Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

Appendix A
Tier 1 Draft Environmental Impact Statement

April 2021

Oregon Passenger Rail
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Tier 1 Draft Environmental Impact Statement

Prepared by

Oregon Department of Transportation

U.S. Department of Transportation
Federal Railroad Administration

October 2018

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FEDERAL RAILROAD ADMINISTRATION

Oregon Passenger Rail
Tier 1 Draft Environmental Impact Statement

Prepared by
The U.S. Department of Transportation
Federal Railroad Administration
and
The Oregon Department of Transportation

Pursuant to

National Environmental Policy Act (42 U.S.C. §4332 et seq.), and implementing regulations (40 CFR Parts 1500-1508), 64 FR 28545, 49 U.S.C. §303 (Section 4(f), formerly Department of Transportation Act of 1966, Section 4(f)); National Historic Preservation Act (54 U.S.C. §300101 et seq.); Clean Air Act as amended (42 U.S.C. §7401 et seq. and 40 CFR Parts 51 and 93); the Endangered Species Act of 1973 (16 U.S.C. §§1531-1544); and the Clean Water Act (33 U.S.C. §§1251-1387).

FRA will issue a single document that consists of the Final Environmental Impact Statement and Record of Decision pursuant to 49 U.S.C. § 304a unless FRA determines statutory criteria or practicability considerations preclude issuance of such a combined document.

10/3/18

Date of Approval — Associate Administrator, Office of Railroad Policy & Development, FRA

4 Oct 2018

Date of Approval — Rail and Public Transit Division Administrator, ODOT

The following persons may be contacted for additional information concerning this document:

Lydia Kachadoorian
Environmental Protection Specialist
U.S. Department of Transportation
Federal Railroad Administration
1200 New Jersey Avenue, SE
Washington, DC 20590
Phone: (781) 227-0778

Jennifer Sellers
Passenger Rail Program Manager
ODOT Rail and Public Transit Division
Oregon Department of Transportation
555 13th Street NE, Suite 3
Salem, OR 97301-4179
Phone: (503) 480-5556

This Tier 1 draft environmental impact statement (EIS) evaluates alternatives for improved passenger rail service for the 130-mile north-corridor between Eugene-Springfield and Portland, Oregon. A No Action Alternative and two build alternatives are evaluated. The build alternatives would provide improved passenger rail service to meet future intercity travel demand, improve rail facilities, reduce journey times and improve connections with regional public transit services. Comments on this service-level draft EIS should be sent to Jennifer Sellers at the above address, through the website at www.oregonpassengerrail.org, or via email at info@oregonpassengerrail.org with "Draft EIS" in the subject line.

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Executive Summary

The U.S. Department of Transportation's (USDOT) Federal Railroad Administration (FRA) and the Oregon Department of Transportation (ODOT) prepared this Tier 1 environmental impact statement (EIS) to evaluate improved Amtrak Cascades intercity passenger rail service alternatives for the Oregon Passenger Rail Project (OPR Project). The OPR Project examines an approximately 125-mile segment of the Federally designated Pacific Northwest Rail Corridor (PNWRC) from the Eugene-Springfield urban area to Portland. In addition to this EIS, ODOT is preparing a Service Development Plan (SDP) for the corridor to guide further development and capital investment in passenger rail improvements.

The PNWRC has been the subject of intercity passenger rail planning, development and operation for more than 30 years. The PNWRC is one of 11 Federally designated high-speed rail corridors in the United States. FRA designated this passenger rail corridor on October 20, 1992, as one of five original corridors called for in the Intermodal Surface Transportation Efficiency Act of 1991. The 466-mile PNWRC serves the most densely populated regions of British Columbia, Washington, and Oregon. It links Vancouver, British Columbia, Seattle, Washington, and Portland and Eugene, Oregon, with growing intermediate communities (including the capital cities of Salem, Oregon, and Olympia, Washington).

Burlington Northern Santa Fe (BNSF) Railway owns the existing PNWRC railroad infrastructure in Washington, in British Columbia, and in Oregon north of Portland's Union Station. Union Pacific Railroad (UPRR) owns the existing PNWRC railroad infrastructure in Oregon south of Portland's Union Station. A mix of freight and passenger trains (operated by BNSF Railway, UPRR, Oregon Pacific, Portland Terminal Railroad, Willamette Valley Rail, Portland & Western Railroad, and Amtrak) currently utilize BNSF Railway and UPRR trackage that serves as the PNWRC. Intercity passenger rail service consists of three round trips per day between Eugene and Portland (two Amtrak Cascades trains plus one Amtrak Coast Starlight—a "2+1" passenger train schedule), and six round trips per day between Portland, Oregon, and Vancouver, Washington (four Amtrak Cascades trains plus the Amtrak Coast Starlight and the Amtrak Empire Builder—a "4+2" schedule). The Washington State Department of Transportation (WSDOT) has commitments to increase to a "6+2" intercity train schedule between Portland and Seattle, Washington (six Amtrak Cascades trains plus the Amtrak Coast Starlight and the Amtrak Empire Builder [Empire Builder runs only between Portland and Vancouver, Washington]).

This EIS evaluates a reasonable range of alternatives and identifies a preferred alternative within the OPR Project EIS study area, which is the aforementioned area between Eugene-Springfield, Oregon, and the Washington state line at the Columbia River. A No Action Alternative, two build alternatives, and one build alternative option are evaluated. The build alternatives include infrastructure improvements in existing rail corridors and sections of new rail corridor. This EIS evaluates the potential environmental impacts for each of the alternatives, in accordance with the National Environmental Policy Act (NEPA).

Following the release of the DEIS, ODOT will gather feedback from stakeholders and interested parties and the public will have an opportunity to review and provide comments. The Final EIS will respond to substantive comments received on this Draft EIS and identify and describe the final preferred alternative which may or may not be the preferred alternative identified in this DEIS. FRA's identification of a preferred alternative in an EIS is required by the CEQ regulations implementing NEPA but does not represent an approval or selection of the Project by FRA for any possible future funding opportunities that ODOT may pursue.

Project Overview

Because of the complexity of intermediate and long-range planning associated with passenger rail service development, extensive pre-construction preparation is required as part of the ODOT cooperative agreement with FRA for the OPR Project. The first phase of the process is the development of a Corridor

Investment Plan (CIP). The process of completing a CIP consists of conducting an environmental review in accordance with the National Environmental Policy Act (NEPA), as documented in this EIS, and developing a SDP, which is a detailed definition of the service improvements, transportation network, and the operational and financial aspects for the alternative for passenger rail service that is selected through the NEPA process. The intent of the OPR Project CIP is to provide sufficient information to support future decision-making regarding investments in the Oregon segment of the PNWRC.

For this project, ODOT and FRA are using a tiered environmental process, which is a phased environmental review used in the development of complex projects. FRA typically uses a "tiered" NEPA approach (as provided in 40 Code of Federal Regulations [CFR] 1508.28) for complex projects of the size and scope of the OPR Project. The tiered NEPA decision-making process allows a broad-level programmatic decision with a first-tier EIS, followed by more specific decisions through one or more second-tier NEPA evaluations. For FRA, this tiered NEPA approach allows for incremental decision-making for large corridor projects that are unsuited for analysis in a traditional project-level EIS.

FRA and ODOT formally initiated a Tier 1 EIS for the OPR Project on August 17, 2012, through publication of a Notice of Intent (NOI) in the *Federal Register*. This Tier 1 Draft EIS has been prepared in accordance with NEPA, the Council on Environmental Quality (CEQ) NEPA implementing regulations, and FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545 as updated in 78 Fed. Reg. 2713, January 14, 2013). The OPR Project Tier 1 EIS and the SDP address corridor-level improvements to Amtrak Cascades passenger rail service in the OPR Project study area, including the following:

- Rail corridor – Reasonable and feasible rail alignment improvement alternatives from Eugene-Springfield, Oregon, to Vancouver, Washington
- Service characteristics – Passenger rail operational elements, train speeds, travel time, train frequency and train technology
- Potential stations – The general location of potential passenger rail stations

If FRA selects a build alternative at the conclusion of this Tier 1 NEPA analysis, it is expected that ODOT would implement the OPR Project in phases. One or more of the components or operable segments of the selected alternative for the OPR Project could be developed as individual projects to advance into final design and construction. If ODOT advances the OPR Project into final design and construction, additional NEPA analysis may be required depending upon the source of funding.

Purpose and Need

In the next 20 years, the population of Oregon's Willamette Valley is projected to grow by approximately 27 percent to 3.6 million residents (Oregon DAS, 2015). As population and the economy grow, so does the demand for travel. With more people and more jobs each year, Oregon's transportation infrastructure is facing significant pressures. In several areas of the state today, transportation infrastructure has inadequate capacity, and the system lacks the multimodal transportation options that Oregonians need. Also during the next 20 years, freight volume in the state is expected to grow by approximately 60 percent (ODOT, 2011). These increases in population and freight volume would result in transportation demand that exceeds the available freight and passenger rail capacity in the Willamette Valley, because both utilize the same facilities within the PNWRC.

Purpose of Proposed Action

The purpose of the OPR Project is to improve the frequency, convenience, speed and reliability of passenger rail service along the Oregon segment of the Federally designated PNWRC in a manner that will:

- Provide riders with an efficient, safe, equitable and affordable alternative to highway, bus and air travel;

- Be a cost-effective investment;
- Protect freight-rail carrying capability;
- Support the ongoing implementation of regional high-speed intercity passenger rail in the PNWRC between the Eugene-Springfield, Oregon metropolitan area and Vancouver, British Columbia;
- Be compatible with the Washington state portion of the PNWRC;
- Promote economic development;
- Avoid or minimize community and environmental impacts; and
- Integrate with existing and planned multimodal transportation networks.

Need for Proposed Action

The need for the OPR Project arises from multiple transportation, land use, socio-economic and environmental considerations, including the following:

- Increasing intercity and regional travel demands;
- Existing limited rail-system capacity and competing service needs;
- Constrained state and local roadway funding;
- Increasing economic vitality of the corridor;
- Declining transportation system safety and security; and
- Changing transportation demand resulting from demographic changes.

Study Area

ODOT and FRA established a preliminary OPR Project study area during the NEPA scoping[1] period in fall 2012 (Figure ES-1). The preliminary OPR Project study area was generally bounded by the Eugene-Springfield, Oregon, area to the south and the Washington state line (Columbia River) to the north. The Cascade foothills bounded the study area to the east and the Coast Range bounded it to the west. This study area was broad enough to encompass a variety of potential rail alignments and potential station locations suggested by stakeholders and the public during the scoping period. As corridor concepts and potential station locations were considered and eliminated, FRA and ODOT narrowed the study area boundaries to assess a more localized range of potential impacts associated with each of the corridor concepts. ODOT and FRA also developed discipline- and resource-specific study areas for each environmental impact analysis topic studied in this Tier 1 Draft EIS.

[1] Scoping is an early and open process that occurs following the publication of an NOI to identify significant issues related to a proposed action. As part of the scoping process, agencies and the public are invited to participate and provide comment.

