review and pedestrian survey conducted as part of this cultural resource survey. Subsurface investigation has been deferred until later in the project design process and will be stipulated in a programmatic agreement, which will be included in the final EIS.

CDID Ditch No. 3

Reynolds Lead

Project Impacts and Benefits

The No Build Alternative would have no effect on any historic resources. The GSA Alternative would realign a short segment of the Reynolds Lead and eliminate two at-grade road/rail crossings as shown in Figure 3-22, but would maintain the overall historic alignment of the rail line. The PGSB Alternative would not alter the alignment of the Reynolds Lead, but would require reconstruction of the at-grade crossings of Oregon Way and Industrial Way (non-contributing elements of the historic property) as shown in Figure 3-23. Both alternatives would require extension or replacement of the twin culverts that cross under Oregon Way (non-contributing elements of the historic property) for CDID Ditch No. 3. The historic setting and viewshed of both historic resources have been changed by modern development and the industrial nature of the area; therefore, the build alternatives would not cause indirect effects to either historic resource. The No Build Alternative would have no direct or indirect effects on cultural resources. Table 3-11 presents a summary of the findings of effect under Section 106 of the National Historic Preservation Act. The Washington State Department of Archaeology and Historic Preservation (DAHP) concurred with these findings on October 16, 2017.

Table 3-11: Summary of Impacts to Historic Resources under Section 106

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
CDID Ditch No. 3	No effect	No adverse effect	No adverse effect
Reynolds Lead	No effect	No adverse effect	No adverse effect

Additional detail on historic and archaeological resources is provided in the Cultural Resources Discipline Report (Appendix E).

Figure 3-22: Impacts to Historic Resources under the GSA Alternative

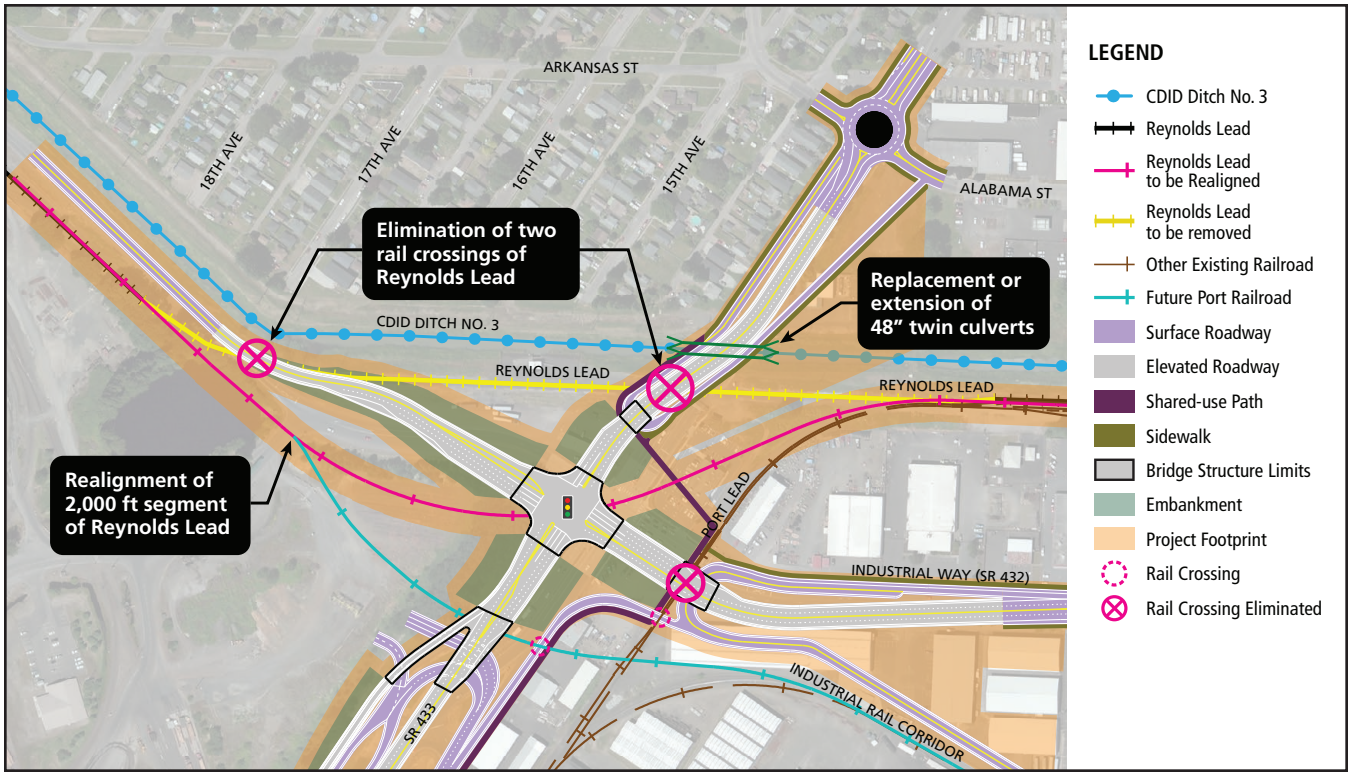
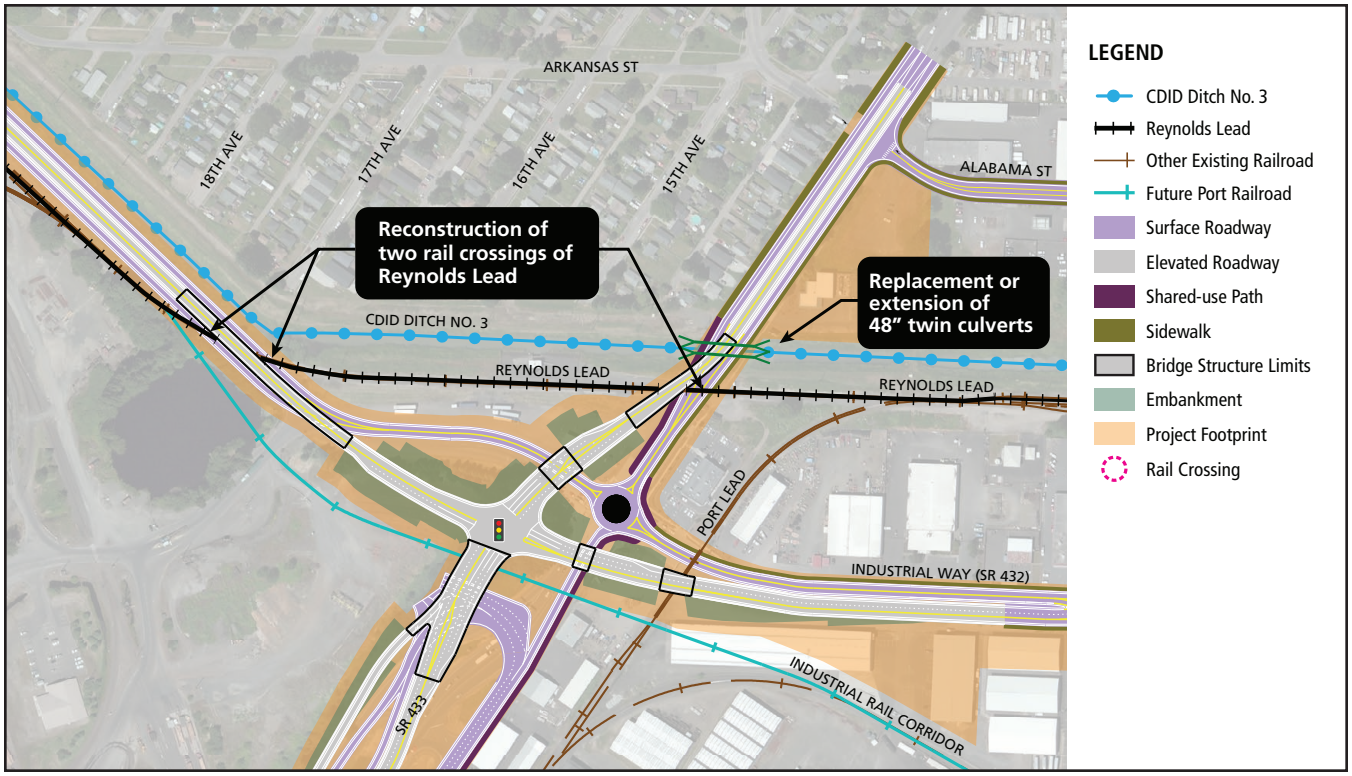


Figure 3-23: Impacts to Historic Resources under the PGSB Alternative



3.8 How would the project affect park and recreation resources?

Existing Conditions

The Highlands Trail is a 10-foot paved pathway constructed in 2011 adjacent to the north side of CDID Ditch No.3 and connects from Oregon Way west to Douglas Street, parallel to Industrial Way. This 1.3-mile long trail serves bicyclists and pedestrians with connections to sidewalks on Oregon Way and streets in the Highlands Neighborhood, such as 15th Avenue. This trail is part of the planned Diking District Trails system identified in the City of Longview's 2016–2022 Parks and Recreation Comprehensive Plan, which would form a loop around the city following the CDID #1 ditches. The Highlands Trail provides access to Archie Anderson Park in the Highlands Neighborhood. There are no other park and recreation facilities in the study area.

Project Impacts and Benefits

No alterations to the Highlands Trail would occur under the No Build Alternative. Neither the GSA nor PGSB Alternative would physically alter the existing trail, although temporary construction easements and minor land acquisitions would be required from the trail right-of-way. As listed in Table 3-12, pedestrian and bicycle access from the Oregon Way sidewalk would remain the same under both alternatives except for temporary closures during construction to ensure user safety.

The Highlands Trail connection to Oregon Way sidewalk

During temporary closures, the Highlands Trail would still be accessible from the southern termini of neighborhood streets to the west, such as 15th Avenue, and from Archie Anderson Park, which would not be affected by the project. Construction of the GSA Alternative would require complete closure of the Oregon Way roadway, including the access point to the Highlands Trail, for up to 1.5 years.

The GSA and PGSB Alternatives would not significantly alter the noise, air quality, or visual setting that trail users experience, as the trail is already within an urbanized environment. The design of the GSA and PGSB Alternatives accounts for and would not preclude a future extension of the Highlands Trail to the planned Diking District Trails system, as shown in Figure 3-24 and Figure 3-25.

Table 3-12: Summary of Impacts to Highlands Trail

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Existing Trail Facility	No alterations	No alterations	No alterations
Trail Access	No change to access	Temporary access closures from Oregon Way sidewalk during closure of Oregon Way (1.5 years) and as needed during construction	Temporary access closures from Oregon Way sidewalk as needed during construction
Connectivity to Future Trails	No change	No change	No change

Additional detail on park and recreation resources is provided in the Section 4(f) Technical Analysis (Appendix M).

Figure 3-24: Impacts to the Highlands Trail under the GSA Alternative

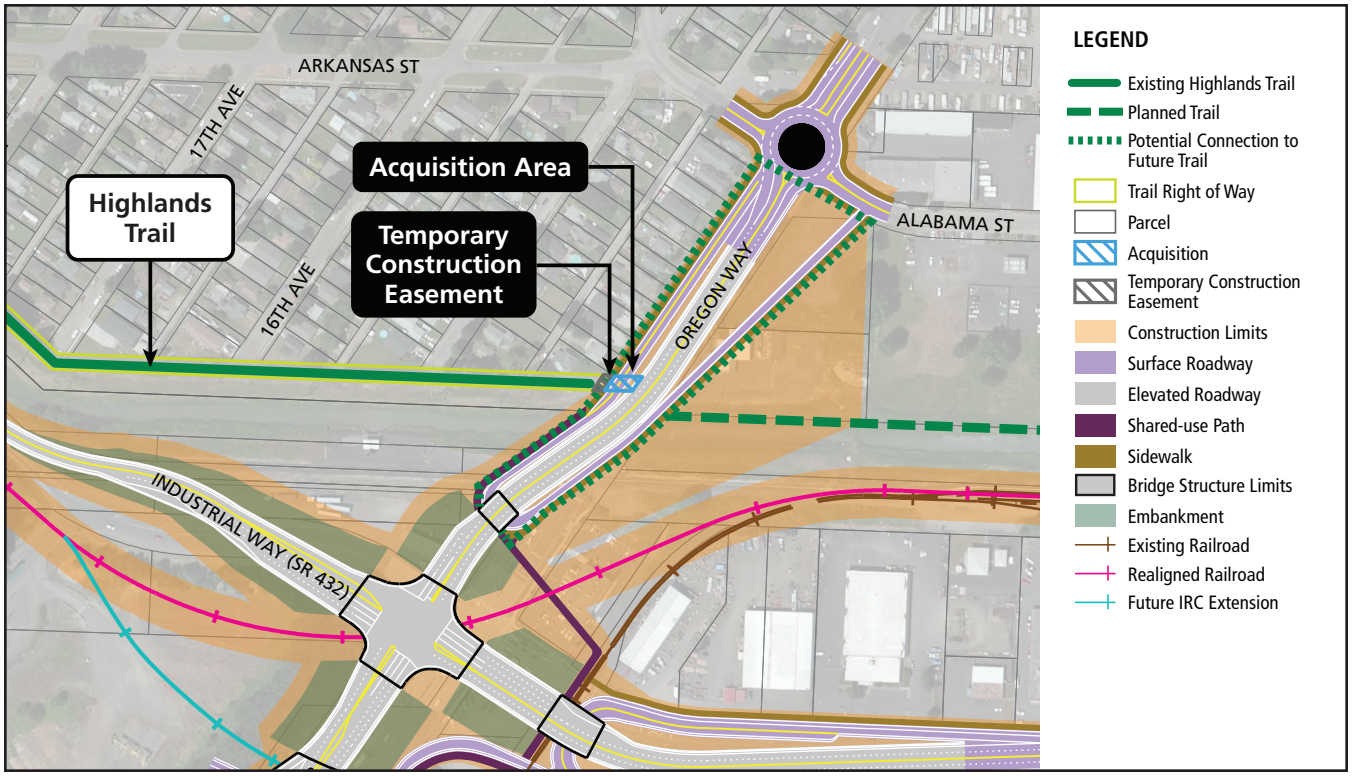
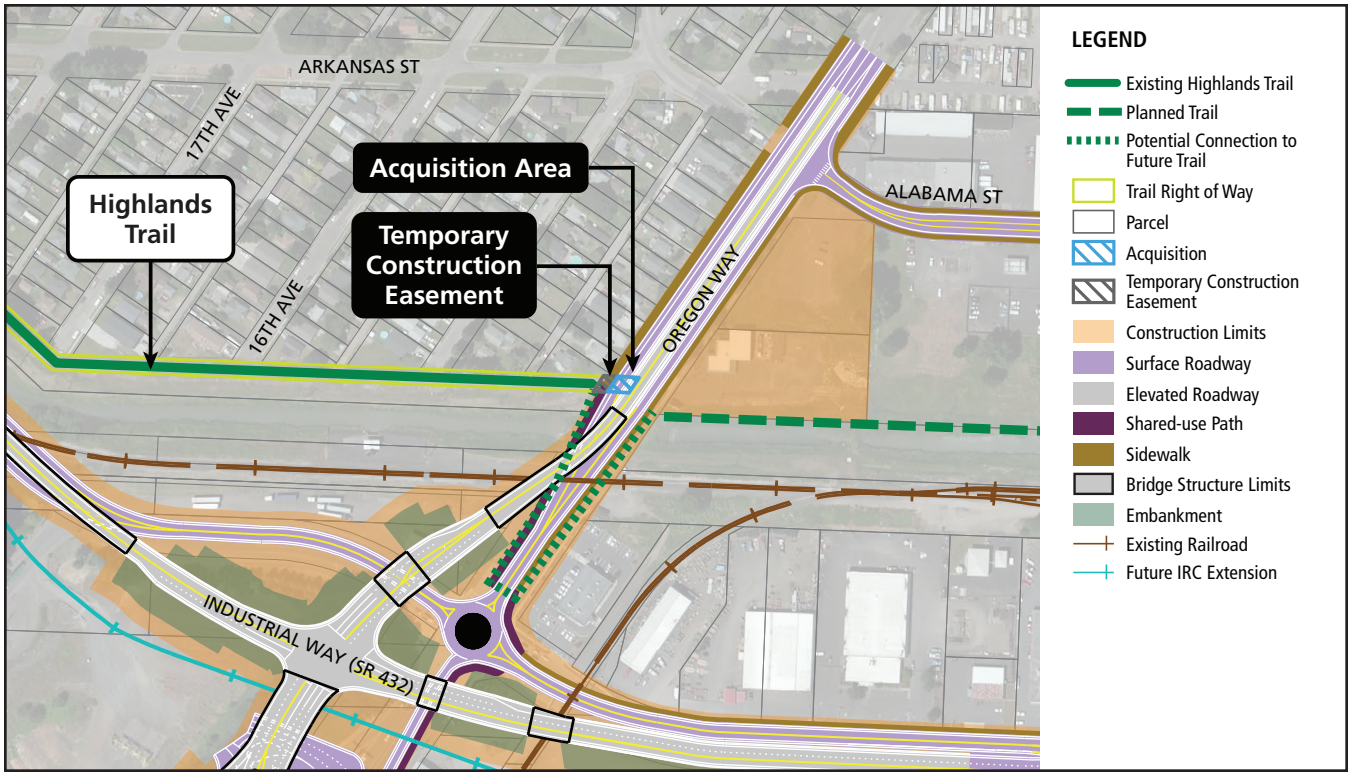


Figure 3-25: Impacts to the Highlands Trail under the PGSB Alternative



3.9 How would the project affect Section 4(f) and Section 6(f) resources?

Existing Conditions

Section 4(f): Section 4(f) of the U.S. Department of Transportation Act of 1966 specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if: there is no prudent and feasible alternative to using that land; and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use. There are three properties in the study area that qualify for protection under Section 4(f):

- CDID Ditch No. 3 (previously described in Section 3.7)
- Highlands Trail (previously described in Section 3.8)
- Reynolds Lead (previously described in Section 3.7)

Section 6(f): Section 6(f)(3) of the Land and Water Conservation Fund Act of 1965 states that any property acquired and/or developed with funds from the Land and Water Conservation Fund Act State Assistance Program shall not be wholly or partly converted to other than public outdoor recreation uses without the approval of the National Park Service. There are no properties in the study area that received funding from this program; thus, no properties are applicable to Section 6(f).