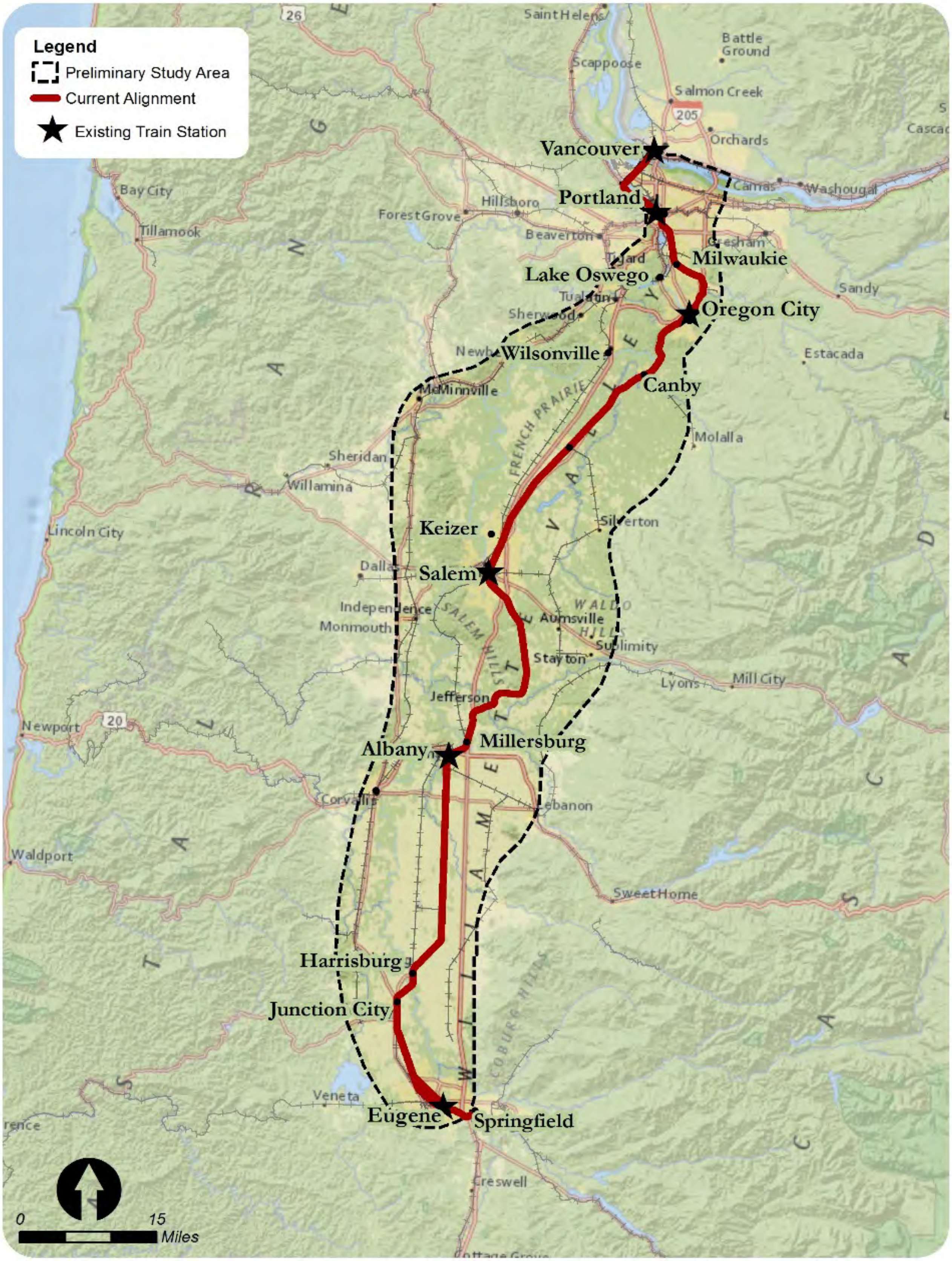

Figure ES-1. Preliminary OPR Project Study Area

Alternatives Screening and Evaluation Processes

Based on input received during the scoping period and information from previous regional and local planning studies, a wide range of corridor concepts were established. Corridor concepts were broadly defined as potential passenger rail alignments and associated station locations between Eugene/ Springfield, Oregon, and the Oregon/Washington state line. During the early stages of scoping, minimal design work was done; the corridor concepts were characterized as approximate railway connections between potential station areas. Most corridor concepts suggested during the scoping period took advantage of existing rail or highway corridors where additional tracks or sidings would be adjacent to existing transportation facilities and therefore where minimal additional right-of-way would be needed. Tunnels were considered when topographic conditions did not allow for at-grade or elevated structure alignments, and/or when environmental conditions could make adding capacity at-grade too impactful. The scoping process assumed that each corridor concept would operate six daily passenger rail round trips between Eugene/Springfield and Portland, Oregon, which would make the Oregon service consistent with Washington's service between Portland and Seattle. Electric and diesel fuel motive power options were considered and screened. The main corridor concepts identified were:

- The **Blue corridor concept** would generally follow the existing Amtrak Cascades route within or near the UPRR right-of-way between Eugene/Springfield and Portland. Passenger trains would share track with freight trains and have a maximum speed of 79 miles per hour (mph). Existing and potential new station locations included Springfield, Eugene, Harrisburg, Tangent, Albany, Salem, Brooks, Woodburn, Canby, Oregon City and Portland, Oregon, and Vancouver, Washington.
- The **Red corridor concept** would parallel Interstate 5 (I-5), either within or near the current highway right-of-way, starting at a new station in Springfield and heading north to Vancouver, Washington. The alignment would consist of largely new track devoted to intercity passenger rail service and have a maximum design speed of 110 mph. Potential new and existing station locations included Springfield, Eugene, Albany, Salem, Keizer, Woodburn, Wilsonville, Tualatin and Portland, Oregon, and Vancouver, Washington.
- The **Purple corridor concept** would generally follow the existing freight rail line historically known as the Oregon Electric Railway (OER) and would involve the intermingling of passenger and freight rail with limited sections that had passenger-only traffic, and a maximum design speed of 110 mph. Existing and potential new station locations included Springfield, Eugene, Harrisburg, Albany, Salem, Keizer, Donald, Wilsonville and Tualatin.
- The **Yellow corridor concept** would originate in Springfield, follow the Purple corridor to Junction City and proceed to Monroe on a new rail alignment. Near Monroe, the alignment would connect with a currently abandoned rail grade and then proceed north through Corvallis, McMinnville and Lake Oswego before connecting to the Purple corridor at Tualatin. The Yellow corridor would also include options to connect to the Purple or Blue corridors in Albany or east of Independence. The Yellow concept would involve the intermingling of passenger and freight rail, and a maximum design speed of 79 mph. Existing and potential new station locations included Springfield, Eugene, Corvallis, Independence, McMinnville, Newberg and Tualatin.
- The **Cascadia High-Speed Rail (HSR) corridor concept** would consist of a fully electric high-speed rail alignment from Eugene to Vancouver, Washington, that would be separate from existing rail right-of-way and have a maximum design speed of 180 mph. Stakeholders introduced this concept during the scoping process, and it was defined to include electric power locomotives. This rail alignment would be similar to the Red corridor concept, following the I-5 median at-grade where possible from Eugene to Tualatin. North of Tualatin, it would travel along a new dedicated right-of-way on a combination of tunnel and elevated track along the Willamette River to the Rose Quarter in Portland, and then north across the Columbia River on a new bridge. Existing and potential station locations associated with the

Cascadia HSR corridor concept included Eugene, Albany, Salem, Keizer, Woodburn, Wilsonville, Tualatin and Portland, Oregon, and Vancouver, Washington.

In addition to the corridor concepts above, a number of partial corridor concepts and options were considered that connected to the main corridor concepts and had design speeds up to 79 mph.

The corridor concepts, partial concepts and options went through a two-step screening and evaluation process:

- Step 1, Screening: The first step, conducted in winter 2012 through spring 2013, assessed the range of corridor concepts identified during the scoping period against elements of the OPR Project's Purpose and Need statement. Corridor concepts were assessed using nine screening questions and readily available data. Concepts were eliminated if they did not pass screening using one or more of these questions. Corridor concepts, including alignments and potential station locations, that passed the screening were subsequently developed into preliminary alternatives; corridor concepts that failed the screening process were eliminated from further consideration. Based on this screening process, all of the partial corridor concepts and the Cascadia HSR corridor concept were eliminated. In addition, the Yellow corridor concept was shortened to only run between Eugene and Albany via Corvallis.
- Step 2, Evaluation: Preliminary alternatives based on the corridor concepts that remained after the screening in Step 1 were defined in terms of the general location of the mainline track, the location of sidings and stations, whether crossings would be at-grade or grade-separated, and whether structures would need to be replaced. Conceptual cost estimates were developed for each preliminary alternative. The preliminary alternatives were then evaluated according to how effectively they met the OPR Project evaluation criteria, which are based on the Purpose and Need statement, as well as the Goals and Objectives for the OPR Project derived from stakeholder input. The Goals and Objectives for the OPR Project are listed in Chapter 1, Section 1.3.[2] The Step 2 evaluation resulted in the elimination of the Purple Alternative and the Yellow Alternative, and eliminated several potential station areas: Harrisburg, Tangent, Corvallis, Brooks, Canby and Portland's Rose Quarter.

Figure ES-2 shows the corridor concepts and resulting preliminary alternatives. The screening and evaluation processes resulted in and developed a reasonable and feasible range of build alternatives to study in more detail in this Tier 1 Draft EIS.

[2] For additional information on the screening and evaluation processes, see the Alternatives Selection Report (ODOT, 2014c).

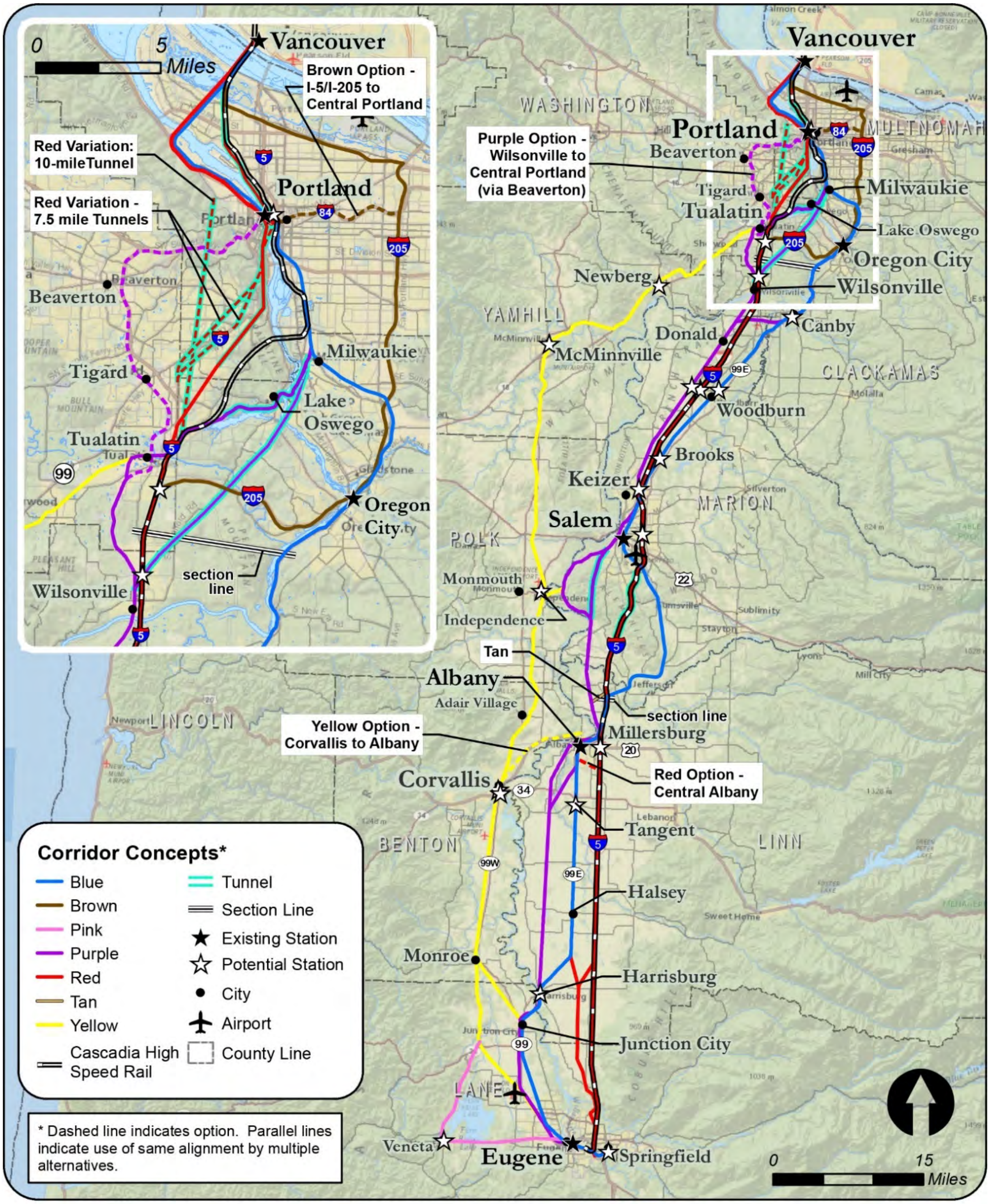

Figure ES-2 Corridor Concepts

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Project Description

The preliminary alternatives screening process identified two build alternatives. In addition to the build alternatives, this EIS considers the impacts associated with a No Action Alternative. This allows a comparison of future conditions with and without a developed project. Rail operations simulation analyses using *Rail Traffic Controller* (RTC) and associated preliminary conceptual engineering identified the proposed service and infrastructure for the alternatives. Figure ES-3 shows the two build alternatives, and the locations of existing and potential new stations.

No Action Alternative

The No Action Alternative for the OPR Project consists of the continuation of the existing Amtrak Cascades passenger train route and service, including existing stations between Eugene, Oregon, and Vancouver, Washington. It includes all committed improvements to the existing intercity passenger rail system, the intercity highway system, and other modes of transportation available to the public (particularly aviation and intercity bus services) in the OPR Project study area. None of the actions required to implement enhanced levels of intercity passenger rail service between Eugene and Portland would take place under the No Action Alternative. The No Action Alternative does not meet the OPR Project Purpose and Need, but is carried forward as a baseline alternative against which the build alternatives are compared. The current intercity passenger rail service in the study area consists of three round trips per day between Eugene and Portland (two Amtrak Cascades trains plus one Amtrak Coast Starlight – a “2+1” passenger train schedule), and six round trips per day between Portland, Oregon, and Vancouver, Washington (four Amtrak Cascades trains plus the Amtrak Coast Starlight and the Amtrak Empire Builder - a “4+2” schedule). The Washington State Department of Transportation (WSDOT) has commitments to increase to a “6+2” schedule between Portland and Seattle, Washington; the No Action Alternative would provide the same frequency in 2035.

Alternative 1

Alternative 1 would consist of the existing route traveled by Amtrak between Eugene, Oregon, and Vancouver, Washington, with capital improvements implemented adjacent to the existing Amtrak alignment in specific locations. Track modifications or additions would consist of mainline track, sidings, crossovers, and industry connections constructed or reconfigured as needed to optimize freight and passenger rail operations throughout the full route. Under Alternative 1, passenger trains would continue to share track with freight trains, and the route would serve seven passenger rail round trips per day—six on the Amtrak Cascades and one on the Coast Starlight (a “6+1” schedule). Between Eugene and Portland, this reflects an increase in the number of trips from the No Action Alternative, which would continue to follow the existing schedule (three round trips per day, or a 2+1 schedule). North of Portland Union Station, Alternative 1 would be the same as under the No Action Alternative (eight round trips per day, or a 6+2 schedule). Alternative 1 would have the same existing stations (Eugene, Albany, Salem, Oregon City and Portland) as the No Action Alternative.

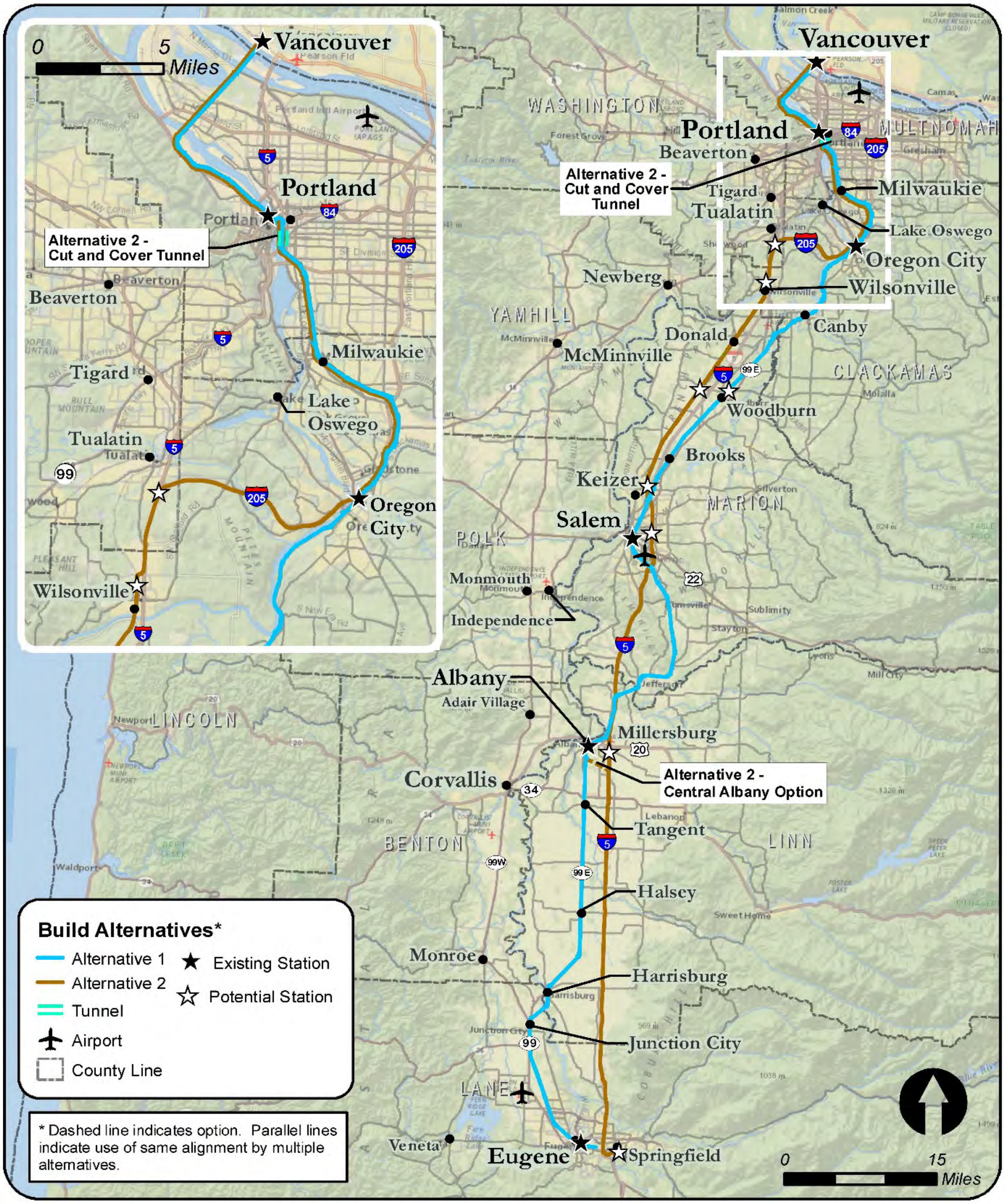

Figure ES-3 Build Alternatives

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Alternative 2

Between Springfield and Oregon City, Alternative 2 would consist of a predominantly new rail route following I-5, an existing freight rail route, and Interstate 205 (I-205). Alternative 2 would follow the current passenger rail route north of Oregon City to Vancouver, Washington. For the majority of the Alternative 2 alignment, capital improvements would occur either adjacent to the existing I-5 and I-205 freeway corridors or adjacent to the existing Portland and Western Railroad (PNWR) line between Keizer and Wilsonville, and adjacent to the existing UPRR alignment in Springfield and between Oregon City and Portland Union Station. Except for a proposed tunnel below SE 2nd Avenue in Portland, Alternative 2 would be identical to Alternative 1 between Oregon City and Vancouver, Washington. This alternative would add new passenger railroad track throughout virtually the full route to provide a single-track mainline for the full alignment. New track would not be added at the Willamette River crossings south of Wilsonville and at the Steel Bridge in downtown Portland. Passenger trains would share track with freight trains where Alternative 2 is adjacent to existing UPRR and PNWR freight rail lines. In other areas, primarily parallel to I-5 and I-205, the new track would be for the exclusive use of passenger rail. Alternative 2 would have seven round trips per day between Springfield and Portland Union Station —six Amtrak Cascades and one Coast Starlight (a “6+1” schedule). Alternative 2 would serve the existing Portland station but would have new stations in Springfield, Albany, Salem or Keizer, and Wilsonville or Tualatin.

Alternative 2 with Central Albany Option

The Alternative 2 with Central Albany Option varies from Alternative 2 in the vicinity of Albany, Oregon. This option would allow service to the existing passenger rail station in Albany and would not require a new station in Albany near I-5. The Alternative 2 with Central Albany Option would diverge from Alternative 2 for 10.7 miles from the existing I-5 corridor at the south edge of Albany to the Alternative 2 alignment on the east side of I-5, north of Millersburg.

Preferred Alternative

Historically, ODOT has deferred the identification of a Preferred Alternative for Federally-assisted transportation projects until after public review of a Draft EIS. However, recent efforts by the Federal government to streamline the environmental review process, such as 49 U.S.C. § 304(a) (requiring, to the maximum extent practicable, the development of a combined Final EIS and Record of Decision), led ODOT and FRA to identify the Preferred Alternative in this Draft EIS to further inform the public’s review.

ODOT used the evaluation criteria previously developed and based on the Goals and Objectives to compare the two build alternatives and subsequently identified Alternative 1 as the Preferred Alternative. During OPR Project scoping, ODOT conducted an open, interactive process to develop the project Purpose and Need statement and high-level goals and objectives. ODOT used the OPR Project goals and objectives to develop an evaluation framework, which served as the basis for the analysis and screening of corridor concepts and preliminary alternatives. In association with the technical analyses conducted for this Draft EIS, ODOT used the evaluation framework to compare the Alternatives. Table ES-1 shows Project goals and summarizes objectives-based performance attributes that differentiate one or more of the DEIS Alternatives. Based on the comparison of performance attributes, ODOT and FRA proposed that Alternative 1 be identified in this Draft EIS as the Preferred Alternative. More information on the Preferred Alternative can be found in Chapter 4, Section 4.22.

Table ES-1. DEIS Alternatives Evaluation Findings

Performance Attribute	No Action Alternative	Alternative 1	Alternative 2
Goal 1: Improve passenger rail mobility and accessibility to communities in the Willamette Valley			
Passenger rail trip time: Eugene to/from Portland	2:35	2:20	2:02
Ability to accommodate higher speeds in the future	Maintains current maximum speed (79 mph)	Maintains current maximum speed (79 mph)	Maximum speeds of 120 mph on portions of new alignment
Goal 2: Protect freight-rail capacity and investments in the corridor, and maintain safety			
Future freight-rail capacity	No improvement	Build alternatives designed to protect capacity	
At-grade (street level) crossings	Two passive crossings closed; no additional safety modifications to existing at-grade crossings	Widening of 64 existing crossings to accommodate additional track; safety improvements as needed	Widening of 52 existing crossings; safety improvements as needed, 1 new crossing (65 for Central Albany Option)
Goal 3: Plan, design, implement, maintain, and operate a cost-effective project			
Ability to phase improvements over time	Not applicable	Could be constructed incrementally in smaller phased projects	Would require building in large sections; if phased, could require improvements to existing alignment
Capital costs through 2035 (2015 dollars)	Not applicable	$870 - $1,025 million	$3.62-4.44 billion
Ridership (2035)	390,000	739,000	723,000
Goal 4: Provide an affordable and equitable travel alternative			
Cost and access	No change	Improved train service for both build alternatives	
Goal 5: Be compatible with passenger rail investments planned in Washington State			
Compatibility	No change	Build alternatives were designed to meet this goal	
Goal 6: Promote community health and quality of life for communities along the corridor			
Produces benefits and minimizes negative impacts	No change	Higher frequency and ridership, improves service to central cities	Higher frequency and ridership, but service focused outside central cities
Goal 7: Protect and preserve the natural and built environment			
Support preservation of land, avoid and minimize negative impacts	No change	Lower footprint and construction impacts than Alternative 2	New alignment, thus higher right-of-way and environmental impacts than Alternative 1

Impacts Summary

This section summarizes the potential effects of implementation of the build alternatives and the No Action Alternative based on the analysis of the social, economic and environmental resources documented in Chapter 4. The potential effects of, and the differences in effects among, the alternatives are described in each resource section in Chapter 4 and are summarized in Table ES-2. General considerations regarding the effects of constructing stations are discussed when applicable.

The potential for effects and the comparison of effects among alternatives are based on the presence of resources within various resource-specific study areas. The resource-specific study areas vary in size since impacts to some resources, like hazardous materials, generally occur within the construction footprint while others, like noise and visual, often occur away from the construction footprint. The identification of resources within the resource-specific study areas allows for a comparison of effects among alternatives and provides information about key resources that may need to be considered during the project-level design that would be reviewed during a Tier 2 NEPA process.

Table ES-2 provides a summary of resource effects. The table does not represent the actual impacts that would occur from implementation of a future project, but rather represents a generalization about the potential for impacts based on the location of improvements and the corresponding location of known resources.

Table ES-2. Summary of Environmental Consequences Related to the Resources Addressed in DEIS

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Transportation	Passenger Rail Ridership (Annual – 2035): 197,000. Thruway Bus Ridership (Annual – 2035): 193,000. 2035 Station Activity (annual number of riders, both on and off for rail and bus): 1,302,500. Passenger Train Travel Time: 02:35. At-grade crossings – decrease by 2, but safety and mobility concerns exist due to remaining 147 at-grade crossings and freight traffic increases. Connectivity and accessibility to stations to remain similar to existing, except for Transportation System Plan (TSP) project improvements by local jurisdictions. With the expected increase in freight demand, delays would continue and could increase, resulting in increased travel times and decreased reliability for passenger trains.	Passenger Rail Ridership (Annual – 2035): 646,000. Thruway Bus Ridership (Annual – 2035): 93,000. 2035 Station Activity (annual number of riders, both on and off for rail and bus): 1,862,700. Passenger Train Travel Time: 02:20. Alternative 1 would have the same number of at-grade crossings (147) as the No Action Alternative but would include improvements at existing at-grade crossings, which would increase safety for pedestrians, bicyclists and vehicles. Safety upgrades may create added wait times at grade crossings for surface vehicles. Connectivity and accessibility to stations to remain similar to existing except for TSP project improvements by local jurisdictions. Improvements made under Alternative 1 would be used by both passenger and freight trains. This could result in an improvement in freight operations and capacity.	Passenger Rail Ridership (Annual – 2035): 631,000. Thruway Bus Ridership (Annual – 2035): 92,000. 2035 Station Activity (annual number of riders, both on and off for rail and bus): 1,841,700. Passenger Train Travel Time: 02:02. Alternative 2 improvements include a number of elevated structures, which would reduce the number of at-grade crossings used by passenger trains to 47, thereby increasing safety for multimodal surface users. Connectivity and accessibility would experience potential impacts for stations built closer to I-5, where few, if any, multimodal connections exist from nearby neighborhoods. Street and highway network impacts could occur, because Alternative 2 would be close to the existing I-5 and I-205 freeways and their interchanges, and the construction of elevated structures could require realignment of existing roads in several locations. Alternative 2 would remove passenger trains from much of the UPRR between Springfield and Oregon City, freeing up capacity for freight traffic. New track constructed adjacent to existing rail lines would be available for use by freight traffic which would increase freight capacity.	Passenger Rail and Thruway Bus Ridership and Station Activity (2035) – Similar to Alternative 2. Passenger Train Travel Time: slightly longer than for Alternative 2. Alternative 2 Central Albany Option would increase the number of existing at-grade crossings used by passenger trains to 59, thereby potentially impacting safety for multimodal surface users. Connectivity and accessibility would be similar to Alternative 2 except for in Albany, where existing multimodal infrastructure exists. Street and highway network impacts similar to those for Alternative 2, except for more impact in Albany, where there will be a substantial increase in at-grade crossings used by passenger trains. Freight capacity and operations would be similar to Alternative 2, except for more potential freight-related delays in the downtown Albany area.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Land Use/ Agricultural Lands	No impacts.	Impacts from conversion of existing land uses and agricultural lands to a transportation-related use along the rail alignment would be minimal. No impacts to existing station areas are anticipated, and no new stations are proposed under Alternative 1. In general, Alternative 1 is anticipated to have fewer land use and agricultural lands impacts than Alternative 2.	The new alignment associated with Alternative 2 is anticipated to result in a greater degree of impacts than Alternative 1 related to the conversion of existing land uses, including agricultural lands, to a transportation-related use and impacts to existing structures. An exception to Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces) could be required for potential impacts to up to two aggregate mining resources. Goal 15 (Willamette River Greenway) would be required where new crossings of the Willamette River occur (Springfield and Oregon City). Alternative 2 would involve the construction of up to four new stations; the study area includes six potential locations for the new stations.[3] The potential direct land use impacts related to siting new stations consist of conversion of existing uses to a transportation-related use, displacement of existing uses, and impacts to agricultural lands.	Impacts similar to Alternative 2, except there will not be a new station area that converts industrial land to a station area in Albany.