Project Impacts and Benefits

As described in Sections 3.7 and 3.8, the No Build Alternative would not alter any of the Section 4(f) properties. Both the GSA and PGSB Alternatives would require extension or replacement of the CDID Ditch No. 3 culverts under Oregon Way, but would not change the alignment of this property. Both alternatives would avoid permanent changes to the Highlands Trail, although there could be short-term closures to a portion of the trail during construction. Under the GSA Alternative, the Reynolds Lead would be realigned, and under the PGSB Alternative the at-grade crossings of Oregon Way and Industrial Way would be reconstructed; however, neither alternative would alter the overall historic alignment of the Reynolds Lead. These minor changes would result in a *de minimis* impact to all three properties under both alternatives, as listed in Table 3-13.

The project cultural resource report, submitted on September 25, 2017 to the Washington State Department of Archaeology and Historic Preservation (DAHP), the official with jurisdiction over CDID Ditch No. 3 and the Reynolds Lead, disclosed FHWA's intent to make a *de minimis* finding for the two historic properties. The City of Longview, the official with jurisdiction over the Highlands Trail, concurred with FHWA's determination that impacts to the Highlands Trail would be classified as a Section 4(f) *de minimis* impact on October 18, 2017.

CDID Ditch No. 3

Highlands Trail

Reynolds Lead

Table 3-13: Summary of Section 4(f) Impacts

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
CDID Ditch No. 3	No use	*De minimis* impact	*De minimis* impact
Highlands Trail	No use	*De minimis* impact	*De minimis* impact
Reynolds Lead	No use	*De minimis* impact	*De minimis* impact

Additional detail on Section 4(f) properties is provided in the Cultural Resources Discipline Report (Appendix E) and Section 4(f) Technical Analysis (Appendix M).

3.10 How would the project affect railroads and public utilities?

Existing Conditions

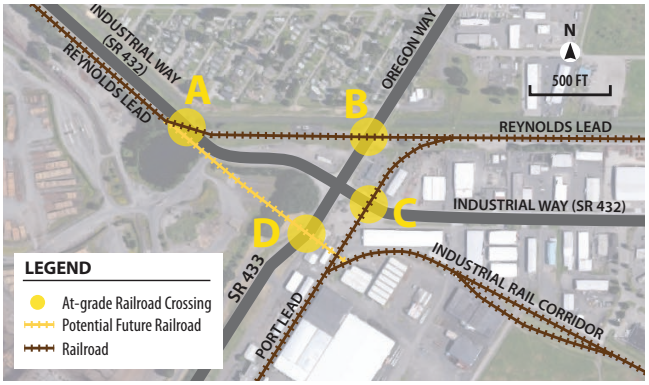
Three existing at-grade rail crossings occur near the project intersection (Figure 3-26). Up to four trains per day travel on the Reynolds Lead and cross the west leg (Crossing A) and the north leg (Crossing B) of the intersection. Up to six trains per week travel on the Port Lead and cross the east leg (Crossing C) of the intersection. A future extension of the IRC is proposed, but the specific location is not yet established so a conceptual crossing alignment is shown (Crossing D).

Public utilities in the project vicinity include water, sanitary sewer, storm drainage, telephone, fiber optics, cable television, natural gas, and electric utilities. Major utility infrastructure includes CDID Ditch No. 3 and Bonneville Power Administration transmission lines.

Project Impacts and Benefits

The No Build, GSA and PGSB Alternatives would not change railroad capacity or operational conditions. As listed in Table 3-14, the GSA and PGSB Alternatives would provide safety benefits by reducing the risk of rail-vehicle conflicts where at-grade crossings are eliminated, especially in light of substantial increases in rail service by 2040. The GSA Alternative would realign a segment of the Reynolds Lead at the Industrial Way/Oregon Way intersection and elevate the intersection over all rail facilities. The PGSB Alternative would elevate most of the vehicle movements that pass through the intersection. Higher vehicular movements would travel on the elevated portion of the intersection, whereas lower volume movements would travel on the surface portion of the intersection. At-grade rail crossings would occur on the surface roads under the GSA and PGSB Alternatives. Under the No Build Alternative, rail service on the railroads crossing the intersection is anticipated to increase from 4–6 trains per day in 2015 to 28–30 trains per day in 2040, regardless of whether or not the project is constructed. This increase in train frequency would further exacerbate the vehicular congestion and delays expected as a growth in vehicular traffic in the study area.

Figure 3-26: Rail Crossings at the Industrial Way/ Oregon Way Intersection



CDID Ditch No. 3 and Bonneville Power Administration transmission lines on the east side of Oregon Way

Many of the public utilities would be relocated during construction; however, no changes to the Oregon Way Pump Station would occur. The culverts that carry CDID Ditch No. 3 under Oregon Way would be replaced or extended to accommodate the widening of Oregon Way under either build alternative. Coordination with affected utility companies would ensure service disruptions are minimized or avoided during project construction and all utility service would continue in the future as it operates today.

Table 3-14: Summary of Impacts and Benefits to Railroads and Public Utilities

	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Railroads (Reynolds Lead, IRC, Port Lead)	No effect	» Reduced risk of rail-vehicle conflicts » Grade-separate intersection traffic from railroads » Realign a segment of Reynolds Lead	» Reduced risk of rail-vehicle conflicts » Partially grade-separate intersection traffic movements from railroads
Utilities	No effect	» Relocate water, sanitary sewer, storm drainage, telephone, fiber optics, cable television, natural gas, and electric utilities located within the project footprint » Extend or replace CDID Ditch No. 3 culverts under Oregon Way	

Additional detail on railroads and public utilities is provided in the Utilities Memorandum (Appendix P) and the Transportation Discipline Report (Appendix O).

3.11 How would the project affect land uses?

Existing Conditions

Land uses in the study area reflect the industrial use of Longview's waterfront along the Columbia River, including several large import and export facilities. The predominant land uses are industrial and commercial south of the Industrial Way/ Oregon Way intersection and residential and commercial north of the intersection. Nearly half of the study area is industrial land and major industrial uses include Export Grain Terminals, KapStone Pulp and Paper, Millennium Bulk Terminals, Pacific Fibre, Port of Longview, and Weyerhaeuser. Vacant land is the second most predominant land use. Planned land uses correspond to the City of Longview, Cowlitz County, City of Rainier, and Columbia County zoning designations, which are primarily industrial but also include a mix of commercial and residential.

Project Impacts and Benefits

Table 3-15 provides a summary of the project's potential impacts to land uses. The No Build Alternative would require no temporary or permanent easements, convert no land to a transportation use, and displace none of the existing land uses. However, the No Build Alternative would be inconsistent with plans that include policies to improve the transportation system and eliminate at-grade rail/roadway crossing conflicts. The GSA and PGSB Alternatives would temporarily and permanently impact land uses by converting land to a transportation use and displacing existing businesses; however, no acquisition of residential land would be required (Table 3-15). Both the GSA and PGSB Alternatives were designed to avoid displacing residential land uses. The

Land uses along Industrial Way

locations of potential property acquisitions are shown in Figure 3-27 and Figure 3-28. In the case of partial acquisitions, a portion of the property would be acquired and the remainder would be retained by the current owner. In addition, new and expanded easements would be needed from railroad parcels and temporary easements would be needed during project construction.

The GSA Alternative would be consistent with all state, regional and local plans – including the State of Washington Growth Management Act and Shoreline Management Act; the City of Longview Comprehensive Plan, Zoning Code, and Parks and Recreation Comprehensive Plan; Cowlitz County Comprehensive Plan and Land Use Ordinance; and the Cowlitz-Wahkiakum Council of Government Regional Transportation Plan. The PGSB Alternative would be consistent with all but one plan. Because a portion of Industrial Way would remain a surface roadway, the PGSB Alternative would not be consistent with the City of Longview Comprehensive Plan Policy TR-B.1.6 to eliminate congestion conflicts caused by at-grade rail crossings along SR 432 (Industrial Way).

Transportation improvements from the GSA or PGSB Alternative would not be expected to induce growth in the

Table 3-15: Summary of Impacts and Benefits to Land Uses

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Easements	0	59 temporary 2 permanent	71 temporary 2 permanent
Parcel Acquisitions	0	15 full 26 partial	12 full 21 partial
Displacements	0	10 businesses 0 residences 3 billboards 1 radio/cell tower	7 businesses 0 residences 2 billboards 1 radio/cell tower
Land acquired	0	19 acres	14 acres
Plan consistency	Inconsistent with some plans	Consistent with all plans	Consistent with all but one plan

more info Additional detail on land uses is provided in the Land Use Technical Analysis (Appendix J).

area; they would not cause or facilitate development or redevelopment because the project would not add any rail capacity or make any significant improvements that would facilitate growth in rail operations or the ability for property owners to establish rail-served industrial operations. Approval of future development and land use changes are local planning decisions made by the City of Longview, Cowlitz County, the City of Rainier, and Columbia County. No development or land use changes are expected to result from construction of the GSA or PGSB Alternatives.

Figure 3-27: Parcel Acquisitions under the GSA Alternative

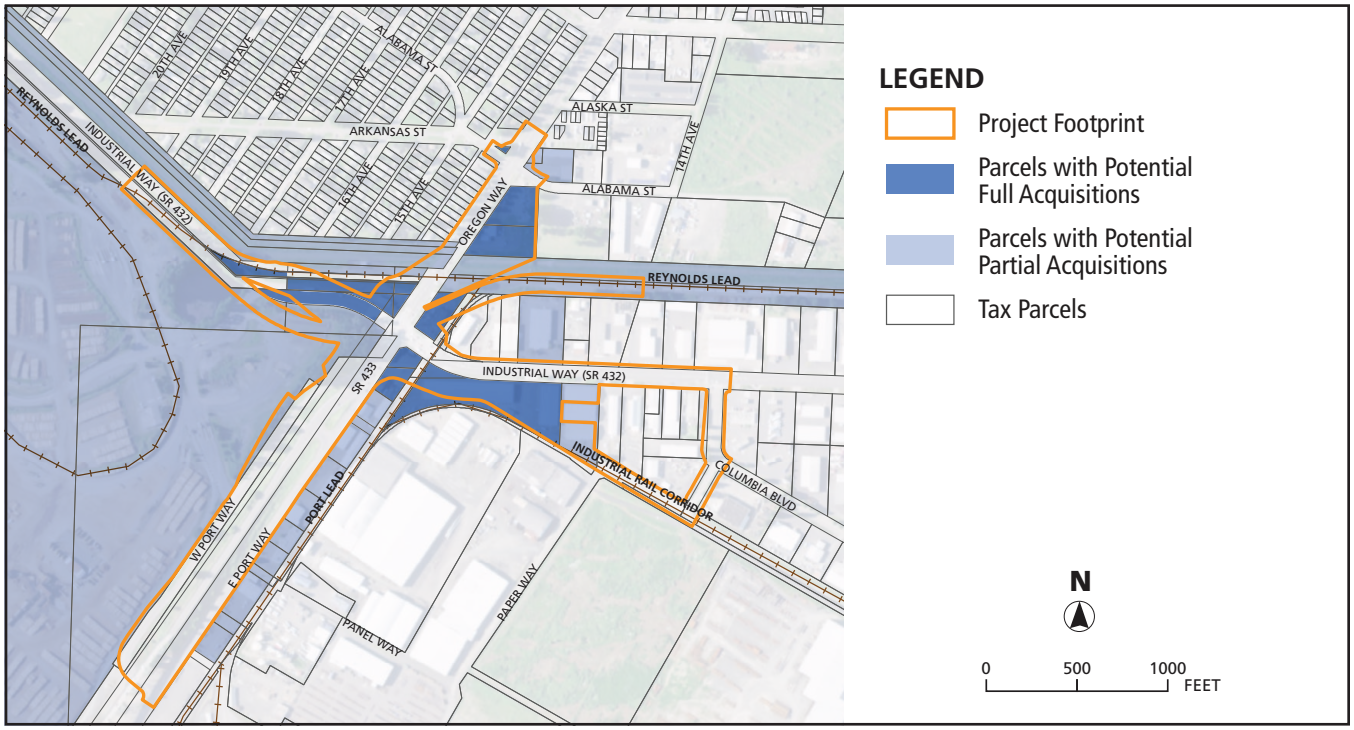
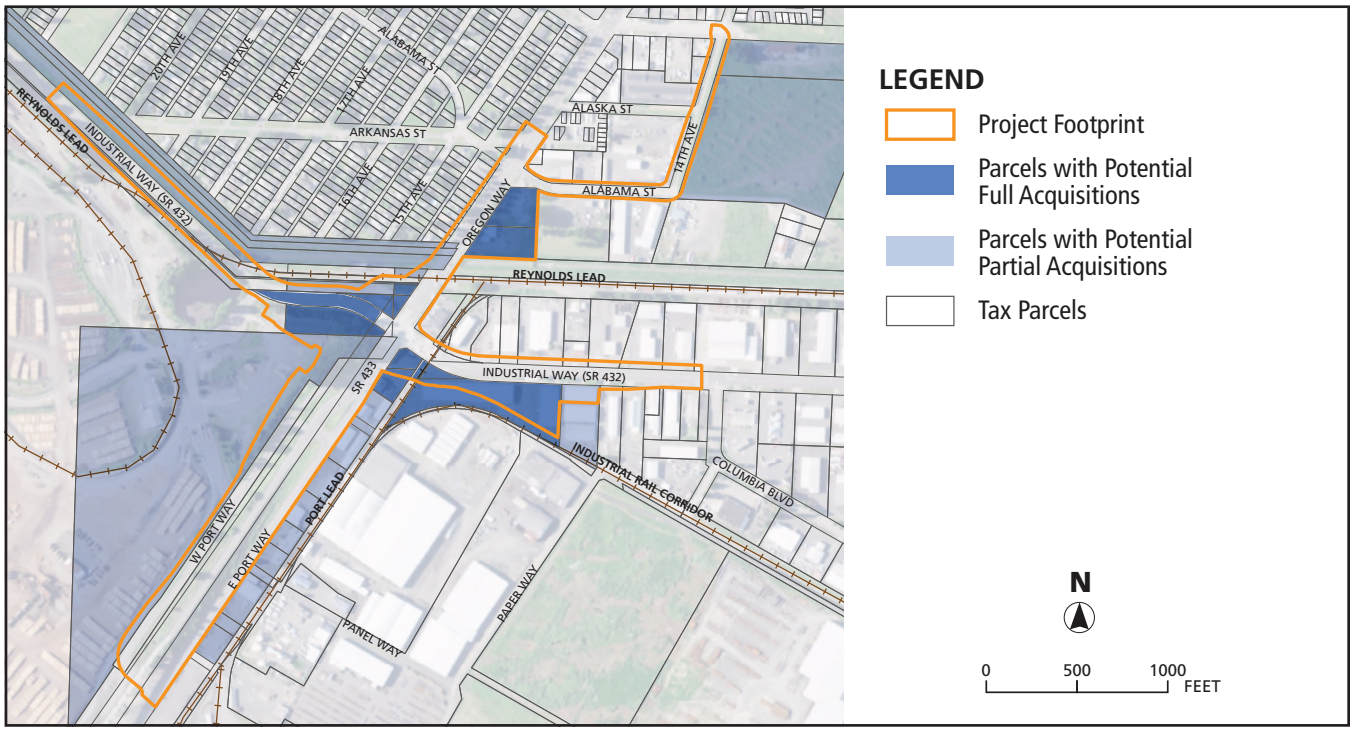


Figure 3-28: Parcel Acquisitions under the PGSB Alternative



3.12 How would the project affect hazardous materials?

Existing Conditions

Past and present land uses may contribute to the presence of hazardous materials in the area through accidental spills and releases or on-site storage of large quantities of contaminants. Fifteen sites of concern (properties that generate, transport, and/or store hazardous materials) were identified in or within a one-quarter mile of the study area. Six sites are considered to have a low risk of impacting project construction through cost increases or delays; and nine sites are considered to be moderate risk sites. No high-risk sites were identified. Included in the 15 sites of concern are six sites that the Washington State Department of Ecology has identified as known or suspected contaminated sites.

Petroleum storage in the study area

Project Impacts and Benefits

Under the No Build, GSA, and PGSB Alternatives, the potential for hazardous material spills from vehicle accidents or the use of pesticides for vegetation management could occur during the on-going use of roadways in the study area. The No Build Alternative would have no other impacts or benefits to sites with hazardous materials.

During construction of the GSA or PGSB Alternative, hazardous materials could be encountered in contaminated soils and groundwater during excavations, such as for bridge and wall foundations, and in materials disturbed during building demolition. The potential exposure to contaminated materials that are disturbed during construction presents a health and safety concern to construction workers and the public in the area. During on-going roadway operations and maintenance, both the GSA Alternative and PGSB Alternative would benefit water quality by adding stormwater treatment facilities that would collect and retain pollutants deposited on roadways from vehicular traffic.

The project would be required to remove hazardous materials from the portions of sites that are acquired and disturbed following the Model Toxics Control Act Cleanup Regulation (Washington Administrative Code (WAC) 173-340). Table 3-16 summarizes the impacts of the project alternatives on sites with hazardous materials. The elimination of hazardous materials from the portions of sites with acquisitions or easements would reduce future adverse effects to human health and the environment from exposure at those locations or from potential migration, which would be a benefit of the project. As shown in Figure 3-29 and Figure 3-30, both the GSA and PGSB Alternatives would result in acquisition or easements and subsequent soil disturbance on 11 sites of concern.

Table 3-16: Summary of Impacts and Benefits to Sites with Hazardous Materials

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Acquisitions or easements from low risk sites of concern	No acquisitions or easements	7 acquisitions (3 full, 4 partial) and 3 temporary easements from industrial, commercial, and railroad property	3 acquisitions (2 full, 1 partial), 1 permanent, and 6 temporary easements from commercial and railroad property
Acquisitions or easements from moderate risk sites of concern	No acquisitions or easements	2 acquisitions (2 full, 1 partial) and 1 temporary easement from industrial, commercial, and government property	3 acquisitions (1 full, 2 partial) and 2 temporary easements from industrial and commercial property

Note: Some sites of concern would have both a temporary easement and a partial acquisition or permanent easement.

Additional detail on hazardous materials is provided in the Hazardous Materials Discipline Report (Appendix I).

Figure 3-29: Sites with Hazardous Materials Impacted under the GSA Alternative

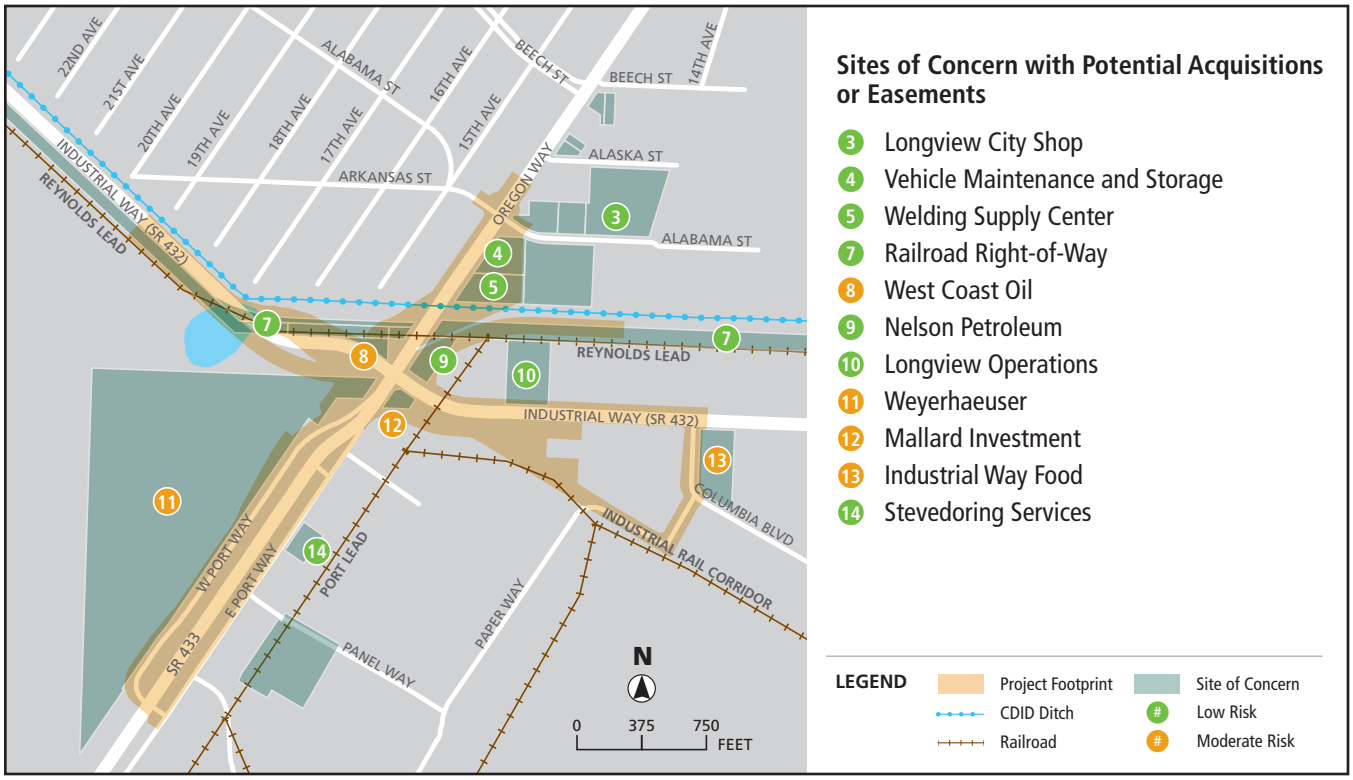
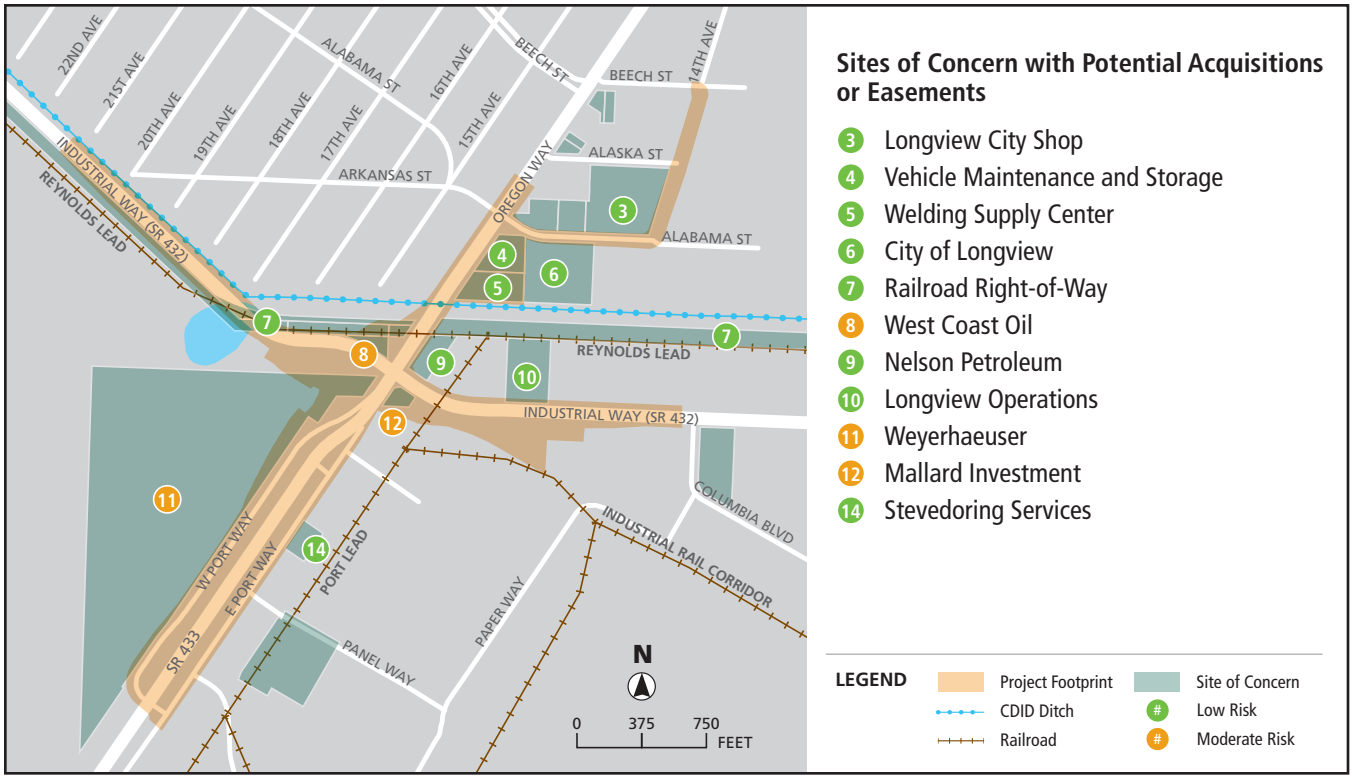


Figure 3-30: Sites with Hazardous Materials Impacted under the PGSB Alternative



3.13 How would the project affect traffic noise levels?

Existing Conditions

Vehicle engines, mufflers, braking, and tires contribute to traffic noise. As speeds and the number of vehicles or heavy trucks increase, traffic noise increases. The terrain, vegetation, shielding by barriers and buildings, and distance from the road affects how loud traffic noise is at nearby land uses. Existing noise levels in the study area were analyzed using noise measurements, traffic data, and computer assisted modeling. During the worst-hour (PM peak period) traffic noise, the model showed that existing noise levels range from 55 decibels (a typical office) to 65 decibels (a vacuum cleaner from 10 feet away) at nearby residential areas. These noise levels are below the FHWA's Noise Abatement Criteria (NAC), which sets thresholds for when a noise impact would occur based on the type of land use. The NAC is 66 decibels for residences and active recreation areas.

Project Impacts and Benefits

To determine noise impacts resulting from the project, the noise modeling evaluated future (year 2040) traffic volumes; including future population, planned development, and planned roadway changes. Anticipated noise impacts during the worst-hour of traffic for each alternative are summarized in Table 3-17. Under the No Build Alternative, 32 residences and the Highlands Trail would experience noise levels at or above FHWA's NAC. The GSA and PGSB Alternatives would have fewer residences with noise impacts than the No Build Alternative with 20 residences impacted because the elevated portion of Oregon Way would shield homes from traffic noise. The Highlands Trail would experience noise impacts under the GSA Alternative; however, with the PGSB Alternative noise levels along the Highland Trail would not exceed the NAC because the elevated portion of Industrial Way, which would have higher traffic volumes than the surface portion, would be shifted slightly further south than under the GSA Alternative. Where noise impacts would occur with the GSA and PGSB Alternatives, noise barriers were evaluated. None of the barriers that were evaluated met the criteria for both feasibility (physically constructible and reducing noise levels by at least 5 decibels for the first row of receivers [residences or recreational facility]) and reasonableness (cost effectiveness and design goal achievement of at least 7 decibels reduction for one or more receiver). While all barriers that were evaluated would have been physically constructible, some of them would have exceeded the cost allowance per residence, while others would not sufficiently reduce noise (by at least 5 decibels for the first-row receivers). Although rail service is anticipated to increase in the future from other projects (as described in Section 2.1), residents may benefit from the realignment of the Reynolds Lead under the GSA Alternative. This realignment would create a greater separation between the railroad and the neighborhood, thereby reducing railroad noise levels.

Measuring existing noise levels along Oregon Way

Figure 3-31 and Figure 3-32 show the noise levels at measured sites. Most of the measurement sites shown in the figures represent more than one residential dwelling unit.

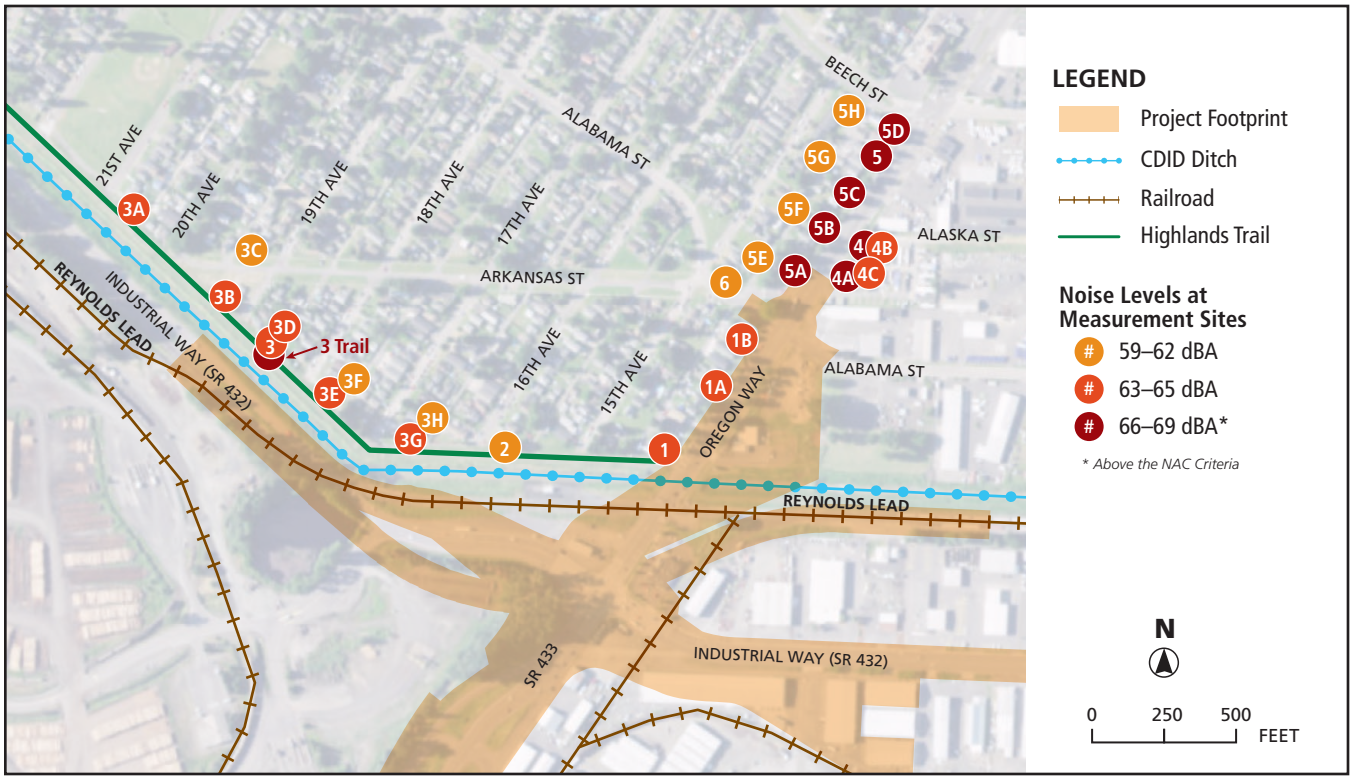
During the construction of both alternatives, areas adjacent to the project would be exposed to construction noise in addition to ongoing traffic-related noise. Impacts during construction would be of short duration and standard specifications for noise control would minimize or eliminate impacts during construction. The GSA Alternative would take approximately 1.5 years longer to construct than the PGSB Alternative with longer periods of loud equipment operating near noise sensitive land uses close to the construction area.

Table 3-17: Summary of Noise Impacts and Benefits

	EXISTING CONDITIONS (2015)	NO BUILD ALTERNATIVE (2040)	GSA ALTERNATIVE (2040)	PGSB ALTERNATIVE (2040)
Noise Levels	55 to 65 decibels	59 to 69 decibels	59 to 69 decibels	60 to 69 decibels
Noise Impacts (above 66 decibels)	None	32 residences and Highlands Trail	20 residences and Highlands Trail	20 residences

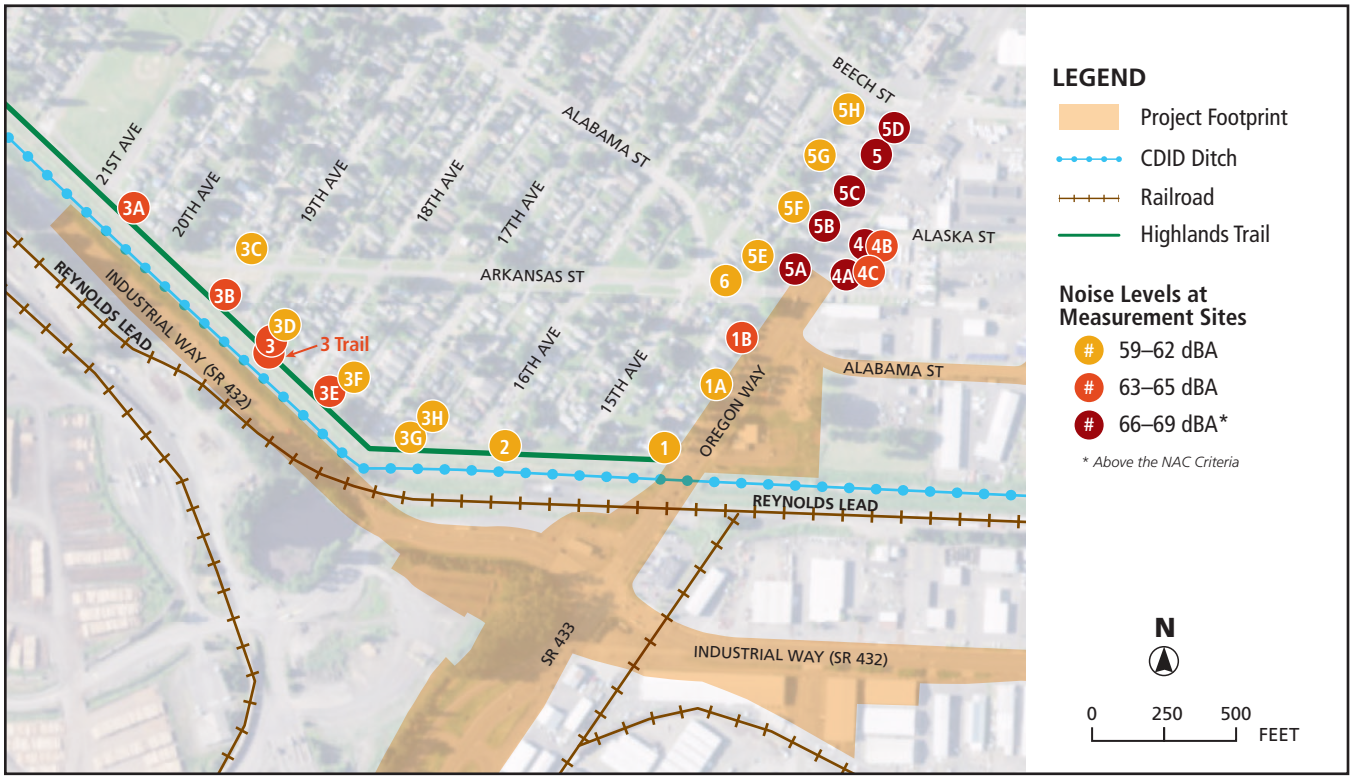
Additional detail on traffic noise levels is provided in the Noise Technical Analysis (Appendix K).

Figure 3-31: Noise Impacts under the GSA Alternative



Note: Most measurement sites represent more than one residence.

Figure 3-32: Noise Impacts under the PGSB Alternative



Note: Most measurement sites represent more than one residence.