[3] See Chapter 3 for details. Potential new stations include: (1) Springfield, (2) Albany, (3) Salem or Keizer, and (4) Wilsonville or Tualatin.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Environmental Justice, and Title VI of the Civil Rights Act	Under the No Action Alternative, Amtrak Cascades passenger rail service would continue serving existing stations in Eugene, Albany, Salem, Oregon City and Portland, and changes to current track configurations or operations would not occur. The No Action Alternative would not meet the OPR Project purpose and need, and would result in associated impacts in communities including EJ populations near existing stations. The No Action Alternative would not result in beneficial effects on EJ populations associated with improvements to enhance intercity passenger rail service.	Because Alternative 1 is primarily within or adjacent to an existing transportation right-of-way (ROW), it would result in few displacements and impacts to Environmental Justice (EJ) and limited English proficiency (LEP) populations.	Alternative 2 would include the addition of new track throughout the full alignment and the potential for up to four new stations. Therefore, it is anticipated that Alternative 2 would result in a greater degree of displacements and impacts to EJ and LEP populations.	The potential impacts would be the similar to those for Alternative 2.
Social Resources	The No Action Alternative would not result in the separation or isolation of land uses, redistribution of population, or the bisecting of communities, nor would it require ROW acquisition or the displacement of community resources.	Because Alternative 1 would either share or parallel the existing UPRR ROW, impacts related to community cohesion as a result of the bisection of communities or barriers to interaction would be minimal. Alternative 1 would benefit communities within the study area by providing faster and more frequent passenger rail service.	Alternative 2 would be constructed within or adjacent to the existing I-5, I-205, PNWR, and UPRR ROW, which already bisect communities; therefore, potential impacts related to the bisection of communities would be minor. Alternative 2 would result in more ROW acquisition and a greater potential for displacement of buildings and structures than Alternative 1. Similar to Alternative 1, Alternative 2 would benefit communities within the study area by providing faster and more frequent passenger rail service.	Outside of the Albany area, the Alternative 2 with Central Albany Option would have the same impacts to social resources as those described for Alternative 2. Where the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station there would be impacts to community resources and features such as parks.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Economics	The No Action Alternative would have few and negligible economic impacts, because the proposed action would not be constructed, and the service levels and stations served by passenger trains and buses would remain the same as in the existing condition.	Alternative 1 has more employment density and establishments near the existing station locations.	Short-term economic impacts associated with construction would be larger under Alternative 2 than Alternative 1, because Alternative 2 would have a higher construction cost.	Similar to Alternative 2.
Section 4(f) and Section 6(f) Resources	The No Action Alternative would have no effects on any Section 4(f) or Section 6(f) resources.	Alternative 1 could impact up to 13 Section 4(f) parks/recreation resources. Section 6(f) of the Land and Water Conservation Fund (LWCF) Act also protects six of these resources.	Alternative 2 could impact up to 18 Section 4(f) parks/recreation resources. Section 6(f) of the LWCF Act also protects four of these resources.	Potential impacts to parks and recreational resources under the Alternative 2 Central Albany Option would be the same as those described for Alternative 2, with the addition of potential impacts on one more Section 4(f) property.
Visual and Aesthetic Quality	The No Action Alternative would not result in visual/aesthetic impacts, except that the increase in freight demand could increase freight traffic and, in cases where the railroad is visible but is not a prominent feature until a train passes by, increase foreground views of passing freight trains.	Alternative 1 would result in minor visual impacts, because it involves limited physical changes, with structures that would be constructed immediately adjacent to the existing railroad alignment, and it would use existing stations. Alternative 1 would result in eight more passenger trains per day (four round trips per day) traveling on the alignment. When considered along with the anticipated increase in freight traffic, Alternative 1 could create a noticeable visual change (i.e., more frequent views of trains) for viewers from adjacent properties.	Alternative 2 would introduce more than 20 miles of elevated structures (viaducts and bridges) and four new stations, which have the potential to result in visual changes, specifically where these structures could be seen by sensitive receptors from designated scenic resources, from open space areas or from residential areas. The extent of new and elevated structures under Alternative 2 has the potential to result in adverse visual effects, including to the Willamette Scenic Bikeway.	Alternative 2 with Central Albany Option would provide more feet of new main track and would introduce two additional elevated crossings of I-5, but one fewer new station than Alternative 2. The elevated crossings would be visible from some distance away and would introduce a significant new visual element into the present landscape.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Noise and Vibration	The No Action Alternative would not introduce new passenger train service or related noise and vibration impacts. Noise and vibration in the existing service corridor could increase with anticipated increases in freight train traffic.	Noise-sensitive uses within the study area: Residential acres: 1,615 Institutional uses: 71 Vibration Impacts: 317 acres of residential land; 7 institutional uses. Noise Impacts: At the 140 public at-grade crossings, the sounding of warning horns by additional passenger rail trains outside designated Quiet Zones (currently in central Salem, Milwaukie and northwest Portland) would result in an incremental increase in noise levels, along with potential new noise sources at upgraded crossings.	Noise-sensitive areas within the study area: Residential acres: 2,185 Institutional uses: 50 Vibration Impacts: New vibration source in areas where there is new rail construction (including along existing railroad alignments, e.g., PNWR and UPRR); 275 acres of residential land; 8 institutional uses. Noise Impacts: At the 46 existing public at-grade crossings, the sounding of warning horns by additional passenger trains outside designated Quiet Zones (currently in Milwaukie and northwest Portland) would result in an incremental increase in noise levels, along with potential new noise sources at upgraded and new crossings.	The Alternative 2 with Central Albany Option would have impacts similar to Alternative 2, with the majority of the potential noise impacts in urban areas. However, the Central Albany Option would include more potential for noise impacts near at-grade crossings (59) than would Alternative 2 (46).
Hazardous Materials	Because no construction activities would be associated with the No Action Alternative, no known or suspected subsurface hazardous materials would be encountered.	All build alternatives could require removal of buildings or structures containing hazardous materials, such as asbestos or lead-based paint. However, Alternative 1 would primarily involve the continued use of existing UPRR mainline track and stations, thereby limiting the area of disturbance and reducing the likelihood of encountering hazardous materials.	Alternative 2 would include new track along the full alignment and four new stations, which could result in the demolition and/or modification of existing buildings and other structures to a greater degree than Alternative 1, thereby increasing the likelihood of encountering hazardous materials.	Similar to Alternative 2 with more potential to encounter buildings that need to be removed near downtown Albany. This option would use the existing Albany station and would have one less new station than Alternative 2.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Cultural and Historic Resources	No track or station improvements would be made as a result of the No Action Alternative. Therefore, the No Action Alternative would have no direct impacts to historic properties listed on or eligible for the National Register of Historic Places (NRHP).	Historic properties adjacent to the existing, active UPRR alignment are not expected to receive any adverse effects, because the changes to the existing conditions of these historic properties, which are already adjacent to an active rail line, would likely be negligible. Direct impacts on the historic railroad lines would likely occur, but are not anticipated to be adverse effects. None of the 8 known archaeological sites within the area of potential effect (APE) for Alternative 1 have been determined eligible for listing in the NRHP. However, because field investigations have not been conducted, potential adverse impacts to archaeological sites are unknown.	Historic properties adjacent to existing active rail alignments would have similar effects as Alternative 1. However, ROW and station area acquisition could potentially result in acquisition and demolition of historic properties, which could result in adverse effects. Four of the ten known archaeological sites within the Alternative 2 APE have been determined eligible for listing in the NRHP. However, because field investigations have not been conducted, potential adverse impacts to archaeological sites are unknown.	Historic properties, including the existing station, are already adjacent to an existing railroad line and improvements to the line would likely not have a significant direct impact or adverse effect to the historic properties. Because field investigations have not been conducted, potential adverse impacts to archaeological sites are unknown.
Geology and Soils	No impacts to or from geology and soils would result from the No Action Alternative.	Alternative 1 would be constructed within and parallel to an existing rail alignment; therefore, limited earthwork is anticipated. No large fills would be required, so settlement because of compressible soil is expected to be minimal. Therefore, limited impacts to or from geology and soils would result from Alternative 1.	Alternative 2 would require considerably more earthwork than Alternative 1 for bridges and elevated viaduct structures with retained approach fills and from rock cuts. Cuts and fills placed in areas with potentially hazardous soil or slope conditions (e.g., compressible soil, historic landfills, or unconsolidated debris flow fans) would need mitigation.	Similar to Alternative 2, but the existing Albany Station is located in an area mapped with a liquefaction susceptibility of “very high.”

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Biological Resources	The No Action Alternative would have no new direct impacts on biological resources.	The Alternative 1 study area has 13 known locations of special-status species, and 1 known location of a Federally listed species within the area of potential impact. Alternative 1 has 95 acres of general wildlife habitats and 7.4 acres of Oregon Conservation Strategy (OCS) habitats. Alternative 1 could directly impact up to 14 wildlife linkages. Alternative 1 has approximately 1.8 acres of conservation easements (wetlands) in its potential impact area. Alternative 1 could impact up to 10 streams with protected fish.	The Alternative 2 study area has 7 known locations of special-status species. Alternative 2 has more potential than Alternative 1 to directly impact natural wildlife habitats (284 acres) and Oregon Conservation Strategy (OCS) habitats (20.6 acres). Alternative 2 could directly impact up to 64 wildlife linkages. Alternative 2 has approximately 2.8 acres of conservation easements (wetlands) in its potential impact area. Alternative 2 could impact up to 22 streams with protected fish.	Similar to Alternative 2 except has no conservation easements in its potential impact area.
Floodplain	There are no direct or indirect impacts to floodplains associated with the No Action Alternative.	Alternative 1 would potentially impact approximately 100,087 lineal feet and 287 acres of high-risk floodplain.	Alternative 2 would potentially impact approximately 113,440 lineal feet and 1,110 acres of high-risk floodplain.	The Alternative 2 with Central Albany Option would potentially impact 113,450 lineal feet and 1,114 acres of high-risk floodplain.
Water Quality/ Surface Water/ Stormwater	The No Action Alternative would have no new water quality, surface water or stormwater impacts.	Alternative 1 would cross 43 Section 303(d)-listed impaired water bodies. Impacts would come from operations and maintenance activities associated with the passenger rail lines.	Alternative 2 would cross 40 Section 303(d)-listed impaired water bodies. Impacts would come from operations and maintenance activities associated with the new passenger rail lines, as well as from installation of four new passenger rail stations.	The Alternative 2 with Central Albany Option would require two additional crossings of Section 303(d)-listed impaired water bodies. The passenger rail stations are identical, with the exception of the Albany Station. Therefore, impacts would be slightly reduced compared to those of Alternative 2, because this option would construct one fewer new station.

Resource	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 w/Central Albany
Wetlands and Waterways	There would be no project-related construction and, therefore, no new project-related wetland and waterway impacts.	Alternative 1 would have up to 32 acres of wetland impacts and 7 acres of high-value wetland impacts. There are 378 acres of hydric soils within the Alternative 1 study area (excluding areas mapped as wetland).	Alternative 2 would have up to 144 acres of wetland impacts and 49 acres of high-value wetland impacts. There are 818 acres of hydric soils within the Alternative 2 study area (excluding areas mapped as wetland) There are a total of 1.8 acres of wetland, including 0.6 acre of high-value wetland, in the 20 acre areas identified for the seven potential new station locations.	The Alternative 2 with Central Albany Option would add 1 acre of potential direct wetland impacts and add 70 acres of potential hydric soil impacts to the Alternative 2 impacts. However, there would be no additional acreage of high-value wetlands impacts, and there would be no wetland impacts related to the existing Albany Station.
Air Quality	The No Action Alternative would have increased bus emissions due to the planned additional round trip between Eugene and Salem. Washington has purchased eight next generation locomotives with lower emissions that are in service throughout the PNWRC.	Alternative 1 has higher locomotive emissions than the No Action Alternative because of increased rail service, but lower Thruway bus emissions because of a decrease in bus service.	Alternative 2 has lower emissions than Alternative 1, because the passenger rail alignment is about 5 miles shorter for this alternative. However, impacts from Thruway bus service are the same as for Alternative 1.	The Alternative 2 with Central Albany Option would have the same approximate emissions as Alternative 1 because of the additional miles required to reach the Central Albany station.
Energy	The No Action Alternative would result in a 9.5 percent decrease in fuel use (and greenhouse gas [GHG] emissions) compared to existing conditions. The decrease is based on expected improvement in fuel efficiency from new locomotives.	Alternative 1 would benefit from the same fuel efficiency gains as the No Action Alternative. Alternative 1 would increase fuel use (and GHG emissions) by approximately 80 percent compared to the No Action Alternative because of the increase in rail service frequencies.	Alternative 2 would benefit from the same fuel efficiency gains as the No Action Alternative. Alternative 2 would increase fuel use (and GHG emissions) by approximately 75 percent compared to the No Action Alternative because of the increase from three to seven daily passenger rail round trips. However, compared to Alternative 1, fuel use related to Alternative 2 would be about 4 percent lower, because it would have fewer track miles.	The Alternative 2 with Central Albany Option would benefit from the same fuel efficiency gains as the No Action Alternative. However, fuel use for this option would be slightly higher than that for Alternative 2, because it would have more track miles.

Mitigation Strategies

In a Tier 1 EIS, potential impacts are identified using high level data and analysis. For the OPR Project, ODOT used existing information on known resources and estimated impacts with a lower level of engineering than is used at a project level analysis. Because of that, the available information is not detailed enough to formulate specific mitigation measures. Therefore, each resource evaluation includes a list of mitigation strategies that would be considered and further developed in the future as part of the Tier 2 environmental analysis (see Chapter 4). Mitigation strategies listed in Chapter 4 include conceptual avoidance and minimization measures for the next phase of design, suggestions for programmatic agreements, Best Management Practices (BMPs), regulatory coordination and further technical study requirements.

Public and Agency Coordination

The public involvement process for the OPR Project was designed to solicit early and frequent coordination with interested parties, stakeholders, government agencies and Tribes to facilitate their input on the purpose and scope, key issues and concerns, and the development and narrowing of alternatives. Input received during the public involvement process helped to shape the OPR Project Purpose and Need, Goals and Objectives, methods of analysis and decision-making process. The OPR Project public involvement process includes the following goals:

- Communicate complete, accurate, understandable and timely information to the public throughout the development of the EIS and the SDP
- Actively seek public input throughout the OPR Project
- Provide meaningful public involvement opportunities and demonstrate how input has influenced the OPR Project EIS and SDP
- Seek participation of all potentially affected and/or interested individuals, communities and organizations
- Ensure that the public involvement process is sensitive to local policies, plans and perspectives

ODOT implemented a number of communication tools and materials to make OPR Project information widely available, and to attain high levels of public participation and input during the development of the Draft Tier 1 EIS. The OPR Project public involvement process has included the following activities and tools:

- **Stakeholder Database.** The stakeholder database includes potentially impacted parties, interested parties and past meeting attendees. The database is regularly updated and serves as the main contact list for all OPR Project mailings and outreach materials.
- **Regulatory Agency Coordination.** ODOT coordinated with and solicited input from Federal and state regulatory agencies during the development of this OPR Project Draft Tier 1 EIS, including the natural resource, cultural resource and land use planning agencies identified in Section 5.3.1. ODOT has logged and analyzed all of the public and agency comments received to date, and has provided responses to comments as appropriate.
- **Community and Jurisdictional Briefings.** ODOT met with local jurisdictions and community groups to discuss the OPR Project and collect input. These briefings provided an opportunity to meet with stakeholders and discuss issues specific to a region or community. These included 20 face to face briefings and 3 online briefings.
- **Individual Communications.** ODOT held briefings with stakeholders and officials upon request to share information and collect input. Examples of these individual communications included briefings with state representatives, communication with staff from local jurisdictions and contact with individual stakeholders.

- **Fact Sheets/Newsletters.** ODOT prepared fact sheets to support open houses, committee meetings and community briefings. ODOT also produced and distributed a newsletter before each round of open houses to share information and invite participation. To date, ODOT has developed and distributed four newsletters.
- **News Media.** ODOT sent out news releases before open houses and committee meetings, and at other key milestones. ODOT purchased print and radio advertisements with English and Spanish language media outlets to promote open houses. ODOT also participated in interviews with radio, television and print media.
- **Open Houses/Online Open Houses.** ODOT used open houses to share information with stakeholders and interested parties, as well as to gather their feedback and opinions. ODOT posted materials and displays from the open houses on the OPR Project website. Additionally, during each public open house, ODOT conducted an online open house to engage individuals who might not attend in-person open houses. The online open houses included OPR Project information and videos, and provided the same opportunities for comment as the in-person open houses. Nineteen open houses and four online open houses have been held to date.
- **Community Events**. ODOT hosted information booths at 37 community events (such as farmers' markets, universities, athletic events and seasonal festivals) to provide opportunities to talk about the OPR Project one-on-one and to get feedback from the public.
- **Website/Social Media.** The OPR Project website, www.OregonPassengerRail.org, has been the primary portal for public information. The site includes a description of the OPR Project purpose and context, EIS-related materials and documents, and contact information for OPR Project staff. ODOT announces upcoming meetings on the OPR Project website and posts materials in advance of each meeting. The OPR Project website contains an online comment form that the public can use to share thoughts and ideas at any time. ODOT also employs its Facebook page and Twitter feed to convey information about OPR Project events and milestones. Furthermore, ODOT works with local jurisdictions and community organizations within the OPR Project study area to post information about the OPR Project on their own social media pages at key outreach points.
- **Informational Videos.** ODOT produced an overview video in the early stages of the OPR Project to help raise awareness regarding the purpose and context of the OPR Project. This video was featured on the OPR Project website and was integrated into online open houses. Subsequent informational videos were posted on the website in association with public outreach conducted during the development and narrowing of OPR Project alternatives. In addition, some key OPR Project committee meetings have been video-recorded and posted on the website.
- **Outreach to Disadvantaged Populations.** ODOT targeted outreach efforts to minority, low-income and limited English proficiency (LEP) populations by providing key project information in Spanish, reaching out to community-based organizations, using ethnic news media sources and having interpreters at meetings.
- **Tribal Outreach and Coordination.** In August 2012, ODOT and FRA identified Tribes with potential interest in the OPR Project because of historic presence and/or treaty interest in the OPR Project EIS study area. At the beginning of the scoping process, FRA and ODOT sent letters to those Tribes to initiate government-to-government consultation and to invite Tribal participation in the development of the OPR Project EIS. The correspondence requested input on the Purpose and Need as well as identification of Tribal issues and concerns related to the OPR Project. In addition, two meetings were held. ODOT and FRA will continue to coordinate with the Tribes through the remainder of the decision-making process for the OPR Project.

- **Leadership Council.** Governor John Kitzhaber established the Oregon Passenger Rail Leadership Council, which is a core advisory group composed mostly of elected officials from the Willamette Valley. The Leadership Council provides guidance to ODOT and works with ODOT to finalize OPR Project recommendations submitted to FRA for FRA's consideration. Eleven Leadership Council meetings have been held to date.
- **Railroad Coordination.** ODOT met with railroad stakeholders in the OPR Project study area during the scoping period to inform them of the process, key elements, schedule and data input needed for the OPR Project. These meetings also provided an opportunity for the railroad stakeholders to comment on the OPR Project to assist in the development of the scope of the OPR Project. To date, 16 meetings have been held with railroad stakeholders.

Following the release of this OPR Project Draft EIS, ODOT will host multiple public hearings and an online open house in order to gather feedback on the Draft EIS from stakeholders and interested parties. Public involvement will continue through the preparation and release of the Final EIS and Record of Decision.

Next Steps

The public review and comment period on the Tier 1 DEIS will provide interested parties, stakeholders, government agencies, Tribes and members of the public the opportunity to review the document, attend public hearings and provide comments to inform decision-making. ODOT and FRA will prepare a Final EIS (FEIS) that will summarize the Draft EIS, identify changes to the Draft EIS that occurred as a result of agency, stakeholder and public input, respond to substantive comments received on the Draft EIS, and identify and describe the final selected alternative. Concurrent with the alternative selection, ODOT and FRA will prepare a Service Development Plan to document planning activities, how the OPR Project could be implemented, and to support Federal and state decisions regarding potential future project implementation and funding.

As described in Chapter 4, the Draft EIS identifies the Preferred Alternative and provides a summary explanation regarding the basis for the selection. Depending on the nature of the comments received on the DEIS, FRA may issue a combined Tier 1 FEIS and Record of Decision that document the Federal decision for the selected alternative and the process for accommodating mitigation measures that would need to be implemented. Most mitigation measures in this Draft Tier 1 EIS represent commitments to further design avoidance and minimization measures and coordination with the public, resource and regulatory agencies, and Tribes during Tier 2 studies as project-level design is developed.

ODOT anticipates seeking a combination of Federal and state funding to advance the OPR Project into final design and construction, and anticipates that this would be done in phases; however, currently no funding has been identified to advance the project. If ODOT advances the OPR Project into final design and construction and Federal funding permits, or other Federal approval is involved, a Tier 2 NEPA analysis, led by the appropriate Federal agency, would be required. The scope of such review would be based on the nature of the Federal action.

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Acronyms and Abbreviations

AERC	Albany & Eastern Railroad Company
APE	Area of Potential Effects
BC	British Columbia
BFE	Base Floodplain Elevation
BNSF	BNSF Railway
BRT	Bus Rapid Transit
CBD	Central Business District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CETAS	Collaborative Environmental and Transportation Agreement for Streamlining
CFR	Code of Federal Regulations
CIP	Corridor Investment Plan
CWA	Clean Water Act
DEQ	Department of Environmental Quality
DMU	diesel multiple unit
DSL	Department of State Lands
EFU	Exclusive Farm Use
EIS	Environmental Impact Statement
EJ	Environmental Justice
EmX	Emerald Express
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
g/gal	grams per gallon
g/veh-mile	grams per vehicle-mile
GHG	greenhouse gas
GIS	Geographic Information Systems
HSIPR	High-Speed Intercity Passenger Rail
HSR	High-Speed Rail

I-205	Interstate 205
I-5	Interstate 5
LEP	limited English proficiency
Lf	lineal feet
LQ	location quotient
LTD	Lane Transit District
LWCFA	Land and Water Conservation Fund Act
mph	miles per hour
MS4	Municipal Separate Storm Sewer System
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O&M	operations and maintenance
OAR	Oregon Administrative Rule
OCS	Oregon Conservation Strategy
ODFW	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OPR Project	Oregon Passenger Rail Project
OPR	Oregon Passenger Rail
OR 228	Oregon Highway 228
OR	Oregon
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statute
PNWR	Portland and Western Railroad
PNWRC	Pacific Northwest Rail Corridor
Project	Oregon Passenger Rail Project
PTC	Positive Train Control
ROD	Record of Decision
ROW	right-of-way
RTP	Regional Transportation Plan
SAAQS	state ambient air quality standards

SDP	Service Development Plan
SE	Southeast
Section 106	Section 106 of the National Historic Preservation Act of 1966
SHPO	Oregon Parks and Recreation Department's State Historic Preservation Office
SIP	State Implementation Plan
STIP	*2015-2018 Statewide Transportation Improvement Program*
SVOC	semi-volatile organic compound
Title VI	Title VI of the Civil Rights Act of 1964
TSP	Transportation System Plan
U.S. Census	U.S. Census Bureau
UGB	Urban Growth Boundary
UPRR	Union Pacific Railroad
USC	United States Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WA	Washington
WES	Westside Express Service
WSDOT	Washington State Department of Transportation

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CHAPTER 1

Introduction and Purpose and Need

This chapter describes the purpose and need for improving intercity passenger rail service along the Oregon segment of the Pacific Northwest Rail Corridor (PNWRC). The Oregon segment of the PNWRC is approximately 125 miles long, from the Eugene-Springfield urban area to Portland. The US Department of Transportation's (USDOT), Federal Railroad Administration (FRA) is the Federal lead agency and the Oregon Department of Transportation (ODOT) is working with the FRA to complete the Oregon Passenger Rail (OPR) Project. The FRA, ODOT and ODOT's consultants comprise the "OPR Project team." The OPR Project entails development of a Corridor Investment Plan (CIP), which has the following two components: development of Service Development Plan (SDP) and associated Tier 1 Environmental Impact Statement (EIS). The OPR Project, and the background leading to its development, are described in more detail in the following sections of this chapter.

The entire Oregon portion of the PNWRC that comprises the OPR Project study area is within the Willamette Valley. In the next 20 years, the population of Oregon's Willamette Valley is projected to grow by approximately 27 percent to reach 3.6 million residents (Oregon DAS, 2015). During the same period, freight volume in the state is expected to grow by approximately 60 percent (ODOT, 2011). These increases will result in transportation demand that exceeds the available freight and passenger rail capacity in the Willamette Valley, as both utilize the same facilities within the corridor. The goal of the OPR Project is to identify the rail infrastructure necessary to support additional passenger and freight-rail capacity, and to identify service improvements that will achieve more reliable passenger rail service with greater frequency and shorter travel times (the principal service objectives) between Portland and the Eugene-Springfield urban area.

1.1 Background and Context

The following sections provide background and contextual information regarding the impetus for, and development of, the OPR Project.

1.1.1 Pacific Northwest Rail Corridor

The PNWRC has been the subject of intercity passenger rail planning, development and operation for more than 30 years. The PNWRC is one of 11 Federally-designated high-speed rail corridors in the United States (U.S.). The FRA designated this passenger rail corridor on October 20, 1992, as one of five original corridors called for in the Intermodal Surface Transportation Efficiency Act of 1991.

The 466-mile PNWRC serves the most densely populated regions of British Columbia, Washington (WA), and Oregon (OR) (see Figure 1-1). It links Vancouver, BC, Seattle, WA, and Portland and Eugene, OR with growing intermediate communities (including the capital cities of Salem, OR, and Olympia, WA). Burlington Northern Santa Fe (BNSF) Railway owns the existing PNWRC railroad infrastructure in Washington, in British Columbia, and in Oregon north of Portland's Union Station. Union Pacific Railroad (UPRR) owns the existing PNWRC railroad infrastructure in Oregon south of Portland's Union Station. A mix of freight and passenger trains (operated by BNSF Railway, UPRR, Oregon Pacific, Portland Terminal Railroad, Willamette Valley Rail, Portland & Western Railroad, and Amtrak) currently utilize BNSF Railway and UPRR trackage that also serves as the PNWRC.

Figure 1-1. Pacific Northwest Rail Corridor
Source: Amtrak Cascades, 2017

As shown in Figure 1-2, rail ridership for full PNWCR has grown from about 287,000 riders in 1995 to nearly 780,000 in 2014, having reached about 850,000 riders in 2011 (Washington State Department of Transportation [WSDOT] Rail Division, 2015). Since 1995, rail ridership along the PNWRC has grown at an average annual growth rate of 5.6 percent.