3.14 How would the project affect water, wetlands, and floodplains?

Existing Conditions

Water resources within the study area include components of the ditch system that was constructed to prevent flooding and allow development of the City of Longview. CDID #1 is the local special purpose district responsible for flood protection. CDID #1 owns, operates, and maintains approximately 19 miles of levees and 35 miles of sloughs, ditches and drains that collect and convey stormwater to pump stations that pump it to the Columbia River. CDID Ditch No. 3 is conveyed in twin 48-inch concrete pipes under Oregon Way to the Oregon Way Pump Station where it is pumped 0.75 miles to the Columbia River. Four medium-quality (Category III) wetland systems were identified within the study area; three associated with the CDID Ditch No. 3 and one pond, a former barge turnaround, on Weyerhaeuser property. The pond and CDID Ditch No. 3 are the only mapped floodplains in the study area (1 percent annual chance of flooding). The existing impervious surface area within the project footprints of the two build alternatives ranges from 22 to 27 acres. Very little of the existing impervious surface currently receives stormwater treatment.

Project Impacts and Benefits

There would be no changes to water, wetlands, and floodplains under the No Build Alternative. As shown in Figure 3-33 and Figure 3-34, both the GSA and PGSB Alternatives would widen Oregon Way, which would require replacing or extending the culverts for CDID Ditch No. 3 and involve construction disturbance within the floodplain. Neither alternative would be anticipated to result in a net rise in the floodplain. During construction of the culverts, flow of CDID Ditch No. 3 would be maintained, and access to the Oregon Way Pump Station would be accommodated. There are no practicable design alternatives that would avoid this minor disturbance in the floodplain.

Pond on Weyerhaeuser property (Source: Google Streetview)

A minor amount of fill in the pond on the Weyerhaeuser property would be required to accommodate the Reynolds Lead realignment under the GSA Alternative or the widened roadway footprint under the PGSB Alternative as listed in Table 3-18. Both alternatives would require a permit under Section 404 of the Clean Water Act for this wetland fill. Due to the proximity of this pond and CDID Ditch No. 3 that surround both sides of the roadway, there are no practicable design alternatives that would avoid all wetland impacts.

Roadway modifications associated with both the GSA and PGSB Alternatives would reduce the amount of impervious surface area. In addition, the GSA and PGSB Alternative would treat all stormwater from the new and replaced roadways using a stormwater pond prior to discharge into CDID Ditch No. 3, which would improve water quality over current conditions.

Table 3-18: Summary of Impacts and Benefits to Water, Wetlands and Floodplains

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Floodplain Impacts	None	Minor fill in pond; no net rise to floodplain	Minor fill in pond; no net rise to floodplain
Impervious Surface Area	GSA footprint: 27 acres PGSB footprint: 23 acres	22 acres	22 acres
Stormwater Treatment (percent of impervious surface treated)	GSA footprint: 0–5% PGSB footprint: 5–10%	60–65%	70–75%
Wetland Impacts	0 acres	Less than 0.5-acre wetland 1.0–1.5 acres wetland buffer Less than 0.5 acre open water	0.5–1.0 acre wetland 1.5–2.0 acres wetland buffer Less than 0.5 acre open water

Additional detail on water, wetlands and floodplains is provided in the Biological Assessment (Appendix D), Floodplain Technical Analysis (Appendix H), Section 4(f) Technical Analysis (Appendix M), and Wetland Delineation Report (Appendix R).

Figure 3-33: Impacts to Water, Wetlands and Floodplains under the GSA Alternative

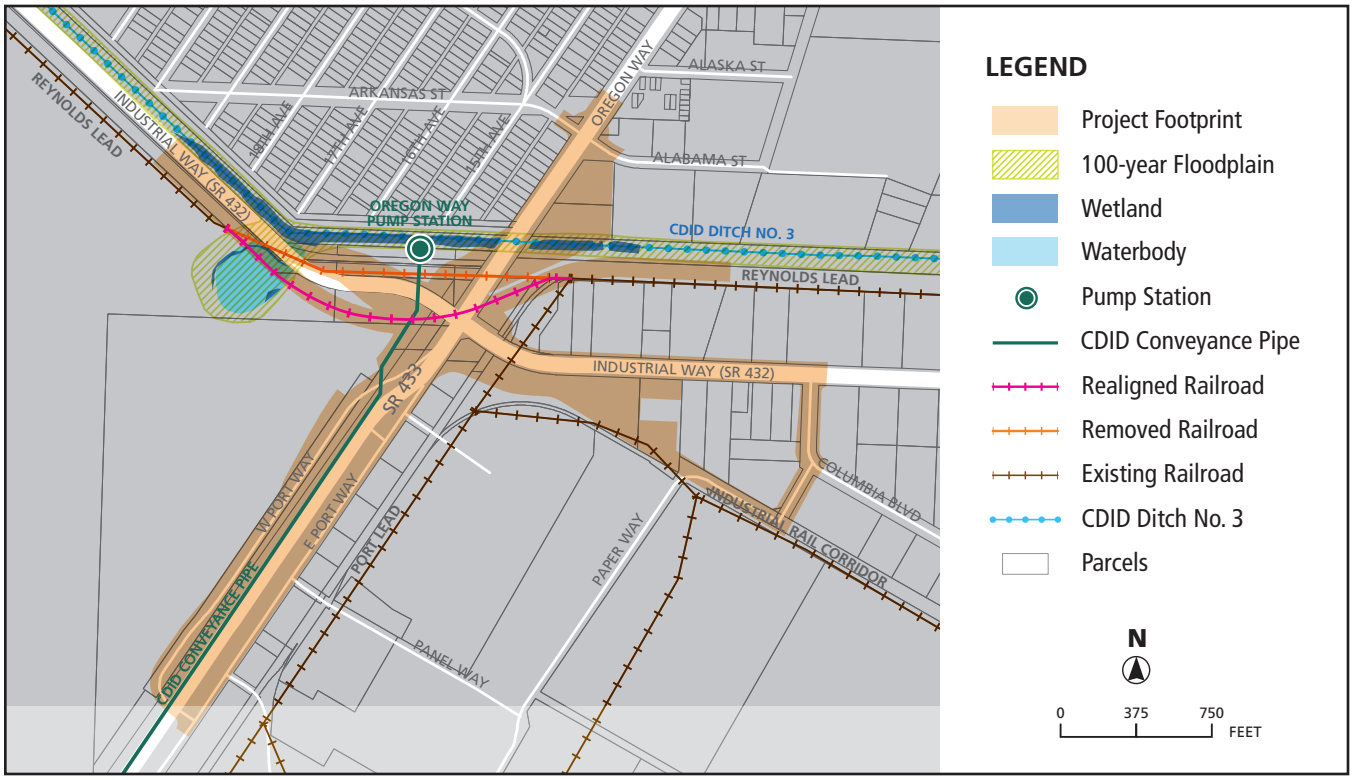
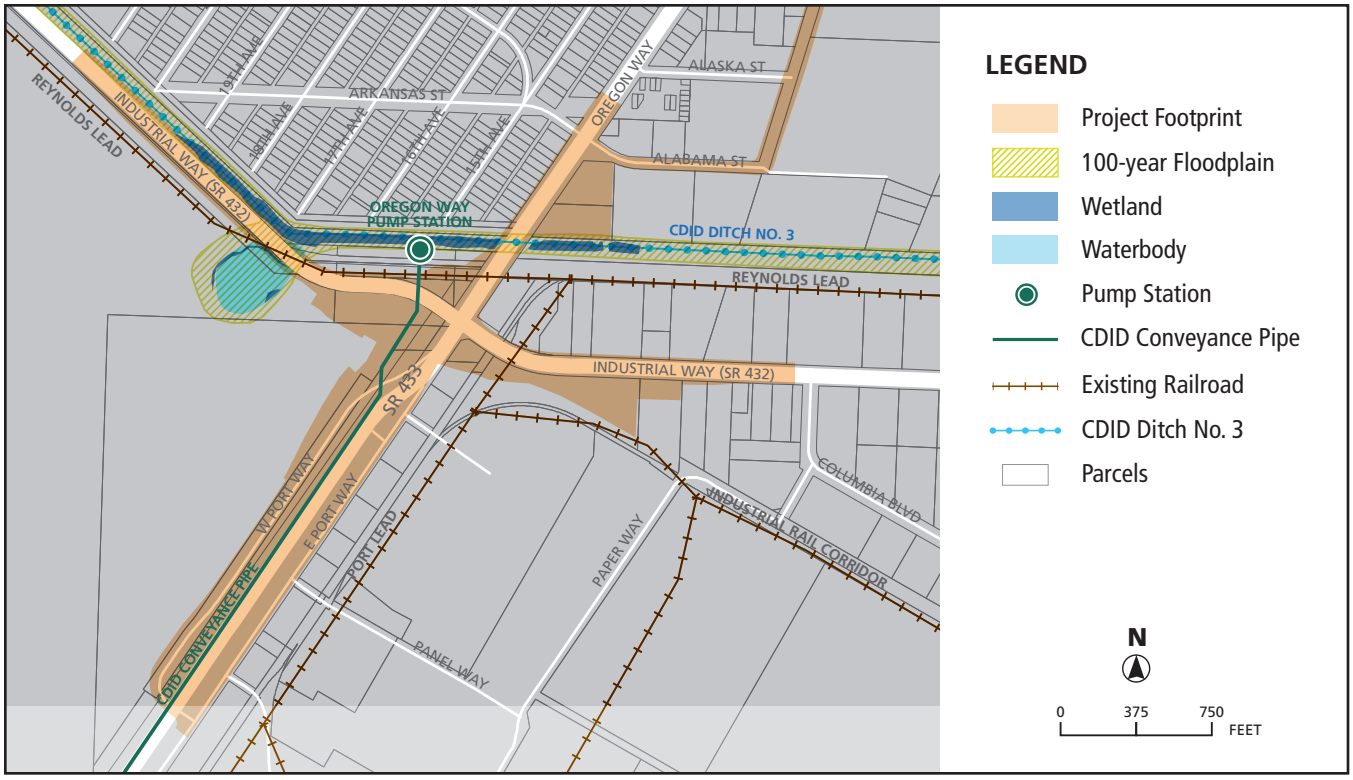


Figure 3-34: Impacts to Water, Wetlands and Floodplains under the PGSB Alternative



3.15 How would the project affect soils and geology?

Existing Conditions

The Industrial Way/Oregon Way intersection is in an area of low-lying floodplain terraces adjacent to the Columbia River with elevations of 5 to 20 feet above sea level. The study area is primarily underlain by alluvium, consisting of silt, sand, and gravel, deposited over bedrock that consists of thin layers of sandstone and siltstone over basalt. The top of bedrock is estimated to be 100 to 150 feet below ground surface. Fill material was placed during the original construction of roadway and railways in the area. Groundwater is 10 feet or less below ground surface in the study area.

Located in a seismically active region that has experienced earthquakes greater than 6.5 magnitude on the Richter scale, the primary geologic hazards in the study area include seismic hazards (ground shaking), soil liquefaction, and soft soils.

Project Impacts and Benefits

There would be no ground disturbance under the No Build Alternative, so no direct or indirect effects to soils and geology would occur. Both the GSA and PGSB Alternatives would include numerous construction activities that would disturb soils, including construction of new bridges with foundations, retaining walls, embankments, surface roadways; soil removal and replacement; vegetation removal; and utility relocations. The total area of disturbance would be slightly higher under the GSA Alternative than under the PGSB Alternative (Table 3-19). This disturbance could result in soil erosion, slope failure, and soil settlement during construction.

Construction of both the GSA and PGSB Alternatives would require placing imported fill on existing ground to create new embankments to support the elevated intersection. Placement of fill could lead to long-term settlement within the project footprint and beyond if soft and compressible soils are present. In areas where settlement-prone soils exist, minimization measures, such as the use of stone or grouted columns or the use of engineered fill, would be used to avoid the detrimental effects.

Indirect impacts of the GSA or PGSB Alternatives could include long-term erosion resulting from the creation of new slopes, slope failure resulting from soil saturation during a large precipitation event, and slope and/or wall failures due to liquefaction of soils during an earthquake.

Table 3-19: Summary of Impacts to Soils and Geology

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
Area of Disturbance	0 acres	51 acres	50 acres

Additional detail on soils and geology is provided in the Soils and Geology Technical Analysis (Appendix N).

3.16 How would the project affect fish, wildlife, and vegetation?

Existing Conditions

Aquatic habitat in the study area is limited and consists of the pond/wetland on the southwest corner of the intersection and CDID Ditch No. 3. Fish protected under the Endangered Species Act (ESA) are found in the Columbia River; however, the pond and CDID Ditch No. 3 are inaccessible to ESA-listed fish because the CDID #1 ditches go through screened weirs, culverts, and detention ponds before reaching the Columbia River.

Vegetation is limited in the study area due to the highly urbanized character of the area, consisting primarily of landscaping alongside the roads and in residential yards, a small area of trees on the southwest corner of the intersection, and some wetland vegetation around the pond. This limited vegetation provides suitable habitat for common species found in urban areas, such as the dark-eyed junco, American robin, racoons, and mice; there is no suitable habitat for ESA-listed wildlife.

Project Impacts and Benefits

The No Build Alternative would have no effect on fish, wildlife, and vegetation in the study area. As summarized in Table 3-20, construction of the GSA or PGSB Alternative may affect, but is not likely to adversely affect 16 populations (8 species) of ESA-listed fish and their designated critical habitat. Water in CDID Ditch No. 3 could become contaminated from construction activities or spills and then drain into the Columbia River, where it could potentially impact these fish; however, proper control measures and best management practices, would make this unlikely to occur. Other fish species are unlikely to be impacted. Some species could be, but are unlikely to be indirectly affected by sediment releases into CDID Ditch No. 3 during replacement of the culverts under Oregon Way, which would elevate water turbidity and could lead to a reduction in juvenile fish's abilities to detect predators and to forage for prey species.

Forested area on southwest corner of Industrial Way/Oregon Way intersection

Construction of the GSA or PGSB Alternative may affect, but is not likely to adversely affect the streaked horned lark, an ESA-listed bird. While no suitable habitat is present in the study area, these birds are present along the Columbia River. An individual bird could travel through the study area, but its exposure to construction activities would be highly unlikely. Construction of these alternatives would not directly or indirectly affect other ESA-listed wildlife or their habitat. ESA consultation with U.S. Fish and Wildlife Service was completed on January 31, 2018, and consultation with the National Marine Fisheries Services was completed on November 29, 2017.

Removal of trees and other vegetation would be required for construction of the GSA or PGSB Alternative, with slightly more tree removal under the GSA Alternative. This vegetation removal, as well as other construction activities that generate noise, dust, and human disturbance could displace common wildlife found in the study area; however, it is likely they could relocate to nearby undisturbed areas, and populations would not be adversely affected.

Table 3-20: Summary of Impacts to Fish, Wildlife, and Vegetation

	NO BUILD ALTERNATIVE	GSA ALTERNATIVE	PGSB ALTERNATIVE
ESA Determination for Fish	Not applicable	» May affect but not likely to adversely affect 16 populations (8 species) of fish and their designated critical habitat » No adverse effect to essential fish habitat	
ESA Determination for Wildlife	Not applicable	» May affect, but not likely to adversely affect 1 bird species » No effect to critical habitat	
Impacts to Vegetation	Existing vegetation retained	Tree, shrub, and groundcover removal; new roadside landscaping	

Additional detail on fish, wildlife, and vegetation is provided in the Biological Assessment (Appendix D).

3.17 How would the project affect air quality?

Existing Conditions

Existing air quality conditions in the study area are a result of residential, commercial, and industrial development and associated rail, vessel, and vehicular traffic that has occurred over time. Freight trucks comprise approximately 20 percent of the vehicle mix traveling through the Industrial Way/Oregon Way intersection; these trucks and the other vehicles are major contributors to air pollution. The project is in an area that currently meets the Clean Air Act's National Ambient Air Quality Standards (NAAQS) for criteria pollutants and is classified as "in attainment." The main criteria pollutants emitted from motor vehicles are carbon monoxide (CO), particulate matter less than 10 micrometers in size (PM_{10}), particulate matter less than 2.5 micrometers in size ($PM_{2.5}$), and ozone precursors (NO_X). In addition, mobile source air toxics (MSATs), which are compounds that are among national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors, are present in vehicle emissions.

Project Impacts and Benefits

Air quality under the No Build Alternative would benefit from improved vehicle technology. Even with an increase in vehicle traffic and the high percentage of truck traffic (which is expected to remain the same), MSATs are expected to be reduced dramatically in the future as a result of cleaner fuels and cleaner engines. In combination with these technological advances, the GSA and PGSB Alternatives would improve future traffic conditions, resulting in a small reduction in pollutant emissions through reduced travel time and intersection delays (Table 3-21). In addition, improved vehicle technology would aid in reducing vehicle emissions. Air quality conditions under all three alternatives would remain below the NAAQS, so the area would continue to be in "attainment." Construction-related air quality impacts for the GSA or the PGSB Alternative would be temporary and primarily due to emissions (CO, $PM_{2.5}$, and NO_X) from heavy-duty construction equipment (e.g., cranes, excavators), diesel-fueled vehicles (e.g., trucks, sweepers), diesel- and gasoline-fueled generators, and project-related vehicles (e.g., worker trips, service trucks). Earthwork could create fugitive dust (PM_{10}).

Residential, commercial, and industrial uses surrounding the Industrial Way/Oregon Way intersection

Table 3-21: Summary of Impacts and Benefits to Air Quality

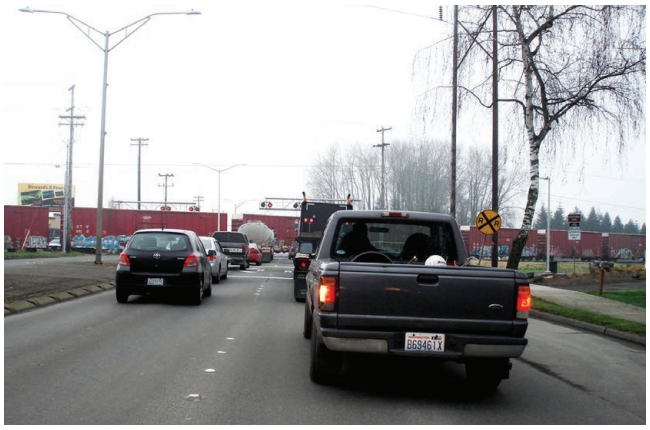
	NO BUILD ALTERNATIVE Compared to existing conditions	GSA ALTERNATIVE Compared to No Build	PGSB ALTERNATIVE Compared to No Build
Construction Impacts	Not applicable	Temporary emissions (CO, $PM_{2.5}$, NO_X) from construction equipment, vehicles; dust from earthwork (PM_{10})	
Pollutant Emissions (2040)	Reduced emissions from: » Improved vehicle technology	Reduced emissions from: » Travel time reduction » 40% reduction of congestion-related delay » Improved vehicle technology	Reduced emissions from: » Travel time reduction » 60% reduction of congestion-related delay » Improved vehicle technology
NAAQS Classification	In attainment	In attainment	In attainment

Additional detail on air quality is provided in the Air Quality Technical Analysis (Appendix C).