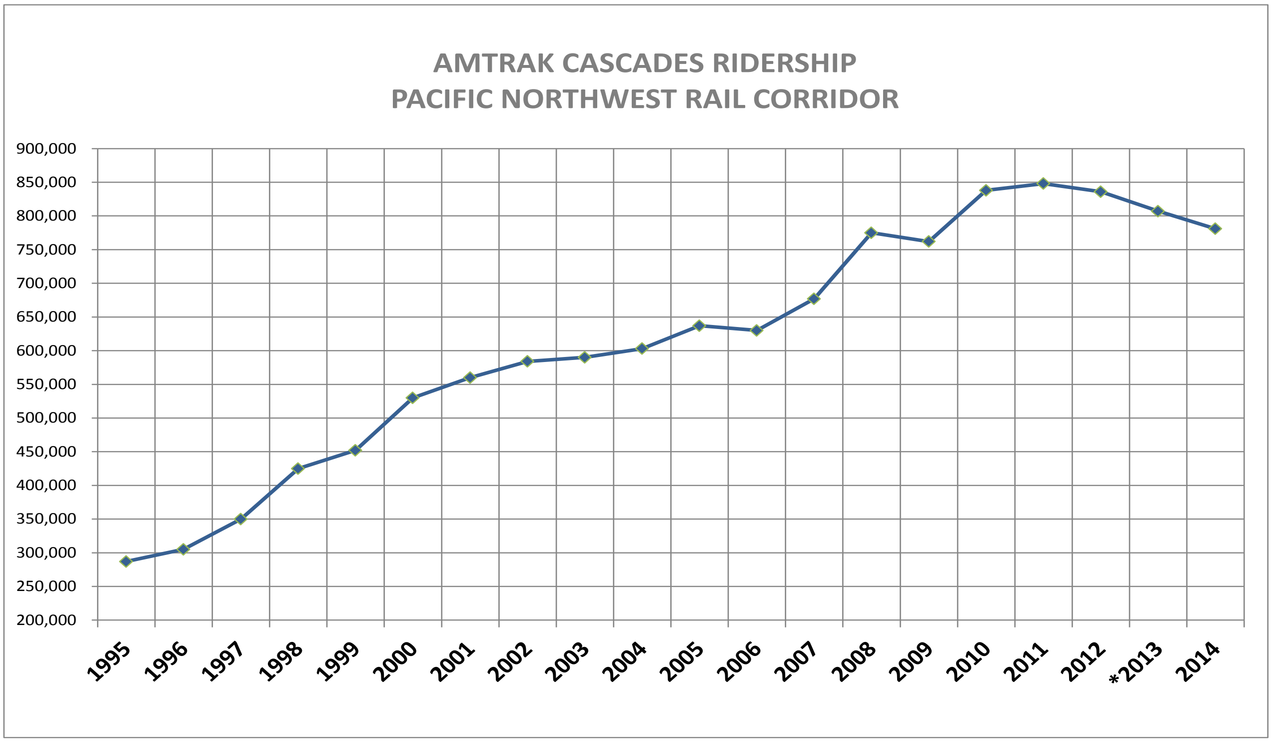

Figure 1-2. Amtrak Cascades Ridership – Pacific Northwest Rail Corridor -between 2000 and 2014
Source: Amtrak Cascades-Pacific Northwest Corridor, 2014 Performance Data Report (WSDOT Rail Division, 2015)

Oregon, Washington, and British Columbia have a long history of collaboration, contributing to the success of passenger rail service on the PNWRC. Oregon and Washington have planned, studied, and operated a coordinated, state-sponsored passenger rail service since 1994. These states' shared vision is to continue cooperation and to transition from operating as separate segments to operating the service as a fully integrated passenger rail system. Oregon and Washington will continue to work together towards achieving the common goals of increasing ridership and developing intercity passenger rail service as a competitive transportation choice.

ODOT and WSDOT signed a Memorandum of Understanding (MOU) on March 7, 2012 that committed the two agencies to joint operation of the service as a single corridor. While WSDOT and ODOT agreed to joint operations of the service in a single corridor, each state is responsible for making infrastructure funding decisions within each respective state independently. The MOU called for completion of the *Cascades Rail Corridor Management Workplan* by January 2013. ODOT and WSDOT endorsed the workplan on January 31, 2013. The *Corridor Management Workplan* provides a framework for the initial steps and milestones ODOT and WSDOT will follow in furthering the coordination, efficiency, and effectiveness of passenger rail service and operations. This workplan identifies the OPR Corridor Investment Plan among the currently funded activities within the PNWRC.

1.1.2 Oregon Passenger Rail

ODOT initiated daily Amtrak passenger rail round trips between Eugene and Portland in 1994. Since that time, Oregon has invested more than $77 million in capital improvements for passenger rail service, including railroad infrastructure, stations, and rolling stock. A second State-sponsored daily round trip was added in 2000, resulting in Oregon ridership growth of over 64,700 rail passengers between 2000 and 2014 (Figure 1-3) (Oregon Department of Transportation [ODOT], 2015). In 2010, ODOT purchased two new trainsets using Federal Highway Administration (FHWA) funds, re-purposed by the Oregon Transportation Commission and approved by the Federal Transit Administration (FTA). The trains are now in service on the Amtrak Cascades corridor.

Current intercity passenger rail service in Oregon includes two Amtrak Cascades train round trips per day. In Oregon, the Amtrak Cascades station stops include Eugene, Albany, Salem, Oregon City, and Portland, and the Amtrak Cascades route continues north to Vancouver, British Columbia (BC). In addition to the Amtrak Cascades service, Amtrak sponsors one daily round trip of the Coast Starlight between Los Angeles and Seattle and one daily round trip of the Empire Builder between Portland and Chicago. In Oregon, the Coast Starlight stops in Klamath Falls, Chemult, Eugene, Albany, Salem, and Portland. Portland is the only stop for the Empire Builder in Oregon.

ODOT also contracts with a private operator servicing eight dedicated Amtrak "Thruway" bus routes in Oregon to supplement passenger rail service. Since 1995, the combined bus and rail ridership in Oregon has grown by over 150,300 passengers, at an average annual growth rate of 7.3 percent, an important contribution to the overall PNWRC.

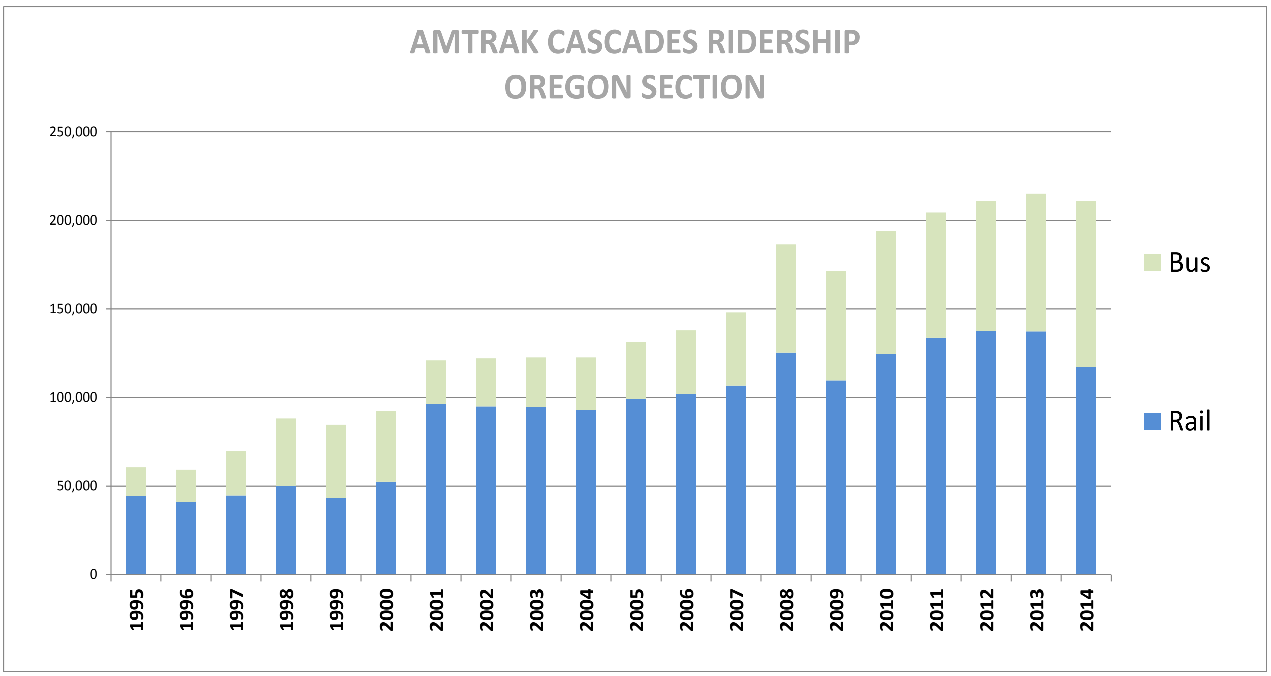

Figure 1.3. Amtrak Cascades Ridership - Oregon Section - between 1995 and 2014
Source: ODOT Rail Division: 2000-2014 Ridership Data (ODOT, 2015a)

ODOT is required to comply with their Oregon Transportation Plan (OTP), including the multiple modal elements that comprise it. ODOT's continued investment in Amtrak Cascades intercity rail and bus service directly implements the policy intent of the Oregon Transportation Options Plan (ODOT, 2015), which is an element of the OTP by: providing greater travel options to Oregon residents, businesses and visitors, through investment to expand the use of existing transportation infrastructure. The Transportation Options Plan goal is to reduce reliance on the single-occupancy vehicle by facilitating greater use of transit, biking, walking and rideshare.

1.1.3 High-Speed Intercity Passenger Rail Program

FRA developed the High-Speed Intercity Passenger Rail (HSIPR) Program to help address the nation's transportation challenges by making strategic investments in an efficient network of passenger rail corridors. The objectives of the HSIPR Program are to:

- Build new high-speed rail corridors that expand and fundamentally improve passenger transportation in the geographic regions they serve
- Upgrade existing intercity passenger rail corridors to improve the reliability, speed, and frequency of existing services
- Lay the groundwork for future high-speed rail services through corridor and state planning efforts

The HSIPR Program is funded through several appropriations, including the American Recovery and Reinvestment Act of 2009. On April 1, 2010, FRA issued the "High Speed Intercity Passenger Rail Program (HSIPR) Notice of Funding Availability (NOFA): FY 2020 Planning Projects" in the *Federal Register*. In response, ODOT submitted an application, which the USDOT selected to receive funding through a cooperative agreement to develop a Passenger Rail Corridor Investment Plan for the Oregon segment of the PNWRC. In September 2011, ODOT received $4.2 million in Federal grants from the HSIPR program to continue planning efforts aimed at improving passenger rail service on the Oregon segment of the PNWRC. This funding, along with $5.8 million from ODOT, was used to prepare this *Oregon Passenger Rail Tier 1 Draft Environmental Impact Statement (EIS)*.

1.1.4 Corridor Investment Planning

Due to the complexity of intermediate and long-range planning associated with passenger rail service development, extensive pre-construction preparation is required, including operations planning, environmental analysis/review, and conceptual engineering efforts. The first phase of this FRA process is the development of a Corridor Investment Plan (CIP). The process of completing a CIP consists of:

- Conducting an environmental review in accordance with the National Environmental Policy Act (NEPA) in which the purpose and need of the improvements are defined and alternatives are developed, then analyzed and compared based on their environmental, socioeconomic, and transportation impacts; and
- Developing a Service Development Plan (SDP), which is a detailed definition of the service improvements, transportation network, operational, and financial aspects for the passenger rail service alternative selected through the NEPA process.

Together, the Tier 1 EIS and SDP complete the CIP. This CIP is the foundation for future project development, including engineering design, project-level environmental reviews, environmental permitting, and construction. The intent of the OPR CIP is to provide sufficient information to support future FRA, State of Oregon, local government and private sector decisions to fund investments in the Oregon segment of the PNWRC.

1.1.5 Tiered Approach to the National Environmental Policy Act

FRA is the lead Federal agency responsible for conducting the NEPA environmental review process for the Project. In addition, FRA manages financial assistance programs for rail capital investments and may also have discretionary decisions related to its role as the regulator of railroad safety (e.g., promulgation of a rule of particular applicability). NEPA is a Federal environmental law that facilitates public disclosures and establishes policies for Federal agencies to study a reasonable range of alternatives and assess environmental impacts of projects. NEPA requires that Federal agencies prepare an EIS for any major Federal action significantly affecting or with the potential to significantly affect the quality of the natural and built environment.

FRA typically uses a "tiered" NEPA approach (as provided in 40 Code of Federal Regulations [CFR] 1508.28) for complex projects of this size and scope. The tiered NEPA decision-making process allows a broad-level programmatic decision with a first-tier EIS, followed by more specific decisions by means of one or more second-tier NEPA documents. The NEPA tiering approach allows for incremental decision-making regarding large projects that would otherwise be too extensive and cumbersome to analyze in a traditional project EIS.

NEPA and the Council on Environmental Quality's (CEQ) NEPA implementing regulations define the general framework for preparing an EIS. FRA also has its own, more specific, guidelines for implementing NEPA. The NEPA EIS process typically includes these steps:

- Notice of Intent (NOI) – a notice, published in the *Federal Register*, notifying the public of the Federal agency's intent to prepare an EIS, defining the proposed action, describing the scoping process including informing the public how to comment on the proposed action, and providing the name and address of a person within the agency who can answer questions about the proposed action and the EIS.
- Scoping – an early and open process for identifying significant issues related to a proposed action. As part of the scoping process, agencies and the public are invited to participate and provide comment.
- Draft EIS (DEIS) – the purpose of the DEIS is to disclose all environmental impacts associated with the project alternatives, whether they are adverse or beneficial; consider mitigation measures; and allow the public to review and comment on the document.
- Final EIS (FEIS) – the purpose of the FEIS is to disclose all environmental impacts associated with the project alternatives, whether they are adverse or beneficial; consider mitigation measures; and identify the preferred alternative. The FEIS also includes all comments received on the DEIS, and responds to those comments.
- Record of Decision (ROD) – the purpose of a ROD is for the agency to provide at the time of its decision a concise public record of that decision that identifies FRA's selected alternative, describes the alternatives considered, lists proposed Best Management Practices (BMPs) and mitigation options, and states how FRA's decision was made. The ROD issuance completes the NEPA process.