3.18 How would the project affect energy and greenhouse gas?

Existing Conditions

Energy is required to move people and goods from place to place. Transportation is one of the highest demands of energy use in Washington State and this demand continues to grow as intermodal connectivity and use of roadways, railways, and waterways increases. Vehicles are a significant source of greenhouse gas emissions primarily through the burning of gasoline and diesel fuels. In Washington State, transportation accounts for nearly half of the state's greenhouse gas emissions.



Traffic at the Industrial Way/Oregon Way intersection; congestion increases energy use and greenhouse gas emissions.

Project Impacts and Benefits

The No Build Alternative would involve routine maintenance activities that consume energy and produce greenhouse gas emissions. Both the GSA and PGSB Alternatives would reduce traffic congestion resulting in less vehicular delay, increased traffic flow, and lower greenhouse gas emissions than the No Build Alternative (Table 3-22). These emissions would be slightly lower under the PGSB Alternative than under the GSA Alternative because the PGSB Alternative would result in less vehicular delay. Construction of the GSA or PGSB Alternative would require energy to operate construction equipment, produce construction materials, and conduct routine maintenance. Construction of the PGSB Alternative would require slightly more energy and produce slightly more greenhouse gas emissions than the GSA Alternative, which is based on the FHWA emissions model that takes roadway surface area and construction detour durations into account. Construction of either alternative would not adversely affect the continued availability of energy because the scale of energy consumption for project construction is negligible when compared to energy production in Washington, the United States, or globally.

Indirect effects on energy and greenhouse gases could result from production and disposal of materials used during construction of the GSA or PGSB Alternative, but these effects are anticipated to be minimal.

Table 3-22: Yearly AM and PM Peak Operational Energy Consumption and Greenhouse Gas (CO_2e) Emissions

	NO BUILD ALTERNATIVE		GSA ALTERNATIVE		PGSB ALTERNATIVE	
	Maintenance (over 20 years)	Operation (2040)	Construction and Maintenance (over 20 years)	Operation (2040)	Construction and Maintenance (over 20 years)	Operation (2040)
Energy Consumption (million British Thermal Units [mBTU]/year)	156	187,738	3,142	165,487	3,159	158,534
Greenhouse Gas Emissions (CO_2e) (metric tons/year)	11	13,216	216	11,627	216	11,095

Additional detail on energy and greenhouse gas is provided in the Energy and Greenhouse Gas Technical Analysis (Appendix G).

3.19 What cumulative effects were considered?

Analysis of Cumulative Effects

Under NEPA, cumulative effects result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the action. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative effects include past, present, and reasonably foreseeable future actions within the study area that, together with the proposed project, may have a cumulative effect on the environment. Past and present actions affecting environmental resources are reflected in the existing conditions of the proposed project. Reasonably foreseeable future actions include those that are being implemented or have been implemented recently, including planned and funded transportation improvements, and other local and regional infrastructure proposals.

The analysis of cumulative effects helps decision-makers and the public know whether there are incremental changes to a given resource which could, if left unmitigated, reach significant proportions.

In identifying and analyzing potential cumulative effects, FHWA, WSDOT, and Cowlitz County used guidance provided in Chapter 412 of WSDOT's Environmental Manual (2016) and the eight-step process outlined in joint guidance issued by WSDOT, FHWA Washington Division, and the U.S. Environmental Protection Agency Region 10, entitled, Guidance on Preparing Cumulative Impact Analyses (2008). The Cumulative Effects Discipline Report (Appendix F) describes the methodology used to identify and analyze potential cumulative effects from this project.

Historical and Present Context (Including Reasonably Foreseeable Actions)

The cumulative effects study area includes the traditional area of the Chinook and Cowlitz peoples, whose first contact with the Euroamerican world began in the late eighteenth century and increased as explorers came to the Columbia River more frequently to trade for furs, metal goods, guns, and other items. Over the past century, the study area and surrounding area has been urbanized and industrialized, resulting in the waterfront undergoing dramatic physical modifications to connect road and rail-based industries with marine transport on the Columbia River. The beginning of major Euroamerican settlement in the project vicinity occurred in 1849 when a community called Monticello was established, but was soon destroyed by floods in 1867. Development in the area was re-initiated in the early 1900s. R.A. Long and the Long-Bell Timber Company bought out farmers and landowners near its selected lumber mill site along the Columbia River to make way for a professionally planned and privately financed city, named Longview, to support the mill. Residential areas were organized into socially stratified neighborhoods separated by large tracts of land. A system of dikes and levees was built around the city perimeter for reclamation and flood control. The City of Longview was incorporated in February 1924.

Long-Bell Timber Company Industrial Development, 1924 (Courtesy UW Special Collections WAS0545)

In 1929, the Weyerhaeuser Timber Company finished constructing a sawmill with 2 miles of Columbia River waterfront. Multiple railroads in the area were also built in the 1920s, including the Longview, Portland, and Northern Railway, to serve the growing industrial infrastructure along the banks of the Columbia River. The Port of Longview began operations in 1921 as the first full-service operating port on the Columbia River. The Longview Bridge (currently referred to as the Lewis and Clark Bridge) was built in 1929, connecting Longview to the Oregon side of the Columbia River. In the early 1940s, the Reynolds Metals Company opened a large aluminum processing plant in Longview. A lead (currently referred to as the Reynolds Lead) from the Longview, Portland, and Northern Railway serviced the plant.

In 1995, to further encourage industrial land development and diversification from the timber industry, the City of Longview acquired a 435-acre site for development of the Mint Farm Industrial Park. Much of the site's buildable land today has been sold or is pending sale to various industries. The Port of Longview constructed the IRC in 2004 to provide direct access to the Port property from the nearby BNSF Railway mainline. Completed in 2010, the Columbia River's 40-foot shipping channel was deepened by 3 feet to enable larger ship navigation access and the economic benefits of waterborne commerce. This channel deepening made new business possible for the Port of Longview and adjacent waterfront properties, including the Export Grain Terminal.

Commerce Avenue, Longview, 1924
(Courtesy UW Special Collections WAS0191)

Population and employment growth in the City of Longview, Cowlitz County, and Southwest Washington is expected to remain slow but steady in the coming decades. To address this growth, future projects and developments are in various stages of planning and implementation. Information about current and reasonably foreseeable future actions in the area was collected as part of this analysis. Reasonably foreseeable future actions include recently-implemented actions and actions that will be implemented, such as planned and funded transportation improvements and other local infrastructure proposals.

Figure 3-35 identifies the projects that comprise other current and reasonably foreseeable actions within the cumulative effects study area that could affect environmental and community resources. Of note are several large-scale industrial development projects including Millennium Bulk Terminals—Longview, the Port of Longview's Barlow Point property, and further build-out of the City's Mint Farm Industrial Park; various rail improvements and extensions; and construction of the Columbia Crossing Shopping Center in Rainer, Oregon. As described in Section 1.1 and under the No Build Alternative in Section 2.1, these projects are independent of the Industrial Way/Oregon Way Intersection Project and are planned for construction regardless of whether or not the Industrial Way/Oregon Way Intersection Project is built. Further, the Industrial Way/Oregon Way Intersection Project is needed to address the increasing vehicle demand and resulting congestion that degrades emergency response times, impairs freight truck movement, and decreases safety today and would increasingly worsen over time regardless of whether or not the planned future industrial development projects are constructed, as explained in Section 1.2 and analyzed in Section 1.3 (Table 3-1 and Table 3-3 'no train' scenarios). Therefore, this cumulative effects analysis considers the planned industrial development in the study area and the corresponding increased rail service that would result in more roadway blockages, which would exacerbate traffic congestion, reduced travel time reliability, and decreased safety at the Industrial Way/Oregon Way Intersection.

Results of the Cumulative Effects Analysis

The GSA and PGSB Alternatives are designed to meet WSDOT and FHWA environmental stewardship guidance as well as to comply with all environmental laws. The project improves the Industrial Way/Oregon Way intersection, an economically-critical junction within the Washington-Oregon bistate trade corridor. All reasonable measures to minimize adverse effects have been incorporated into the project design. The measures combine avoidance, minimization, mitigation, and enhancement. An example of enhancement is the project's addition of pedestrian and bicycle facilities that improve connectivity and linkages between the Highlands Neighborhood and nearby services and jobs, which contributes a beneficial cumulative effect on community connectivity. The analysis finds that the GSA and PGSB Alternatives, together with past, present, and reasonably foreseeable future actions, would have only minor contributions to cumulative effects on some natural and community resources in the study area. As a result, no mitigation for cumulative effects is recommended.

The results of the analysis for each resource are summarized in Table 3-23, which uses the categories of other current and reasonably foreseeable actions from Figure 3-35 as a basis of analysis. Table 3-23 then summarizes the project's direct and indirect impacts and the resulting project contribution to cumulative effects when combined with other current and reasonably foreseeable projects. Differences in the direct and indirect impacts between the GSA and PGSB alternatives are very minor, as demonstrated in Chapter 3, with very limited contributions to cumulative effects so both alternatives are described together in Table 3-23.

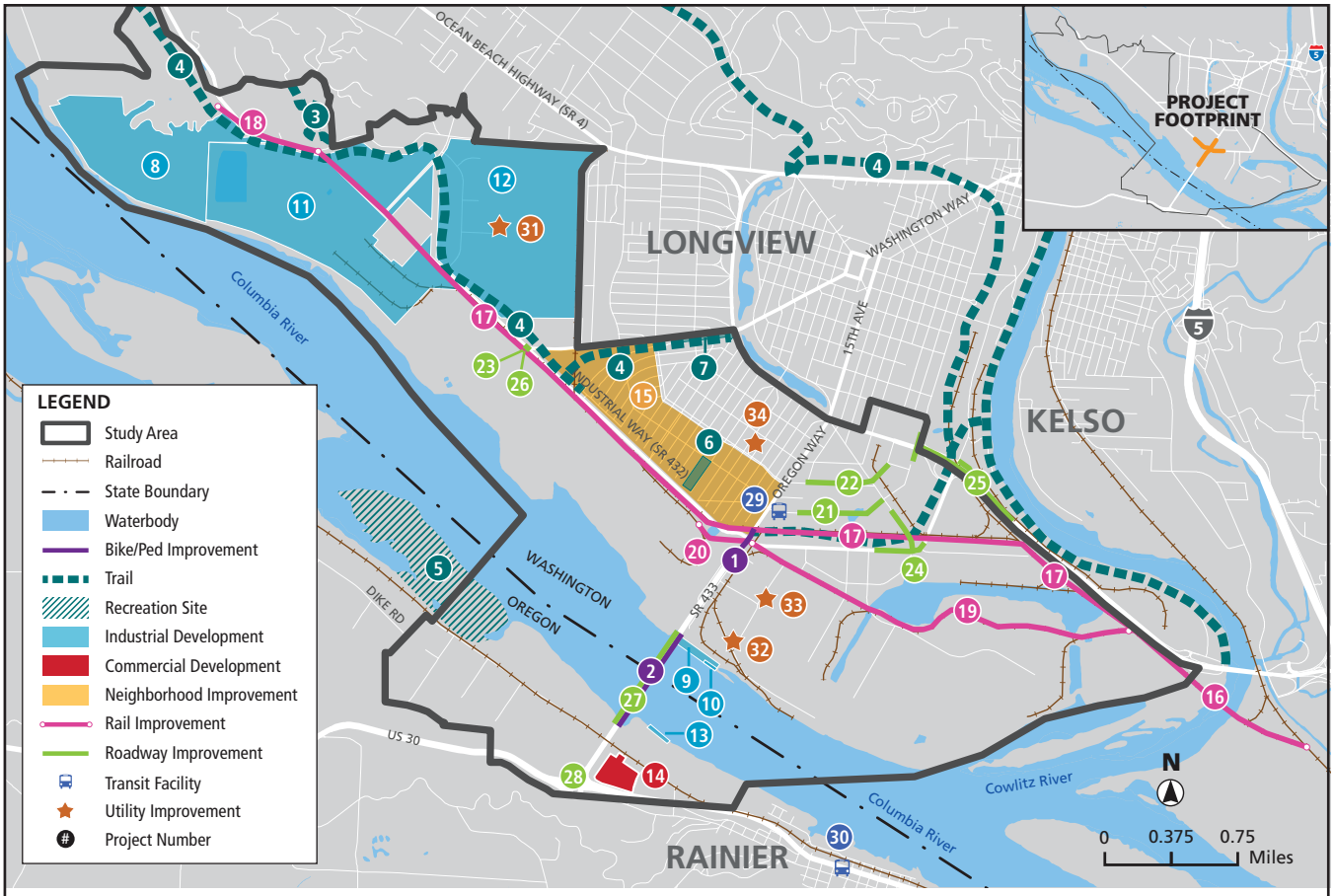
Mitigation Measures Considered

The GSA and PGSB Alternatives would result in long-term improvements to transportation and would further the goals of regional and local land use and transportation plans. Overall, operations of the project would result in minor contributions to cumulative effects on some resources and, therefore, no mitigation is proposed.

Climate Change and Extreme Weather Risks

All of WSDOT's major capital projects undergoing environmental review consider climate change and extreme weather events as part of the agency's strategic plan commitment. The project team examined available information about climate trends and the results of WSDOT's assessment of vulnerable infrastructure. WSDOT is aware that past trends for a specific resource (water, habitat, air) may not be accurate predictions for the future. Instead, we need to look at scientifically-based projections of the changing climate as part of our analysis of cumulative effects.

Figure 3-35: Other Current and Reasonably Foreseeable Actions



REASONABLY FORESEEABLE PROJECTS

BICYCLE/PEDESTRIAN IMPROVEMENTS

1. Sidewalks along SR 432 near Industrial Way
2. Sidewalks on Lewis and Clark Bridge

RECREATION IMPROVEMENTS

3. Solo View Drive Trail
4. Diking District Trails
5. Dibblee Point Developed Recreational Site
6. Archie Anderson Park Redesign and Redevelopment
7. Cloney Park Redevelopment

INDUSTRIAL DEVELOPMENT

8. Barlow Point Development
9. Berth 1 and 2, Warehouse Complex Redevelopment
10. Berth 4 Redevelopment
11. Millennium Bulk Terminals—Longview
12. Mint Farm Industrial Park
13. Teevin Brothers Mooring Dolphins Construction

COMMERCIAL DEVELOPMENT

14. Columbia Crossing Shopping Center

NEIGHBORHOOD IMPROVEMENTS

15. Highlands Revitalization Plan Projects

RAIL IMPROVEMENTS

16. BNSF Spur Improvements
17. Reynolds Lead Upgrades
18. Rail Extension to Barlow Point
19. Industrial Rail Corridor Improvements
20. Industrial Rail Corridor Extension

ROADWAY IMPROVEMENTS

21. Alabama Street Connector
22. Beech Street Connector
23. Grade-separated SR 432 at Washington Way
24. Improvements at California Way/Industrial Way Intersection
25. Improvements at the SR 432/SR 411 Interchange
26. SR 432/Washington Way Signal Replacement
27. Lewis and Clark Bridge Navigation Light Replacement Project
28. US 30 Congestion Improvements at Lewis and Clark Bridge

TRANSIT IMPROVEMENTS

29. River Cities Transit Facilities Improvements
30. Transit Center in downtown Rainier

UTILITY IMPROVEMENTS

31. Mint Farm Groundwater Project
32. Stormwater Improvements
33. Wastewater Improvements
34. 2017 Water Line Replacement

The results of WSDOT's Climate Impact Vulnerability Assessment (WSDOT 2011) show the Industrial Way/Oregon Way intersection to be of low vulnerability to climate-related threats. The project may experience extreme wind, rain, and snow storms and more days of extreme heat expected from regional changes in climate, but the area of the project footprint appears resilient to future climate-related effects. The project would be located out of the zone for potential impacts from sea-level rise, but a portion of the project footprint is within the 100-year floodplain. To reduce the likelihood of localized flooding, the project would include elements that address stormwater flow.

Additional detail on cumulative effects is provided in the Cumulative Effects Discipline Report (Appendix F).

Table 3-23: Summary of Cumulative Effects Analysis Results

TRANSPORTATION	
Past Trends That Led to Current Conditions	» Early industrial development established Longview as a key transportation hub » Intermodal corridors developed for rail, ship, and truck modes, which increased freight movement through study area » Transit services in the Longview area began in the 1930s » Deepening of Columbia River channel resulted in enhanced navigation access and waterborne commerce to the Port of Longview » Population and employment growth in the study area increased, which contributed to vehicle congestion at the Industrial Way/Oregon Way intersection
Other Actions Likely to Contribute to Cumulative Effects	» Population and employment growth would cause traffic volumes to continue increasing » Roadway improvements would improve traffic operations by expanding the local street network, adding capacity or improving operational efficiencies at high-volume locations, or grade-separating other rail/roadway crossings » Industrial development and associated rail improvements would result in additional rail service and roadway blockages at the at-grade rail/roadway crossings, as well as additional freight truck and employee vehicle trips » Commercial development could change traffic patterns and/or create additional trips for employees, customers, and freight trucks, resulting in more congestion
Project Direct and Indirect Effects *Compared to No Build*	» Reduced intersection congestion and queuing » 40% to 60% reduction in delay » Improved travel reliability and travel times » Improved on-time bus performance due to decreased congestion and increased travel time reliability
Project Contribution to Cumulative Effects	**Positive contribution** to cumulative effects on transportation
ROADWAY SAFETY AND EMERGENCY RESPONSE	
Past Trends That Led to Current Conditions	» Regional growth, development, and increased traffic volumes over time in the study area contributed to increased congestion that adversely affects roadway safety and emergency response times
Other Actions Likely to Contribute to Cumulative Effects	» Population and employment growth would result in additional congestion and increased risk-taking behaviors by drivers, which would likely result in more frequent crashes » Industrial development and associated rail improvements would result in additional rail service and roadway blockages at the at-grade rail/roadway crossings, blocking emergency response routes
Project Direct and Indirect Effects *Compared to No Build*	» Likely reduction in vehicle crashes » Elimination of all or most vehicle-train conflicts » Improved response times » No critical emergency response routes blocked when trains are present
Project Contribution to Cumulative Effects	**Positive contribution** to cumulative effects on roadway safety and emergency response

PEDESTRIAN AND BICYCLE TRAVEL	
Past Trends That Led to Current Conditions	» Early planning and development in the study area focused on rail, truck, and automobile travel » Early city planning geographically separated residential areas from industrial and commercial employment areas » More recent city and county planning and funding has been committed to improving pedestrian and bicycle infrastructure, such as the Highlands Trail
Other Actions Likely to Contribute to Cumulative Effects	» Bicycle/pedestrian and recreation improvements would improve connectivity of sidewalks and trails » Industrial development and associated rail improvements would result in additional rail service and roadway, sidewalk and bike lane blockages at the at-grade rail/roadway crossings, blocking and delaying pedestrian and bicycle movements on sidewalks, trails, paths, and roadway shoulders » Commercial development would likely include on-site sidewalks and bicycle parking » Roadway improvements would add sidewalks to facilities where they are not present
Project Direct and Indirect Effects *Compared to No Build*	» Improved facilities, including improved Americans with Disabilities Act (ADA)-compliant pedestrian crossings and additional sidewalks » Enhanced non-motorized safety from more contiguous connectivity » Improved north-south connectivity for pedestrians and bicyclists » Potential out-of-direction travel for pedestrians and bicyclists
Project Contribution to Cumulative Effects	**Positive contribution** to cumulative effects on pedestrian and bicycle travel
ENVIRONMENTAL JUSTICE POPULATIONS	
Past Trends That Led to Current Conditions	» The smaller home sizes and proximity to industrial land uses helped establish the Highlands and St. Helens Neighborhoods as some of the most affordable in the Longview area, supporting traditionally underserved populations, including environmental justice populations, now residing in the study area
Other Actions Likely to Contribute to Cumulative Effects	» Neighborhood and recreation improvements would improve housing conditions, crime prevention, expand access to economic opportunities and resources, and enhance available amenities for residents » Industrial development and associated rail improvements would result in additional rail service and roadway blockages at the at-grade rail/roadway crossings, resulting in increased congestion and delay and reduced travel reliability for residents and employees » Industrial and commercial development could provide employment opportunities » Roadway, transit, and bicycle/pedestrian improvements would improve residents' ability to travel to/from destinations using various modes of travel
Project Direct and Indirect Effects *Compared to No Build*	» Displacement of 3 to 4 minority-owned business (out of the 7 to 10 business displacements) » Of the employees who would be displaced with businesses, up to approximately 24% are racial minorities (non-white), 11% are Hispanic/Latino, and 49% are low-income » Disproportionately high and adverse impact on an area with low-income and minority populations » Reduced delay associated with congestion, improved safety, enhanced bicycle and pedestrian facilities, and improved travel time reliability
Project Contribution to Cumulative Effects	**Minor adverse contribution** to cumulative effects on environmental justice populations, including displacement of minority-owned businesses and their employees **Positive contribution** to cumulative effects that enhance safety and improve travel time reliability, which benefit environmental justice populations

SOCIAL AND ECONOMIC ELEMENTS	
Past Trends That Led to Current Conditions	» Local and regional economy built upon industry and manufacturing that leveraged the rail, interstate highway, and marine transportation network » Early city planning geographically separated residential areas from industrial and commercial employment areas » Deepening of Columbia River channel resulted in enhanced navigation access and waterborne commerce to the Port of Longview » For the last 20 years, Cowlitz County and Columbia County unemployment rates stayed about 2 percent above national average
Other Actions Likely to Contribute to Cumulative Effects	» Neighborhood and recreation improvements would improve housing conditions, crime prevention, expand access to economic opportunities and resources, and enhance available amenities for residents » Industrial development and associated rail improvements would result in additional rail service and roadway blockages at the at-grade rail/roadway crossings, resulting in increased congestion and longer travel times for residents, employees, customers, and freight trucks, potentially reducing business vitality » Industrial and commercial development would provide jobs and increase economic activity » Roadway, transit, and bicycle/pedestrian improvements would improve residents' ability to travel to/from destinations using various modes of travel
Project Direct and Indirect Effects *Compared to No Build*	» Displacement of 7 to 10 businesses » No residential displacements » Up to 1.3 miles out-of-direction travel for 12 residences south of Alabama Street » Reduced delay associated with congestion, improved safety, enhanced bicycle and pedestrian facilities, and improved travel time reliability » Low to moderate security concern for pedestrian and bicycle travel beneath new structures » Permanent change to some residents' views
Project Contribution to Cumulative Effects	**Minor adverse contribution** to cumulative effects on businesses and residents, such as business displacements, out-of-direction travel, security concerns, and changes to some views **Positive contribution** to cumulative effects on residents and businesses, such as reduced congestion, improved safety, enhanced bicycle and pedestrian facilities, and improved travel time reliability
VISUAL RESOURCES	
Past Trends That Led to Current Conditions	» Large-scale industrial development and construction of a flood management system led to the present urbanized appearance of the study area
Other Actions Likely to Contribute to Cumulative Effects	» Industrial and commercial development, as well as rail, roadway, recreation, and neighborhood improvements would continue to urbanize the area and add elements to the built environment » Industrial development and associated rail improvements would result in additional rail service and roadway blockages at the at-grade rail/roadway crossings with visual changes of additional traffic congestion, traffic queuing, and activation of gates and signals for each crossing
Project Direct and Indirect Effects *Compared to No Build*	» Less frequent views of traffic queuing and congestion associated with train crossings and resulting roadway blockages » New visually dominant structure from the elevated intersection » New views of surrounding hills and industrial properties for travelers on the elevated intersection » Adverse impact to views for residents adjacent to the elevated intersection
Project Contribution to Cumulative Effects	**Minor adverse contribution** to cumulative effects on visual resources

HISTORIC AND ARCHAEOLOGICAL RESOURCES	
Past Trends That Led to Current Conditions	» Since around 10,500 BCE, the Chinook and Cowlitz peoples resided in the area and employed highly mobile foraging strategies based on hunting large game, fishing, and gathering » The Hudson's Bay Company established the Euroamerican presence in the area by the 1820s when they engaged in salmon trade along the Lower Columbia » The City of Longview was established in the 1920s and led to subsequent development and construction of transportation and flood control infrastructure (diking system) » Over time, the City of Longview continued to develop and modernize, gradually altering or removing some of the historic properties in the study area
Other Actions Likely to Contribute to Cumulative Effects	» Industrial and commercial development, as well as rail, roadway, recreation and neighborhood improvements could result in adverse effects to (including removal of) historic and archaeological resources » Efforts to preserve, interpret, and celebrate the area's history will continue
Project Direct and Indirect Effects *Compared to No Build*	» No adverse effect to the two historic resources » *De minimis* impact to the two Section 4(f) historic properties
Project Contribution to Cumulative Effects	**No contribution** to cumulative effects on historic and archeological resources
PARKS AND RECREATION	
Past Trends That Led to Current Conditions	» From its onset in the early 1920s, the professionally planned and privately financed City of Longview included deliberate investment in parks and recreation » Longview continued to invest in parks and recreation, including the Highlands Trail constructed in 2011
Other Actions Likely to Contribute to Cumulative Effects	» Recreation improvements would improve the network of recreation facilities available in the area » Bicycle/pedestrian improvements could improve accessibility and connectivity to park and recreation facilities » Neighborhood improvements » Rail, roadway, and bicycle/pedestrian improvements, as well as industrial and commercial development could affect park and recreation resources with changes to the setting (noise, air quality, visual changes), property acquisitions, or access changes
Project Direct and Indirect Effects *Compared to No Build*	» No change to existing trails or future trail connections » *De minimis* impact to one Section 4(f) recreation property
Project Contribution to Cumulative Effects	**No contribution** to cumulative effects on parks and recreation

RAILROADS AND PUBLIC UTILITIES	
Past Trends That Led to Current Conditions	» Multiple rail lines built in the early- and mid-1900s served the growing industrial infrastructure along the banks of the Columbia River » Public utilities evolved to meet the needs of development in the study area
Other Actions Likely to Contribute to Cumulative Effects	» Industrial development would likely increase rail service, resulting in demand for rail improvements – including upgrades to existing rail facilities and additional facilities » Commercial and industrial development, as well as roadway and rail improvements would likely involve ground disturbance and could impact existing public utilities » Utility improvements typically include minor improvements, repairs, and routine maintenance over time as these facilities age
Project Direct and Indirect Effects *Compared to No Build*	» Reduced risk of rail-vehicle conflicts » Partially or fully grade-separated roadways and railroads » No change to rail capacity, operating speeds, or services » Realigned segment of Reynolds Lead (GSA Alternative only) » Relocation of some public utilities » Extended or replaced CDID Ditch No. 3 culverts under Oregon Way
Project Contribution to Cumulative Effects	**No contribution** to cumulative effects on railroads and public utilities
LAND USE AND DEVELOPMENT	
Past Trends That Led to Current Conditions	» Since the early 1900s, industrial development in the study area modernized and expanded over time » Land in the study area is predominately zoned industrial, commercial, and residential
Other Actions Likely to Contribute to Cumulative Effects	» Industrial and commercial development would result in conversion of vacant lands and/or redevelopment in accordance with City and County zoning ordinances
Project Direct and Indirect Effects *Compared to No Build*	» Permanent easements on 2 parcels » 12 to15 parcels with potential full acquisitions and 21 to 26 parcels with potential partial acquisitions comprising 14 to 19 acres converted to public right-of-way » Displacement of 7 to 10 businesses, 2 to 3 billboards, and 1 cell/radio tower
Project Contribution to Cumulative Effects	**Minimal adverse contribution** to cumulative effects on land use and development
HAZARDOUS MATERIALS	
Past Trends That Led to Current Conditions	» The study area's history of industrial land uses led to the presence of hazardous materials that leaked from tanks and/or accumulated over a long period of time
Other Actions Likely to Contribute to Cumulative Effects	» Industrial and commercial development, as well as rail, roadway, and utility improvements would likely involve ground disturbance that could result in exposure to existing contamination; these types of actions would also likely clean-up existing contamination » Industrial and commercial development could create new facilities that use or transport hazardous materials, potentially creating new sites of concern
Project Direct and Indirect Effects *Compared to No Build*	» Acquisitions and/or easements from 11 of the 15 sites of concern » Contaminated soil removal or uncovering during construction » Remediation of hazardous materials from acquired land and disturbed sites » Addition of stormwater and water quality treatment to remove pollutants from traffic operations
Project Contribution to Cumulative Effects	» **Positive contribution** to cumulative effects on hazardous materials

NOISE LEVELS	
Past Trends That Led to Current Conditions	» Residential, commercial, and industrial development over time, and resulting vehicle congestion, led to noise typical of an urbanized area » Existing noise levels (55–65 decibels) are close to exceeding the FHWA's Noise Abatement Criteria (NAC) as a result of this urbanization occurring adjacent to residential areas
Other Actions Likely to Contribute to Cumulative Effects	» Land use changes, population growth, and increased traffic volumes over time would result in increased noise levels » Industrial development and associated rail improvements would result in additional rail service, increasing noise and vibration levels along rail corridors; these projects could implement a Quiet Zone (if approved by the Federal Railroad Administration) to reduce noise at at-grade crossings » Roadway improvements that grade-separate rail/roadway crossings would reduce noise by avoiding the need for train horns at those crossings
Project Direct and Indirect Effects *Compared to No Build*	» Noise levels between 59–69 decibels » Noise impacts (above 66 decibels) experienced by residences would be reduced from 32 to 20 residences » Noise impacts (above 66 decibels) no longer experienced by the Highlands Trail (PGSB Alternative only)
Project Contribution to Cumulative Effects	**No contribution** to cumulative effects on noise levels
SURFACE WATER, WETLANDS, AND FLOODPLAINS	
Past Trends That Led to Current Conditions	» Urban development of the study area required reclamation and flood control, including a system of dikes, levees, and stormwater collection sloughs, ditches, and drains, dramatically modifying the area's natural hydrology
Other Actions Likely to Contribute to Cumulative Effects	» Roadway and rail improvements, as well as industrial and commercial development could require in-water work, wetland fill, or increase impervious surface and stormwater runoff, potentially altering surface water, wetlands, and floodplains
Project Direct and Indirect Effects *Compared to No Build*	» Minor fill in pond with no net rise to floodplain » Creation of approximately 22 acres of impervious surface area » Treatment of stormwater would increase from 0–5% to 60–75% of impervious surface » Impacts to less than 1.0 acre of wetland, 1.0–2.0 acres of wetland buffer, and less than 0.5 acre of open water
Project Contribution to Cumulative Effects	**Negligible adverse contribution** to cumulative effects on wetlands and floodplains **Positive contribution** to cumulative effects on surface water
SOILS AND GEOLOGIC RESOURCES	
Past Trends That Led to Current Conditions	» Historic Missoula floods deposited rich top soil onto western Washington, resulting in primarily alluvium soils over bedrock in the study area » Development beginning in the early 1900s placed fill material for construction of the original roadways and railways » Soil liquefaction and lateral spreading are the main geologic hazards in the area
Other Actions Likely to Contribute to Cumulative Effects	» Rail, roadway, and utility improvements, as well as industrial and commercial development would likely require in ground disturbance activities, disturbing soils and geologic resources
Project Direct and Indirect Effects *Compared to No Build*	» Disturbance of 50 to 51 acres » Placement of fill to create new embankments
Project Contribution to Cumulative Effects	**No contribution** to cumulative effects on soils and geologic resources

WILDLIFE, FISH, AND VEGETATION	
Past Trends That Led to Current Conditions	» Urban development of the study area over time resulted in limited wildlife, fish, vegetation, and habitat
Other Actions Likely to Contribute to Cumulative Effects	» Industrial and commercial development could convert vacant lands, reducing limited habitat in the area; these projects could also include habitat enhancement or mitigation » Roadway, rail, and recreation improvements, as well as industrial and commercial development could require in-water work, potentially modifying terrestrial and aquatic habitat
Project Direct and Indirect Effects *Compared to No Build*	» May affect but not likely to adversely affect 16 populations (8 species) of fish and their designated critical habitat » No adverse effect to essential fish habitat » May affect, but not likely to adversely affect one bird species » No effect to critical habitat » Removal of tree, shrub, and groundcover » Addition of new roadside landscaping
Project Contribution to Cumulative Effects	**Negligible adverse contribution** to cumulative effects on wildlife, fish, and vegetation
AIR QUALITY	
Past Trends That Led to Current Conditions	» Residential, commercial, and industrial development and associated rail, vessel, and vehicular traffic over time contributed to air pollution in the study area » Cleaner fuel and improved engine technology over time reduced individual vehicle emissions
Other Actions Likely to Contribute to Cumulative Effects	» Industrial development and associated rail improvements would result in additional rail service, leading to degraded air quality and increased emissions of diesel particulate matter and increased cancer risk » Population and employment growth would cause vehicular traffic volumes to continue growing, leading to increased congestion with more vehicle idling and emission of criteria pollutants from motor vehicles » Roadway improvements would improve traffic operations, reducing vehicle idling and emissions » Advances in vehicle technology and cleaner fuels would reduce vehicle emissions in the future
Project Direct and Indirect Effects *Compared to No Build*	» Reduced emissions from improved travel time, 40–60% reduction of congestion-related delay, and improved vehicle technology » No change to National Ambient Air Standards (NAAQS) "in attainment" classification
Project Contribution to Cumulative Effects	**Positive contribution** to cumulative effects on air quality
ENERGY USE AND GREENHOUSE GAS	
Past Trends That Led to Current Conditions	» Energy used for transportation in Washington increased over time as a result of population growth and expansion of the transportation network
Other Actions Likely to Contribute to Cumulative Effects	» Population and employment growth would cause traffic volumes and vehicle emissions to continue increasing » Industrial and commercial development, as well as rail, roadway, bicycle/pedestrian, recreation, neighborhood, transit, and utility improvements would require energy for construction and operation, resulting in greenhouse gas emissions
Project Direct and Indirect Effects *Compared to No Build*	Reduced traffic congestion, less vehicular delay, increased traffic flow, and lower greenhouse gas emissions resulting in: » Decreased total estimated operational energy consumed by 22,000–29,000 mBTU per year » Decreased total estimated emissions by 1,600–2,100 metric tons of CO_2e per year » Decreased total estimated gallons of gasoline used by 180,700–240,500 gallons per year
Project Contribution to Cumulative Effects	**Minimal adverse contribution** to cumulative effects on energy consumption **Positive contribution** to cumulative effects on greenhouse gas emissions

3.20 What other effects from the project were considered?

Irreversible and Irretrievable Commitments of Resources

Implementing the proposed action involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed transportation facility is considered an irreversible commitment during the time that the land is used for the transportation facility. However, if a greater need arises for use of the land or if the transportation facility is no longer needed, the land could be converted to another use. At present, there is no reason to believe that it would ever be necessary or desirable to convert land used for this transportation project to another use.

Considerable amounts of fossil fuels, labor, and highway construction materials, such as cement, aggregate, and bituminous material, would be expended during construction of the proposed action. Additionally, large amounts of labor and natural resources are used in the making of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse impact upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of both state and federal funds, which are not retrievable. The commitment of these resources is based on the concept that residents, businesses, and economies in the local area, region, and state would benefit from the improved quality of the transportation system. These benefits would consist of improved automobiles, truck freight, and emergency service mobility and safety, which are expected to outweigh the commitment of these resources, such as savings in energy and time, reduced congestion, and fewer accidents. In addition to the costs of construction and right-of-way acquisition, there would be costs for roadway maintenance, including pavement, roadside, litter/sweeping, signs and markers, electrical systems, and stormwater facilities.