FRA and ODOT formally initiated a Tier 1 EIS for the OPR Project on August 17, 2012 through publication of an NOI in the *Federal Register.* This Tier 1 Draft EIS has been prepared in accordance with NEPA, CEQ's NEPA implementing regulations, and FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545 as updated in 78 Fed. Reg. 2713, January 14, 2013). The OPR Project Tier 1 EIS addresses corridor-level improvements to passenger rail service, including the following:

- *Rail corridor* – Reasonable and feasible rail alignment improvement alternatives from Eugene-Springfield, OR, to Vancouver, WA
- *Service characteristics* – Passenger rail operational elements, train speeds, travel time, train frequency, and train technology
- *Communities with potential stations* – The general location at the community level of passenger rail stations

This Tier 1 Draft EIS evaluates a No Action Alternative and two build alternatives (Alternative 1 and Alternative 2), as described in Chapter 3. In late 2015, the FRA and ODOT identified Alternative 1 as the Preferred Alternative, because it provides more frequent and reliable rail service in a more cost-effective way that would result in less potential adverse impacts to the built and natural environment than Alternative 2. Further description of this preferred alternative can be found in Chapter 4, Section 4.23, of this document.

The OPR Project Tier 1 EIS is the first of two potential environmental review tiers.

If FRA selects a build alternative at the conclusion of this Tier 1 NEPA analysis, it is expected that ODOT would implement the OPR Project in phases. Phases will be added as demand increases and as funding becomes available. One or more of the components or operable segments of the selected alternative for the OPR Project could also be developed as individual projects to advance into final design and construction. ODOT anticipates seeking a combination of Federal and state funding to advance the OPR Project into final design and construction, however, currently no funding has been identified to advance the project. If ODOT advances the OPR Project into final design and construction and Federal funding permits, or other Federal approval is involved, a Tier 2 NEPA analysis, led by the appropriate Federal agency, would be required. The scope of such review would be based on the nature of the Federal action.

1.1.6 OPR Project Study Area

ODOT and FRA established a preliminary OPR Project study area during the NEPA scoping period in fall 2012 (Figure 1-4). The preliminary OPR Project study area was generally bounded by the Eugene-Springfield, OR, area to the south and the Washington state line (Columbia River) to the north. The Cascade foothills bounded the study area to the east and the Coast Range bounded it to the west. This study area was broad enough to encompass a variety of corridor alignments and potential station locations suggested by stakeholders and the public during the scoping period. As corridor concepts and potential station locations were considered and eliminated, ODOT and FRA narrowed the study area boundaries to assess a more localized range of potential impacts associated with each of the corridor concepts. (See Chapter 2 for the concepts that the OPR team considered and eliminated, and the reasons for eliminating these concepts.)

ODOT and FRA also developed discipline- and resource-specific study areas for each environmental impact analysis topic studied in this Tier 1 Draft EIS. These study areas are identified in Chapters 4 and 5.

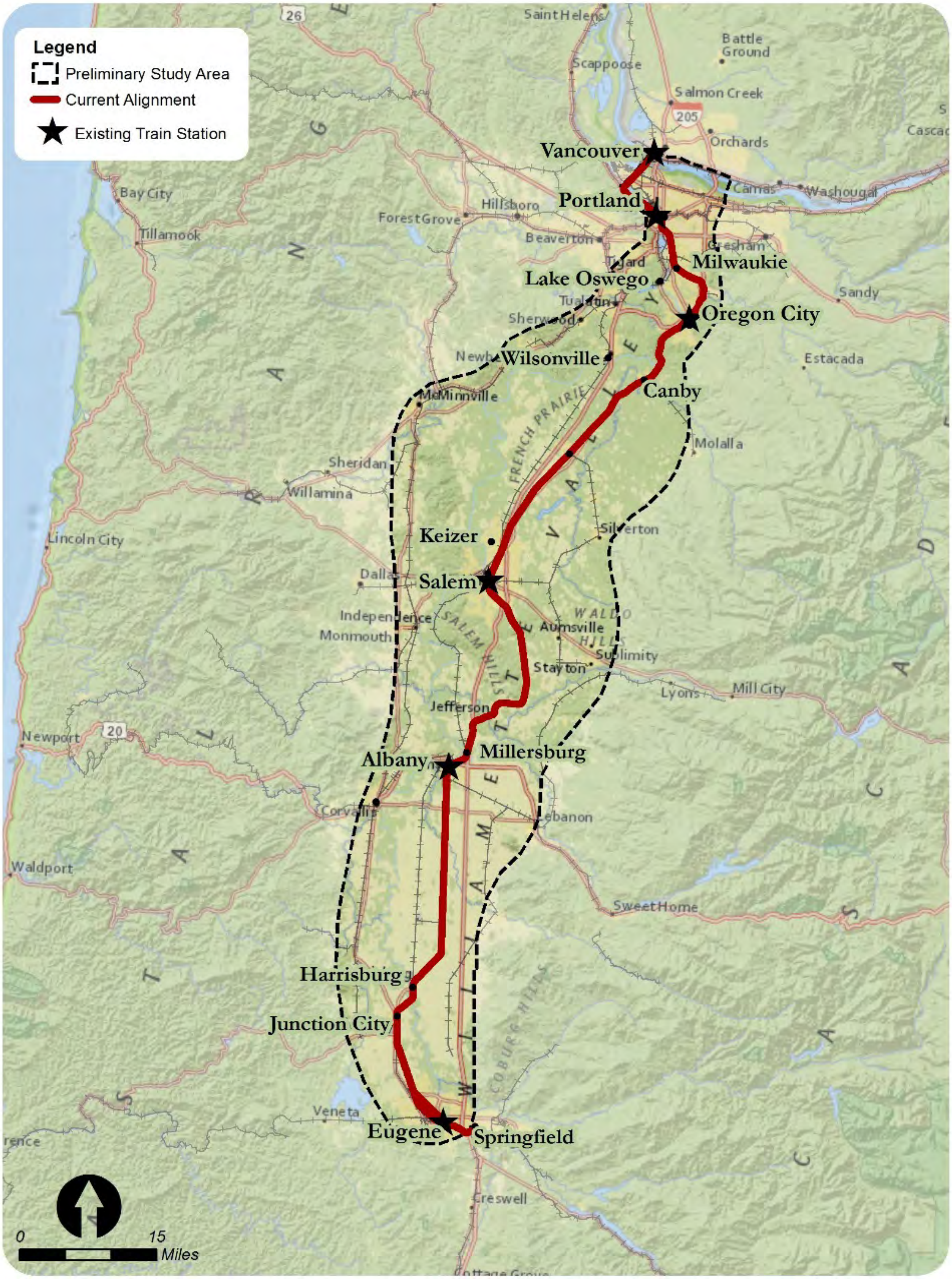

Figure 1-4. Preliminary OPR Project Study Area

1.2 Statement of Purpose and Need

As described in more detail in Chapter 5 of this document, stakeholder, interested party, and jurisdictional agency comments received during the EIS scoping period (August 17 to October 31, 2012) helped shape the following Purpose and Need statement.

1.2.1 Purpose of Proposed Action

The purpose of the OPR Project is to improve the frequency, convenience, speed, and reliability of passenger rail service along the Oregon segment of the Federally designated PNWRC in a manner that will:

- Provide riders with an efficient, safe, equitable and affordable alternative to highway, bus, and air travel;
- Be a cost-effective investment;
- Protect freight-rail carrying capability;[4]
- Support the ongoing implementation of regional high-speed intercity passenger rail in the PNWRC between the Eugene-Springfield, OR, metropolitan area and Vancouver, British Columbia;
- Be compatible with the Washington state portion of the PNWRC;
- Promote economic development;
- Avoid or minimize community and environmental impacts; and
- Integrate with existing and planned multi-modal transportation networks.

1.2.2 Need for Proposed Action

The need for the OPR Project arises from multiple transportation, land use, socio-economic, and environmental considerations, including the following:

- Increasing intercity and regional travel demands;
- Existing limited rail-system capacity and competing service needs;
- Constrained state and local roadway funding;
- Increasing economic vitality of the corridor;
- Promoting transportation system safety and security; and
- Changing transportation demand resulting from demographic changes.

1.2.2.1 Increasing Intercity and Regional Travel Demands

As population and the economy grow, so does the demand for travel. With more people and more jobs, Oregon's transportation infrastructure is facing significant pressures. In several areas of the state, transportation infrastructure has inadequate capacity and the system lacks the multimodal transportation options that Oregonians need today. In the next 20 years, the population of Oregon's Willamette Valley is projected to grow by approximately 27 percent to 3.6 million residents (Oregon DAS, 2015). Consequently, the demands on the transportation system will increase.

The FRA-designated PNWRC travels through Oregon's Willamette Valley, which is bookended on the south by the cities of Eugene and Springfield (approximate regional population of 350,000) and on the north by the Portland metropolitan region (population 2.3 million). Stretching more than 100 miles north to south in western Oregon, the Willamette Valley is home to 70 percent of the state's 4.0 million residents.

[4] Cargo load that can be transported by freight rail.

Oregon's population growth through 2035 will be concentrated in the Willamette Valley. Four counties within the Greater Portland area (Multnomah, Washington, Yamhill, and Clackamas) will account for over two-thirds (68%) of Oregon's population growth through 2035 (Oregon DAS, 2015).

Eight of the 10 largest cities in Oregon are situated along the PNWRC, including the state's three largest metropolitan areas of Portland, Salem-Keizer, and Eugene-Springfield. The Portland, Salem-Keizer, and Eugene-Springfield metro areas serve as the state's economic, cultural, and political centers and provide a hub for trade, commerce, and travel. In addition, the Willamette Valley has some of the most fertile soils on earth (Portland State University, 2015). The Eugene-Springfield area is shaped by the presence of the University of Oregon.

The primary modes of intercity passenger transportation along the PNWRC consist of private motor vehicles, intercity bus and rail services, and commercial air travel. The vast majority of north-south trips within the Willamette Valley are accomplished using private automobiles, with air travel playing a much smaller role. With competitive costs, travel times, comfort, and convenience, conventional passenger rail can compete with air travel for short-haul intercity travel.

The major north–south highway running through the Willamette Valley is Interstate 5 (I-5). The freeway carries both local and long-distance trips, linking the city of Portland with suburban communities to the south as well as the larger cities of Keizer, Salem, Albany, Eugene, and Springfield. It connects the most populous Willamette Valley metropolitan areas, and serves as the major north–south freight route on the West Coast. Traffic congestion can make travel slow and unreliable along I-5, especially during peak travel times in the section between Portland and Albany. While regional and statewide transportation plans may include some additional transportation capacity in the Willamette Valley by 2030, there are no plans to build capacity into the highway and rail systems commensurate with the magnitude of growth in people, jobs, and freight (ODOT, 2014a).

The combination of increases in congestion on I-5, in population, and in freight, and the general lack of funding to expand the state's highway system, has led to increased demand for alternative travel modes, including passenger rail, for business, personal, and tourist travel. For example, in response to the large population of students in the Eugene and Corvallis-Albany areas, BoltBus (a subsidiary to Greyhound) began intercity bus service on I-5 between Eugene and Portland in 2013.

Passenger rail ridership on the existing State-sponsored Amtrak Cascades service between Portland and Eugene (that also serves stations in Oregon City, Salem, and Albany) is expected to increase with Willamette Valley population growth. By 2035, the population of the Willamette Valley is forecast to reach approximately 3.6 million. During this same period, freight volume (carried by both trains and trucks) in Oregon is expected to grow by approximately 60 percent (ODOT, 2014f). The increase in both freight and demand for alternative modes of travel creates a need for capital investment in rail infrastructure.

The *Oregon Transportation Plan* (ODOT, 2006) forecasts that public transportation ridership would increase by an annual rate of 3.2 percent between 2005 and 2030, and that passenger rail ridership would grow by 3.6 percent annually during the same period. In comparison, the plan forecast that highway vehicle miles traveled would grow by a lower annual rate of 1.4 percent between 2004 and 2030. Between 1995 and 2014, annual rail ridership along the Oregon segment of the PNWRC grew 163 percent, from 44,490 to 117,160 passengers. Therefore, *actual* intercity passenger rail ridership along the Oregon segment of the PNWRC exceeded expectations by increasing at a compound average annual rate of 6.8 percent between 1995 and 2014. In addition, annual Amtrak Cascades ridership growth exceeded average annual statewide population growth (1.0 percent) between 2005 and 2012, which suggests that intercity passenger rail's market share is likely increasing relative to other modes.

Factors that have contributed to the increases Oregon passenger rail ridership has experienced in recent years include, but are not limited to, the following:

- Population growth

- Rising costs of highway travel and diminished performance through congestion
- Aging populations that cannot or choose not to drive and need alternate travel options, as well as younger populations that desire the same
- Growing environmental awareness and concerns about climate change
- Improved information and communication technology and intelligent transportation systems that ease rail system use and enhance the travel experience
- Public and private investments that improve rail service

Overall, these trends indicate a steadily growing demand for intercity passenger rail services.

1.2.2.2 Limited Rail System Capacity and Competing Service Needs

Predictable, safe and reliable performance is needed to ensure that rail remains a viable part of Oregon's balanced multimodal transportation system. Freight and passenger rail between Eugene and Portland have competing service needs in a corridor with limited rail system capacity. Forecasted economic and population growth places an added burden on the existing rail network to move both people and freight. Currently, passenger trains between Portland and Eugene operate on UPRR-owned tracks. BNSF Railway owns the railroad tracks in the congested corridor between Union Station in Portland, OR, and Washington State.