The GSA and PGSB Alternatives would commit the same types and amounts of irreversible and irretrievable resources.

Tradeoffs between Short-Term use of Environmental Resources and Long-Term Gains

The GSA and PGSB Alternatives would have similar temporary, short-term impacts during construction. Short-term impacts and use of resources resulting from either build alternative could include the following:

- Noise, dust, light, and glare produced by construction equipment and activities
- Traffic delays and detours for automobiles, freight trucks, buses, emergency response vehicles, bicyclists, and pedestrians
- Use of materials, labor, and energy to construct improvements
- Changes in access to properties during construction
- Reduced visibility, dust creation, soil erosion, respiratory hazards, mobilized contaminants, changes in aesthetics of the surrounding area, establishment of invasive plants, increased sediment in stormwater runoff because of ground clearing construction activities
- Creation of short-term jobs to construct the project and related spending at local businesses

Long-term gains of the GSA or PGSB Alternatives include reducing congestion, improving travel reliability, emergency service response times, truck freight movement efficiency, and project safety in the study area. The long-term safety and mobility improvements that the build alternatives offer outweigh the short-term inconveniences and use of resources that would occur during construction, such as noise, dust, traffic congestion, and energy use.

The No Build Alternative, which would not construct the improvements of the proposed action, would avoid short-term impacts but would have long-term adverse impacts from increased congestion, which would have associated safety impacts, degradation of emergency service response times, and reduced productivity of economic systems.

Chapter 4. Environmental Commitments

Chapter 4 discusses environmental commitments by resource that will be used to avoid, minimize, or mitigate adverse effects that may result from constructing, operating, or maintaining the Grade-Separated Option A (GSA) or Partial Grade-Separated Option B (PGSB) Alternative. Mitigation measures are intended to be consistent with anticipated permit requirements. Federal Highway Administration (FHWA), Washington State Department of Transportation (WSDOT), and Cowlitz County will have joint responsibility for adhering to the environmental commitments described in this chapter.

4.1 What efforts have been or will be made to avoid, minimize or mitigate for effects?

Project effects due to construction, operation, and maintenance are an inevitable part of transportation improvement programs. Efforts have been made throughout the design process to avoid and minimize impacts; such efforts will continue to be made once the preferred alternative is selected and the design is further refined. In order to minimize project effects, steps can be taken to address issues that may arise during construction and after completion of a project. The following measures could be implemented for either build alternative to avoid and minimize project effects.

Roadway Traffic Operations

Mitigation for temporary construction effects

- Coordinate with City of Longview and Cowlitz County transportation officials to develop a detailed traffic management plan as well as work zone traffic control plans that provide a framework for detours, lane closures, staging plans, etc.
- Develop a public outreach program to include periodic media broadcasts, a newsletter, and project website to inform residents and businesses in and around the study area of changes in vehicle, freight, pedestrian, bicycle or transit routes during construction.
- Prepare and distribute written notices in English and Spanish (or other relevant languages) that concern construction activities and changes in vehicle, pedestrian, bicycle, or transit routes during construction.

Mitigation for long-term effects

- Following completion of the project, re-examine and modify critical emergency response routes within the study area based on the new roadway design and "post-project" congestion and travel time data.
- Following completion of the project, validate and maintain intersection connectivity for pedestrians and bicyclists based on the new roadway design.

Pedestrian, Bicycle, and Transit Access

Mitigation for temporary construction effects

- Coordinate with the cities of Longview and Kelso, Port of Longview, and transit agencies during design and construction, providing advanced notice of potential pedestrian, bicycle or transit delays, detours, and access impacts during construction.
- Provide advanced notice to residential areas about sidewalk and trail closures during construction.
- Coordinate with the City of Longview to maintain pedestrian and bicycle connectivity between residential areas north of Industrial Way and business south of Industrial Way during construction.
- Maintain pedestrian and bicyclist access to the segment of the Highlands Trail west of 17th Avenue. Provide a signed detour route for the 0.2-mile segment between 17th Avenue and Oregon Way.

No mitigation for long-term effects is recommended for this resource.

Neighborhoods, Community Resources, and Traditionally Underserved Populations

Mitigation for temporary construction effects

- Send English and Spanish notices/flyers to residents, businesses, project stakeholders, schools, churches, community service organizations, Kelso/Longview Chamber of Commerce, and local media in advance of construction activities to provide information about upcoming construction activities and schedule, detour routes, and temporary utility service disruptions, if any.
- Install variable message signs in advance of construction activities to allow travelers to plan alternate routes.
- Consider installing signs near residential areas to encourage "local access only," and to discourage cut-through traffic, particularly the Highlands and St. Helens Neighborhoods.
- Where construction work zones impact existing pedestrian facilities, ensure that Americans with Disabilities Act (ADA)-compliant alternate routes and detour signage are provided.

» If feasible, incorporate goals in the construction contract that contractors utilize a designated percentage of women and minorities during construction of the project.

Mitigation for long-term effects

» Follow WSDOT's standard, systematic process for business relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition Polices Act of 1970 as amended. The legal requirements and relocation process are described in WSDOT Right-of-Way Manual M 26-01 Chapter 12.

» Ensure that pedestrian facilities (existing and newly constructed) associated with this roadway project are ADA-compliant and provide connectivity between the affected neighborhoods and employers south of Industrial Way.

» Consider proactive design techniques to discourage people from congregating beneath elevated structures to minimize security concerns.

» Consider community input on the aesthetics of any walls constructed as part of the project.

» Coordinate with the City of Longview to promote safety and security by installing illumination in areas where the elevated intersection creates isolated or concealed spaces.

Businesses and Economy

Mitigation for temporary construction effects

» Send English and Spanish notices to residents, businesses, project stakeholders, schools, churches, community service organizations, Kelso/Longview Chamber of Commerce, and local media in advance of construction activities to provide information about upcoming construction activities and schedule, detour routes, and temporary utility service disruptions, if any.

» Install variable message signs in advance of construction activities to allow travelers to plan alternate routes.

Mitigation for long-term effects

» Conduct all right-of-way acquisitions and commercial relocations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, as well as the Washington Relocation Assistance – Real Property Acquisition Policy. All affected property owners will be compensated for property rights acquired at fair market value and relocation assistance will be provided. The Uniform Act provides protection and assistance for people affected by the acquisition, rehabilitation, or demolition of real property for federal or federally funded projects. This law was enacted by Congress to ensure that people whose real property is acquired, or who move as a direct result of projects receiving federal funds, are treated fairly and equitably and receive assistance in moving from the property they occupy.

Visual Resources

Mitigation for temporary construction effects

» During construction, retain as much of the existing vegetation as possible, particularly mature trees located between roadways and adjacent land uses.

» Where feasible, set up construction staging areas in locations that are out of sight from a majority of viewers.

» Shield construction lighting and/or focus lighting on work areas to minimize ambient spillover of light into adjacent areas.

» Survey and document the existing visual character of construction of staging areas prior to construction and restore construction staging areas to pre-project conditions once construction is complete.

Mitigation for long-term effects

» Consider contouring cuts and fills to visually blend with the surrounding landscape.

» Develop a range of options for wall textures consistent with local projects to reflect landscape context and to blend with the local environment. Textures may include fractured fin, random board finish, smooth coping strips along the top of wall or incorporated into wall surfaces. Provide an opportunity for community members to review and provide input on these options.

» Install street lights that focus light toward the roadway and minimize the spillover of light into residential areas.

» Implement roadside restoration in accordance with WSDOT's Roadside Policy Manual, utilizing a combination of trees, low growing native shrubs, and grasses to screen and separate various conflicting land uses, blend large structures into the landscape, provide positive driver guidance, and reduce the negative effects of light and glare from reflective surfaces, new luminaires, and signals.

» During final design, retain as much existing vegetation as possible, particularly mature trees between residences and roadways.

Historic and Archaeological Resources

Mitigation for temporary construction effects

» Develop and implement an inadvertent discovery plan. If unidentified archaeological resources or human remains are encountered during construction, work should immediately cease in the vicinity of the discovery to avoid further damages to the resource. WSDOT, FHWA, Washington State Department of Archaeology and Historic Preservation (DAHP), and affected Native American tribes should be notified so the significance of the discovery can be evaluated and the appropriate course of action implemented.

Mitigation for long-term effects

» Prepare and comply with the stipulations of a programmatic agreement approved by DAHP.

Parks and Recreation Resources

Mitigation for temporary construction effects

» Provide notice of upcoming trail closures and notice of pedestrian and bicycle detour routes.

Mitigation for long-term effects

» Ensure project design does not preclude a future connection of the existing trail to a planned trail east of Oregon Way, including pedestrian and bicycle crossing of Oregon Way.

Railroads and Public Utilities

Mitigation for temporary construction effects

» Coordinate with utility owners to provide notice of upcoming construction activities and avoid disruptions to utility service.

» Coordinate with Union Pacific Railroad and BNSF Railway to schedule construction activities related to rail crossings and/or rail realignments to avoid or minimize disruptions to rail operations.

Mitigation for long-term effects

» Comply with the conditions of existing utility agreements.

» During future design efforts, confirm the location of utilities in the study area by field investigations, including locating lines below ground.

» Consider conducting a Subsurface Utility Engineering study for this project. The Subsurface Utility Engineering process combines civil engineering, surveying, and geophysics, and has been shown to reduce relocations normally necessitated by highway construction projects, reduce delays to the project caused by waiting for utility work to be completed so highway construction can begin, and reduce unexpected conflicts with utilities.

» Coordinate with the Washington Utilities and Transportation Commission and comply with the petition process for approval of modifications (including grade-separation) to rail crossings per RCW 81.53.060.

Land Use

Mitigation for temporary construction effects

» Provide notice of upcoming traffic impacts to property and business owners in the study area on a frequent basis.

» Provide residents, tenants, and property owners in the study area with advance notice of potential access or utility disruptions as a result of construction activities.

Mitigation for long-term effects

» Conduct all right-of-way acquisitions and commercial relocations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, as well as the Washington Relocation Assistance – Real Property Acquisition Policy. All affected property owners will be compensated for property rights acquired at fair market value and relocation assistance will be provided. The Uniform Act provides protection and assistance for people affected by the acquisition, rehabilitation, or demolition of real property for federal or federally funded projects. This law was enacted by Congress to ensure that people whose real property is acquired, or who move as a direct result of projects receiving federal funds, are treated fairly and equitably and receive assistance in moving from the property they occupy.

» Follow the substantive requirements of the applicable federal, state, and local land use statutes, including zoning and critical area regulations, to protect land uses, resource lands, and critical areas.

Hazardous Materials

Mitigation for avoidance of contamination

» Evaluate structures to be demolished for the presence of hazardous materials.

» Conduct site assessments to evaluate soil and groundwater conditions near the hazardous materials associated with structures to be demolished and in areas proposed for excavations.

» Use the results of the soil and groundwater sampling to develop project specific provisions for storage and disposal of contaminated material during construction.

» Remove and dispose of hazardous materials, and remediate contaminated soil and groundwater through a construction contract special provision in accordance with applicable regulations.

» Evaluate soil conditions near the construction area as grading activities occur. If hazardous materials are encountered, remove and assess soil and groundwater conditions through a construction contract requirement special provision.

» Coordinate with utilities to remove and relocate transformers along the alignment per WSDOT Standard Specifications Page 1-68 section 1-07.17(1) and as included in contract plans or placed into a construction contract special provision.

» Conduct a Phase II environmental site assessment (an on-the ground assessment that includes sampling and laboratory analysis to confirm the presence of hazardous materials) of all properties where a full or partial acquisition

or temporary easement is planned to accurately assess the potential for existing environmental contaminants on each property.

Mitigation for construction planning

- Develop construction plans that specify procedures, including best management practices, to be employed for construction of the project. The plans will include direction for spill prevention, control, and countermeasure plans, temporary erosion and sedimentation control plans, and plans for handling and disposal of known and unanticipated contamination.
- Develop a site-specific Health and Safety Plan describing monitoring requirements and the use of personal protective equipment.
- Pre-assign a dangerous waste identification number, along with planning for soil handling and disposal to reduce soil handling time, so soils can be loaded onto trucks during initial excavation and hauled to treatment or disposal facilities.

Mitigation for disposal options for contamination

- Adjust construction methods to minimize the volume of contaminated soil and/or groundwater encountered.
- Properly manage and dispose of encountered contaminated soil and/or groundwater.

No mitigation for long-term effects is recommended for this resource.

Traffic Noise Levels

Mitigation for temporary construction effects

- To the extent feasible, conduct noisier construction activities during daytime hours to reduce noise levels during sensitive nighttime hours.
- Apply additional measures as needed and to the extent feasible to reduce noise levels, including equipping engines with adequate mufflers, turning off equipment during prolonged periods of nonuse, and locating compressors and generators away from residences.

Mitigation for long-term effects

- During final design of the Preferred Alternative, update the feasible and reasonable analysis for potential noise barriers that could reduce predicted traffic noise to residences along the west side of Oregon Way.

Water, Wetlands, and Floodplains

Mitigation for temporary construction effects

- Require construction contractor to submit a culvert bypass plan and maintain the flow through the existing CDID Ditch No. 3 during and after construction.
- Maintain access to the Oregon Way Pump Station during and after construction.
- Comply with WSDOT standard specification (Sections 1-07.15 and 8-01) requirements and special provisions for temporary water pollution control and erosion control during construction.
- Comply with Section 404(b)(1) Guidelines for Specifications of Disposal Sites for Dredged or Fill Material.
- Protect the existing CDID Ditch No. 3 from sediment-laden runoff during construction.

Mitigation for long-term effects

- Purchase mitigation credits at the Coweeman Mitigation Bank to offset loss of wetlands and open water resources.
- Heavily revegetate proposed highway embankments along the western arm of the project adjacent to the wetlands associated with the Weyerhaeuser pond and CDID Ditch No. 3 to the maximum extent practicable to establish a forested buffer of primarily evergreen trees and associated woody understory that would enhance buffer function, provide light and glare screening, provide shading of wetlands, stabilize embankment slopes, promote water infiltration and storage, improve water quality, and provide wildlife habitat for local wetland-dependent species. Establish and monitor the vegetated buffer for a minimum of 5 years to meet performance standards developed during the permit application process. Conduct seasonal weed control and replanting activities and annual scientific monitoring throughout that time period.

Soils and Geology

Mitigation for temporary construction impacts

- Maintain vegetation to the extent possible, and provide adequate surface water runoff systems.
- Construct erosion and sediment control measures downslope.
- Use temporary erosion control blankets and mulching to minimize erosion prior to vegetation establishment.
- Use retaining structures designed for the loads from moving soils.
- Implement construction specifications and quality assurance programs that prohibit over-steepened slopes.
- Relocate or protect utilities where ground settlement cannot be avoided.
- Control changes in groundwater elevation near critical structures with localized dewatering and groundwater injection methods.
- Use sheetpile barrier systems to control the horizontal extent of groundwater withdrawal.

Mitigation for long-term effects

» Consider the use of stone columns or grouted columns in areas with liquefiable and/or compressible soils.
» Consider the use of pile-supported embankments to transfer earth loads to incompressible layers.
» Excavate unsuitable and/or liquefiable soils beyond the footprint of each embankment and replace with engineered fill as necessary.

Fish, Wildlife, and Vegetation

Mitigation for temporary construction effects

» Ensure that fresh concrete and/or concrete by-products are prevented from entering surface waters during construction. Any water having direct contact with uncured concrete shall be contained and treated or removed from the site (as appropriate) to prevent discharge to surface waters and/or wetlands.
» Establish concrete truck chute cleanout areas to properly contain wet concrete and wash water.
» Install high visibility fencing around preservation areas before construction to avoid unintended impacts to vegetation or other sensitive areas.
» Implement a site-specific Temporary Erosion and Sediment Control plan to minimize erosion and sedimentation.
» Implement a site-specific Spill Prevention, Control, and Countermeasures plan to minimize spills and ensure all harmful materials will be properly stored and contained.
» Restore disturbed areas of temporary impacts according to the most current version of the WSDOT Roadside Classification Plan (WSDOT 2017) and permitting requirements.
» Inspect equipment daily for leaks and proper function. Ensure that equipment will be clean and free of external petroleum-based products.
» Ensure that any wastes resulting from the project shall become the responsibility of the contractor and will be disposed at a properly permitted site of their choosing.
» Install and maintain best management practices as stated in the most current version of the WSDOT Highway Runoff Manual (WSDOT 2017) to ensure that no foreign material, such as pavement slurry from asphalt grinding equipment, will be sidecast, and to control and prevent sediments from entering aquatic systems.
» At a minimum, comply with Washington Department of Ecology's State Water Quality Standards or permit modifications and with all requirements of the most current version of the WSDOT Highway Runoff Manual (WSDOT 2017).
» Require that all unstable slopes resulting from construction activities with a high likelihood of delivery of material to listed species-bearing waters will be stabilized within 2 days from October 1 to April 30 and within 7 days from May 1 to September 30.
» Require all equipment to be fueled and maintained more than 200 feet from the nearest wetland, ditches, flowing or standing water, unless site specific review completed by the project biologist indicates that no impacts to the resource areas will result due to topography or other factors. Exceptions to this requirement may be allowed for large cranes, pile drivers, and drill rigs if they cannot be easily moved.
» Ensure that no paving, chip sealing, or stripe painting will be initiated in rainy weather.

No mitigation for long-term effects is recommended for this resource.

Air Quality

Mitigation for temporary construction effects

» Reduce construction impacts by incorporating applicable measures from the Associated General Contractor of Washington Guidelines (AGC 1997) into the project's construction specifications.
» Spray exposed soil with water or other dust palliatives to reduce emissions and deposition of particulate matter.
» Cover all trucks transporting materials, wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck) to reduce deposition of particulates during transportation.
» Provide suitable construction entrances to remove particulate matter that vehicles will otherwise carry offsite to decrease deposition of particulate matter on area roadways.
» Remove particulate matter deposited on paved, public roads to reduce mud and resultant windblown dust on area roadways.
» Route and schedule construction trucks to reduce delays to traffic during peak travel times to reduce secondary air quality impacts caused by a reduction in traffic speeds while waiting for construction trucks.
» Place quarry spall aprons where trucks enter public roads to reduce mud track-out.
» Gravel or pave haul roads to reduce particulate emissions.
» Require appropriate emission-control devices on all construction equipment powered by gasoline or diesel fuel to reduce carbon monoxide (CO) and ozone precursors (NO_X) emissions in vehicular exhaust.
» Use maintained equipment to reduce CO and NO_X emissions.
» Enforce WSDOT's no idle policy that directs employees to turn off engines when their vehicles are not in motion.

» Plant vegetative cover as soon as possible after grading to reduce windblown particulates in the area.
» Route construction trucks away from residential areas to minimize annoyance from dust.

No mitigation for long-term effects is recommended for this resource.

Energy and Greenhouse Gas

Mitigation for temporary construction effects

» Include detours and strategic construction timing (such as night work) in the project traffic plan to continue moving traffic through the area and reduce backups to the traveling public to the extent possible.
» Set up active construction areas, staging areas, and material transfer sites in a way that reduces standing wait times for equipment.
» Work with agency partners to promote ridesharing and other commute trip reduction efforts for employees working on the project.

No mitigation for long-term effects is recommended for this resource.

Cumulative Effects

No mitigation for cumulative effects is recommended as part of this project.

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Chapter 6. Glossary

TERM	DEFINITION
At-grade roadway/ rail crossing	Crossing of a railroad with a surface roadway.
Attainment	A geographic area that meets or does better than the national ambient air quality standard (NAAQS).
Area of potential effects	The geographic area within which the project may directly or indirectly cause alterations in the character or use of historic properties and cultural and archaeological resources. This is a term that specifically applies to Section 106 of the National Historic Preservation Act.
Best management practices	Physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollutant discharge.
Biological assessment	A document that is prepared for compliance with the Endangered Species Act in cases where the potential exists for a project to affect federally listed species. Its purpose is to document the project's potential to affect listed species, to document measures taken to avoid adverse effects, and to make a provisionary effects call. Scientific data used to prepare Biological Assessments are generally gathered through a combination of field reconnaissance surveys, and scientific literature research; and provisionary effects determinations are established based on an analysis of project design details. The biological assessment is submitted to the National Marine Fisheries Service and/or the U.S. Fish and Wildlife Service.
Critical habitat	Specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection. Critical habitat may also include areas that are not currently occupied by the species but will be needed for its recovery.
Cumulative effect (cumulative impact)	The effect on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects result from individually minor but collectively significant actions taking place over a period of time.
Decibels	A unit for relative sound intensity. For highway traffic noise, an adjustment, or weighting, of the high and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sounds are called "A-weighted levels" (dBA).
Delay	The additional time that a vehicle must slow down or stop in traffic compared to freely-flowing traffic conditions; used to measure congestion levels.
***De minimis* impact**	An impact that involves the use of Section 4(f) property that is generally minor in nature. A *de minimis* impact is one that, after taking into account avoidance, minimization, mitigation and enhancement measures, results in no adverse effect to the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under Section 4(f). For historic properties, a *de minimis* impact is one that results in a Section 106 determination of "no adverse effect" or "no historic properties affected." A *de minimis* impact determination requires agency coordination with the officials having jurisdiction over the Section 4(f) property and opportunities for public involvement. A *de minimis* impact determination may not be made when there is a constructive use.
Disabled	A person having a long-lasting condition, such as severe vision or hearing impairments, or a condition that substantially limits basic physical activities. It may also include people with conditions that make other activities such as learning, getting around inside the home, working at a job, or going places outside the home difficult.

TERM	DEFINITION
Displacement	An individual, family, partnership, association, corporation, or organization, which moves from their home, business, or farm, or moves their personal property, as a direct result of acquisition, demolition or rehabilitation for a project. Displaced persons from federally funded projects are eligible for relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.
Easement	A legal right to use property owned by someone else for a designated purpose.
Elderly	A man or woman aged 65 or older.
Elevated roadway	A roadway that is raised up above the ground level.
Embankment	A bank, mound, dike, or the like, raised to carry a roadway or hold back water.
Emergency response time	The amount of time that it takes for emergency responders to arrive at the scene of an incident after the emergency response system was activated.
Endangered species	Any species that is in danger of extinction throughout all or a significant portion of its range.
Environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. Meaningful involvement means: people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; community concerns will be considered in the decision-making process; and decision makers will seek out and facilitate the involvement of those potentially affected.
Erosion	The wearing away of soil and rock. This may be by weathering and the action of streams, glaciers, waves, wind, and underground water.
Floodplain	The 100-year floodplain is an area with a one percent chance of being flooded in any given year.
Full acquisition	A property acquisitions where the entire property would be acquired for the project.
Fugitive dust	A particulate emission made airborne by forces of wind, man's activity, or both. Unpaved roads, construction sites, and tilled land are examples of areas that originate fugitive dust.
Grade-separation	A process used to improve traffic flow at intersections and junctions. With grade-separation design, each road or rail surface is placed at a different grade, or elevation. This difference in elevation is accomplished using tunnels, ramps, bridges and interchanges at every point where the two roads or rail lines cross one another.
Greenhouse gases	Gases that trap heat in the atmosphere. These include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.
Groundwater	Water found below the water table.
Hazardous materials	A substance or mixture of substances having properties capable of producing adverse health or safety effects.
Highways of Statewide Significance	Interstate highways and other principal arterials that are needed to connect major communities in Washington State. The designation helps assist with the allocation and direction of funding.

TERM	DEFINITION
Hispanic/Latino	A self-designated classification for people whose origins are from Spain, the Spanish-speaking countries of Central or South America, the Caribbean, or those identifying themselves generally as Spanish, Spanish-American, etc. Origin is viewed as ancestry, nationality, or country of birth of the person or person's parents or ancestors. Hispanic/ Latino persons may be of any race, White and non-White.
Impervious surface area	A hard surface area that either prevents or retards the entry of water into the soil mantle as occurs under natural conditions (prior to development) and from which water runs off at an increased rate of flow or in increased volumes. Common impervious surfaces include but are not limited to rooftops, walkways, patios, driveways, parking lots, storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled or macadam surfaces.
Indirect effects	Effects are caused by the proposed action or alternative and are later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems.
Industry train	A train comprised of rail cars that haul various commodities and have different origins and destinations. For this project, typical industry trains are assumed to be 2,000 feet or less in length. An industry train is also referred to as a manifest train.
Intersection approach leg	Segment of roadway used by traffic approaching the intersection.
Landscape unit	The geographic unit on which impacts on visual character, viewers, and visual quality are assessed.
Limited English proficient	Individuals who do not speak English as their primary language and who have a limited ability to read, speak, write, or understand English.
Low-income	A person whose median household income is at or below the U.S. Department of Health and Human Services poverty guidelines.
Minority	A person who is: Black (a person having origins in any of the black racial groups of Africa); Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or the Spanish culture or origin, regardless of race); Asian/Pacific Islander (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or American Indian or Alaskan Native (a person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation or community recognition).
Mitigation	The measures that could be taken to lessen the negative effects predicted for each resource. These measures may include reducing or minimizing a specific negative effect, avoiding it completely, or rectifying or compensating for the negative effect.
National Ambient Air Quality Standards (NAAQS)	The maximum allowable level, averaged over a specific time period, for a certain air pollutant in the outdoor air.
National Environmental Policy Act (NEPA)	The federal policy that requires agencies to incorporate environmental considerations into decision making by preparing an environmental assessment or environmental impact statement that consider the effects of proposed actions.
National Register of Historic Places	A list of districts, sites, buildings, structures, and objects maintained by the National Park Service, each determined by the National Park Service to be of historic, cultural, architectural, archaeological, or engineering significance at the national, state, or local level.

TERM	DEFINITION
Noise abatement criteria	If future noise levels with a project are predicted to approach or exceed the FHWA noise criteria at a sensitive receptor, abatement is evaluated at the receptor. For residences, the criterion is 67 dBA. WSDOT considers a noise effect to occur if the noise level is within 1 dBA of the 67 dBA criterion.
Noise barrier	A solid wall or earth berm located between the roadway and receiver location, which breaks the line-of-sight between the receiver and the roadway noise sources.
Out-of-direction travel distance	Out-of-direction travel distance is the increased distance traveled for trips made from an original to a destination due to changes in the existing roadway.
Partial acquisition	A property acquisition where a portion of the property would be acquired for the project and the remainder would be retained by the current owner.
Particulate matter (PM_{10} or $PM_{2.5}$)	Naturally-occurring and man-made particles with a diameter less than 10 microns or 2.5 microns respectively. Sources of particulate matter include sea salt, pollen, road dust, agricultural dust.
Peak period	A part of the day with the highest traffic volume during which traffic congestion on roads is worst.
Phase II environmental site assessment	An on-the ground assessment that includes sampling and laboratory analysis to confirm the presence of hazardous materials.
Pollutant	Any substance that upon reaching the environment (soil, water, or air), is degrading in effect so as to impair the environment.
Programmatic agreement	A document that spells out the terms of a formal, legally binding agreement between a state Department of Transportation (DOT) and other state and/or federal agencies. In the context of Section 106 of the National Historic Preservation Act, programmatic agreements are used when the effects of an undertaking are not fully known.
Queue	The number of vehicles (measured in distance) lined up and stopped in travel lanes at an intersection or railroad crossing.
Recovery times from train crossings	The time it takes for traffic to return to traffic flow conditions that were occurring prior to the train crossing.
Retaining wall	A retaining wall is a wall that is built to prevent the earth behind it from moving.
Right-of-way	Land set aside for use as a highway. Rights of way are purchased (acquired) prior to the construction of a new road. Usually enough extra land is purchased for the purpose of providing safety clearances, building retaining walls, and implementing other mitigation features.
Roadway blockage	Any impedances to traffic flow that are not related to normal intersection control influences. Examples could include train movements, vehicle crashes, temporary lane closures, etc.
Scoping	An open process involving agency and public outreach and a public comment period early in the development of a project. Scoping shares preliminary information about the proposed action and the range of possible alternatives to seek input on potential issues, concerns, and the overall technical scope of analysis that should be considered for the project.
Section 106 of the National Historic Preservation Act of 1966	Section 106 of the NHPA applies to undertakings by any federal agency, undertakings receiving federal assistance, and undertakings requiring the issuance of a license from any federal agency. In the event of any of the above undertakings, the head of the acting, assisting, or licensing federal agency must "take into account" the possible effects the undertaking will have on any district, site, building, structure or object that is included in or is eligible for inclusion in the National Register of Historic Places prior to the approval of expenditure of federal funds or issuance of a license. In addition, the head of any such agency must afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking.

TERM	DEFINITION
Section 4(f) of the U.S. Department of Transportation Act of 1966	Section 4(f) states that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, wildlife and waterfowl refuge of national, State, or local significance, land of an historic site of national, State, or local significance only if there is no "prudent and feasible alternative" to the use of that land, and the program or project includes all possible planning to minimize harm to the public land involved.
Sediment	A general term for any unconsolidated particulate material that has been deposited by an agent of transport, such as water, ice, or wind.
Seismic hazard	Refers to the probability and amount of ground movement expected from an earthquake.
Shared-use path	Paved, off-road facilities designed for travel by a variety of nonmotorized users, including bicyclists, pedestrians, skaters, joggers, and others.
Signalized intersection	A junction of two or more public roads that is controlled by a traffic signal.
Spill prevention, control, and countermeasures plan	A plan that includes site information regarding hazardous materials, sensitive environmental receptors, spill prevention and containment methods, response procedures, and equipment and material to carry out preventive and response measures, and reporting requirements. These plans ensure that all harmful and/or deleterious materials are properly stored and contained. Contractors are required to prepared and implement the spill prevention, control, and countermeasures plan in accordance to WSDOT Standard Specification 1-07.15(1).
Stormwater	The portion of precipitation (rainwater or snowmelt) that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body or a constructed infiltration facility.
Stormwater treatment	Stormwater treatment (or management) reduces or eliminates the negative impacts of stormwater runoff by controlling flooding, reducing erosion, and improving water quality through the implementation of structural, vegetative or managerial practices used to treat, prevent or reduce water pollution.
Study area	The area in which effects from the project may occur.
Surface roadway	A road that is located at ground level.
Temporary erosion and sediment control plan	A plan to prevent and minimize soil erosion. A temporary erosion and sediment control plan includes measures that may include, but are not limited to, the following (as necessary, depending on site conditions): temporary plastic cover, coir fabric (and/or wattles), seeding and mulching, temporary vegetated filter strips (i.e., for construction site stormwater control), slope drains, silt fence, sand, or geotextile-encased triangular silt dikes.
Traditionally underserved populations	Individuals who are low-income, minority, disabled, elderly, youth, transit-dependent and/or those who are limited English proficient.
Traffic congestion	A condition on road networks that occurs as use increases, and is characterized by slower speeds, longer trip times, and increased vehicular queueing.
Travel time	The total time spent traveling from one point to another point.
Travel time reliability	The level of consistency in travel times for repeated trips (same time of day but different day).
Truck tonnage	An index that measures the gross tonnage of freight that is transported by motor carriers for a given month. The truck tonnage index serves as an indicator of shipping activity in the U.S., and it can be used by analysts to help determine the state of the economy.

TERM	DEFINITION
Two-phase signal	A traffic signal that provides only two separate green (right-of-way)/yellow (change)/red (clearance) phases. Non-conflicting movements can occur in each phase. In the case of the PGSB Alternative, the proposed two-phase traffic signal would have one phase for westbound traffic to flow onto the elevated intersection while eastbound traffic from the surface roadway is stopped. The second phase would stop the westbound movement while the eastbound movement could proceed.
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended	A federal law that establishes minimum standards for federally-funded programs and projects that require the acquisition of real property (real estate) or displace persons from their homes, businesses, or farms. The Uniform Act's protections and assistance apply to the acquisition, rehabilitation, or demolition of real property for federal or federally-funded projects. The Uniform Relocation Assistance and Real Property Acquisition Policies Act requires that comparable decent, safe, and sanitary replacement housing within a person's financial means be made available before that person may be displaced. When such housing cannot be provided by using replacement housing payments, the Uniform Relocation Act provides for "housing of last resort."
Unit train	A train comprised of rail cars that haul the same commodity and have a single origin and destination. For this project, typical unit trains are assumed to be 6,800 to 8,000 feet in length.
Unsignalized intersection	A junction of two or more public roads that is not controlled by a traffic signal.
Visual quality	Character of the landscape, which generally gives visual value to a setting.
Wetlands	Areas that are saturated with groundwater near the surface or areas that are flooded for extended periods of time and that support vegetation that can live in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas.

Chapter 7. List of Preparers

NAME	YEAR OF EXPERIENCE	EDUCATION	ROLE
Washington State Department of Transportation			
Barb Aberle	30	MES, Wetlands Ecology and Land Use Planning BS, Eco-Systems Analysis	SW Region Environmental Manager
Julius Arevalo	3	BS, Civil Engineering	Design
Victoria Book	12	BS, Environmental Studies	Headquarters NEPA Coordination
Alex Countouriotis	15	AS, Civil/Mechanical Engineering BA, Communication	Design
Martin Fuest	2	BS, Civil Engineering	Design
Joanna Lowrey, PE	17	MS, Civil Engineering	Co-Project Manager; SW Region Project Manager
Aaron Myton	20	MS, Civil Engineering	Design/Construction Team Leader
Michael Southwick	11	n/a	SW Region Traffic Operations
Kevin Workman	14	AA, Civil Engineering	SW Region Environmental Coordinator
Cowlitz County			
Claude Sakr, PE	35	MS, Civil Engineering	Co-Project Manager; Project Administrator/Agency Lead
WSP			
Angela Findley	23	MS, Forest Resources BA, Mathematics	EIS Lead
Abby Caringula	11	MS, Civil Engineering BE, Civil Engineering	Traffic Analysis
Jeff Fredine, RPA	20	MA, Anthropology Graduate Cert., Historic Pres.	Cultural Resources Lead
Pete Geiger	29	MSc, Physics BS, Physics	Floodplains Lead
Jessie Jones	16	AAS, Graphic Design and Illustration	Graphic Design
Ginette LaLonde	18	BS, Civil Engineering	Air Quality and Energy Lead
Tony Lo, PE	22	MS, Transportation Engineering BS, Civil Engineering	Transportation Lead
Lesley Maurer	7	MS, Community and Regional Planning BA, Biology	GIS
Ha Pham, PE	18	PhD, Geotechnical Engineering MS, Geotechnical Engineering BS, Civil Engineering	Soils and Geology Lead

NAME	YEAR OF EXPERIENCE	EDUCATION	ROLE
WSP			
Scott Polzin, PMP	22	MCRP, Community and Regional Planning BS, Finance	EIS Author
Jennifer Rabby, AICP	15	MCRP, Community and Regional Planning BA, Biology and Environmental Studies	Deputy Environmental Lead; Land Use and Section 4(f) Lead; Cumulative Effects Co-Lead; EIS Author
Larissa King Rawlins, AICP	18	BA, Environmental Planning	Visual Lead; EIS Author
Patrick Romero, INCE, ENV SP	19	MS, Environmental Policy and Management BS, Environmental Science	Noise and Hazardous Materials Lead
Stephanie Sprague, PMP, AICP	16	MS, Natural Resource Policy BS, Environmental Microbiology	Environmental Justice Lead; Relocation, Social, Economic, Public Services Co-Lead; EIS Author
Kirsten Tilleman, AICP	5	MS, Environmental Science and Management BS, Natural Resources	Cumulative Effects Lead; Relocation, Social, Economic, Public Services Co-Lead; EIS Author
Strategies 360			
Page Phillips	12	MCRP, Community and Regional Planning BA, Politics and Government	Communications Lead

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Industrial Way/Oregon Way Intersection Project

www.IndustrialOregonWay.org