ODOT has a vested interest in proactively planning for the rail system's future so that Oregon's residents and businesses can capitalize on the benefits freight and passenger rail services provide. ODOT has funded a variety of rail improvements on the existing UPRR mainline to mitigate for the effect of increased passenger service on freight operations. Improvements have included installation of Centralized Traffic Control (CTC), at-grade crossing signal upgrades, and track upgrades.

As currently configured, passenger train speeds over the route between Portland and Eugene only average 42 miles per hour (mph). However, recent improvements have increased the miles of track where passenger trains can operate at speeds of up to 79 mph from 7 miles to almost 34 miles between Eugene and Albany, which may result in an increase in average speeds. Reasons for the current slow average speed include, but are not limited to, track condition and geometry, speed restrictions through heavily populated areas, the amount of single track segments and accommodation for freight traffic. At present, the line has little reserve capacity and is configured to handle only the modest traffic volumes that now utilize it (ODOT, 2014b).

Amtrak Cascades is one of the nation's best-patronized passenger rail services. Over the five-year period 2012 through 2016, more than a million people used the Amtrak Cascades trains and supplemental buses between Eugene and Portland, averaging more than 200,000 riders annually. Ridership steadily increased year over year after inception of the service in 1994, topping 215,000 passengers in 2013. Since then, several factors have contributed to some decline in ridership, but two additional Portland-Seattle train round trips, along with a revised timetable, are expected to increase Amtrak Cascades ridership (Melbo, R., pers. comm., 2017).

After a July 2013 court decision invalidated the part of the Passenger Rail Investment and Improvement Act related to development of standard performance metrics for passenger train timeliness, Amtrak on-time performance began to deteriorate in Oregon and throughout the U.S. (ODOT, 2015a). Over the same period, the ongoing economic recovery has increased freight train traffic, adding to the circumstances that cause conflicts between passenger and freight trains operating over the same line interference.

In Oregon, freight train interference continues to be the principal source of Amtrak passenger train delays attributable to the primary host railroad (UPRR). In January 2014, ODOT implemented a schedule change on the Amtrak Cascades between Portland and Eugene to allow passengers to depart in the morning from both Portland and Eugene and make a round trip the same day on the train—an option not previously available. The 2014 schedule established an early-morning southbound train departing Portland at 6:00 a.m. weekdays and, initially, at 8:30 a.m. on weekends and selected holidays. The weekend/holiday departure was adjusted later in the year to 9:35 a.m., which improved ridership on those days. However, ridership on the 6:00 a.m. weekday train remained consistently low, averaging approximately a quarter of the ridership of the other trains. While ODOT anticipated an initial drop in 2014 ridership because of the schedule change, it expected ridership to rebound over the course of several months. Instead, ridership languished through 2014 and ended 2015 at 9.9 percent below the peak of 2013. Ridership during 2016 was relatively flat, posting a year-over-year increase of less than 1 percent (Melbo, R., pers. comm., 2017).

Several factors depressing ridership growth affected the service simultaneously. The schedule change that created the 6:00 a.m. southbound weekday train also established conditions that required passenger trains running in opposite directions to pass one another three times daily between Portland and Eugene. ODOT designed the new schedule with consideration of locations where these encounters were anticipated to occur. However, trains needed to be punctual for the service to function well, and each day the host railroad's dispatchers determine the actual location where trains will meet or pass dependent upon timeliness, freight train traffic and maintenance work. When movement of a passenger train conflicts with another, any resulting delay is recorded as passenger train interference. After ODOT implemented the 2014 schedules, the amount of passenger train interference incurred was substantially greater than anticipated, adding to other host railroad delays and detrimentally affecting on-time performance. People who have time commitments will not travel on a train with poor on-time reliability (Melbo, R., pers. comm., 2017).

Another factor influencing the Amtrak Cascades ridership drop in Oregon has been a decline in gasoline prices, resulting in more people opting to drive personal vehicles. Relatively inexpensive fuel has contributed to reduced ridership in 2017, and ODOT expects this trend to continue through 2018. The late 2013 entry of Greyhound's *BoltBus*—a low-fare intercity bus service that expanded into the Willamette Valley after establishing service between Portland and Seattle. BoltBus ticket sales are via the internet only, stations are simple curbside bus stops, and fares are considerably lower than those of the Amtrak Cascades. BoltBus adjusts service in accordance with demand. Some days it offers no service, while three to six round trips between Portland and Eugene are available on other days (Melbo, R., pers. comm., 2017).

ODOT expects the Amtrak Cascades service additions and schedule changes that took effect on December 18, 2017, to increase ridership in Oregon during 2018 and beyond. Two new daily round trips added between Portland and Seattle provide more options for travel between Oregon, Washington and British Columbia. The departure time of the weekday morning southbound train from Portland changed from 6:00 a.m. to 9:45 a.m., and the weekend/holiday schedule changed from 9:35 a.m. to 12:30 p.m. Both of these schedules allow connections for trains arriving in Portland from Seattle, facilitating continuous, single-seat through travel south of Portland from points in Washington state that were not previously available. Oregon's only other train schedule change is the afternoon northbound Eugene-Seattle train that departs Eugene at 4:30 p.m., 30 minutes later than under the previous schedule (Melbo, R., pers. comm., 2017).

Future capital infrastructure investments in intercity passenger rail that reduce freight conflicts and increase overall train speed, coupled with service and operational adjustments, can improve overall passenger train travel times and reliability.

1.2.2.3 Constrained State and Local Roadway Funding

Constrained state and local roadway funding will limit the ability to fund roadway capacity projects to improve north–south mobility in the Willamette Valley. Oregon's funding outlook for financing roadway improvements is severely constrained because of lower gas-tax revenue, decreased Federal funding for highways, and Oregon's repayment of transportation-infrastructure-improvement bonds. The direct result is limited funding available for future highway projects.

Lower Gas Tax Revenues

While fuel tax revenues for the Oregon State Highway Fund have steadily increased since 2014, ODOT forecasts that they will decline over the foreseeable future. One of the primary reasons for this projected decline is because more people are driving more fuel-efficient vehicles. Federal fuel-efficiency targets have decreased fuel consumption in light vehicles and will likely continue this trend. Based on analysis conducted by the State of Oregon, fuel tax revenues for the Oregon State Highway Fund have steadily increased since 2014 and are anticipated to increase until 2021. After 2021, ODOT predicts that revenues will level off and then decrease, partially due to increased use of more fuel-efficient vehicles (ODOT 2018).

Decreased Federal Funding for Highways

Federal funding comes from the Highway Trust Fund, which has been running at a deficit for years, resulting in decreased Federal highway funding. Reduced Federal funding for highways could lead to fewer highway infrastructure investments, or the postponement of investments to a later date. This increases highway congestion and would encourage travelers to look for alternatives to intercity driving, such as passenger rail.

Repayment of Transportation-Infrastructure-Improvement Bonds

Oregon State Highway Funds are being used to repay bonds from recent critical transportation-infrastructure improvements. The Oregon Transportation Investment Act authorized ODOT to use bonding for the first time in 2001. In 2009, the Oregon Jobs and Transportation Act used the bonding authority to fund infrastructure projects across the state. Bonding allowed ODOT to build projects much faster than the previous “pay-as-you-go” funding approach, but also meant significant debt service over an extended time that has reduced the funding available for new projects. For the next 25 to 30 years, ODOT will be paying more than $200 million in annual debt service from the Oregon State Highway Fund – about 35 percent of ODOT’s share of that fund.

Oregon State Highway Fund resources are essentially fully committed to debt service, highway maintenance activities, and service costs. This means that potential Federal funding will be the predominant source for future transportation projects. As previously mentioned, Federal funding for highways has decreased. Therefore, ODOT and other jurisdictions are looking beyond roadway projects towards other types of transportation projects to leverage available funding sources for non-roadway projects to improve mobility and to provide an interconnected multimodal system that serves both regional and local networks.

Findings from the 2013 *Oregon Values and Beliefs Project* (DHM Research and Policy Interactive, 2013)[5] indicate that a majority of Oregonians support investment in public transportation and consider such investment more important than investing in additional roads for cars. When asked about a list of public-service priorities, however, Oregonians ranked road and highway maintenance above public transportation (such as buses and trains) and new roads. It appears that Oregonians want to take care of the roads they have while recognizing that public transportation investments could be a better choice than additional roads for the future.

1.2.2.4 Increasing Economic Vitality of the Corridor

The Willamette Valley contains the state’s three largest urban areas (Portland, Salem, and Eugene). With 8 of the 10 largest cities in Oregon, the Willamette Valley is the most urban (densely-populated) region in Oregon. It also is the fastest-growing region, with a 2050 population projected at approximately four million, an increase of 70 percent from 2014. The region also provides almost half of the state’s

[5] The 2013 project was led by Portland-based DHM Research and Policy Interactive and sponsored by Oregon Health & Science University, The Oregon Community Foundation, Oregon Public Broadcasting, and Oregon State University. Researchers interviewed more than 9,000 Oregonians from a range of geographies, ages, incomes, and ethnicities.

agricultural sales by value and includes 6 of the top 10 agricultural-producing counties. In addition, 16 of the top 17 private-sector employers (manufacturing, high technology, forest products, agriculture, and services) are located in the Willamette Valley.

With I-5 and the UPRR mainline running its north–south length, the Willamette Valley's economy is shaped by the transportation system and the flow of goods. The freight and passenger rail transportation system in Oregon can help accommodate the needs of an increasing number of residents and workers, and do so reliably, safely, and efficiently.

Increasingly, congested highways and rail corridors have negative effects on the economy of communities in the Willamette Valley. Failure to adequately invest in the transportation system will likely result in significant losses to Oregon's economy, job base, and quality of life. More than 346,400 jobs in Oregon are transportation-related, or transportation-dependent. According to *Economic Impacts of Congestion on the Portland-Metro and Oregon Economy* (Economic Development Research Group, Inc., 2014), in 2010, 5 percent of all travel time in Portland-Metro took place in congested conditions. By 2040, if only the currently programmed improvements are made, this travel time is expected to triple to 69 hours of congestion annually for the average Portland-Metro household. Transportation is critical to business competitiveness and sustained business growth in Oregon. With increased congestion, businesses will have to alter operations to keep a competitive edge.

In an increasingly competitive global economy, the success of cities will depend on efficient connections. For the passenger and freight rail system, economic benefits include job creation, support of freight-dependent industries, and tourism. Historically, connecting cities has encouraged them to prosper. In the Willamette Valley, future economic growth will increasingly depend on the ability to move people and goods easily from city to city. Improved passenger rail service from Portland to Salem to Eugene would, in effect, bring those cities "closer together." Shorter travel times and the ability to avoid traffic congestion on I-5 would strengthen connections among employment centers and major educational institutions, reducing barriers and encouraging new technology clusters.

By connecting urban centers and local transit systems, improved passenger rail service can increase the accessibility of cities with a lower cost of living for those working in major employment areas. It can support Oregon's land use goals by encouraging development and redevelopment around passenger rail stations in existing urban areas, while protecting air quality through lower-emission travel.

Serving both business and leisure travel markets, passenger rail service offers safe, "hands free" travel that gives riders the option to work or use communications devices while in transit. By giving travelers an alternative that is competitive with driving (especially between Portland and Salem), improved passenger rail service has the potential to help reduce future traffic congestion on I-5 and protect roadway capacity for freight movement and interstate travel.

Transportation investments are needed to reduce travel delay, which will improve economic market access and competitiveness. With declining state and local roadway funding, rail infrastructure investments can help reduce congestion's effect on the economic vitality of the Willamette Valley highway network by providing an alternative to driving for some trips. In those areas where track would be shared between passenger and freight service, rail infrastructure investments that focus on improved passenger rail operations would also support improved freight operations. This will consequently help expand market access for individuals and goods, and help increase the economic competitiveness of the communities within the Willamette Valley and Oregon as a whole.

1.2.2.5 Promoting Transportation System Safety and Security

Improving alternatives to highway travel in the Willamette Valley will bolster the stability and security of the surface transportation system. If a major accident or prolonged disruption to travel on I-5 occurs, travelers will need options to move through the Willamette Valley. Improved passenger rail service, coupled with intelligent information systems, would increase the resiliency of the transportation system.

Increased passenger capacity via expanded service could also make the transportation system safer as a whole. Passenger rail has historically had lower fatality rates per passenger mile compared to highway and air travel (Federal Highway Administration [FHWA], 2013). Investing in upgraded tracks, improved at-grade or grade-separated crossings, and safety-related railroad communications and signalization would also improve rail safety for riders and operators.

1.2.2.6 Changing Transportation Demand Resulting from Demographic Changes

Over the past decade, travel choices within Oregon have shifted away from automobiles and towards transit and regional passenger rail. This is consistent with a national trend toward reduced driving within and between urban areas. Oregon's population has become older, with fewer households having access to an automobile. In 1980, the 65 and older age group comprised 11 percent of the population. The 2010 Decennial Census reported that the 65 and older age group now comprises 16 percent of the population in Oregon, and by 2040, people aged 65 and older are expected to comprise 21 percent of the population. This change in age distribution of drivers can be expected to reduce the number of miles driven per capita when averaged across the entire population. Because of the growing population of older Americans, the absolute amount of travel and share of travel by people 65+ has grown. However, on a per capita basis, Americans of all ages are traveling less today than at the beginning of the century, taking fewer trips and traveling fewer miles (FHWA, 2009).

Several recent reports have documented a shift from driving to other travel modes among the "millennial generation," those born between 1982 and 2003 (American Public Transportation Association [APTA], 2013). According to this APTA study, millennials use the transportation system differently than other Americans, relying less on cars and more on transit and bicycling. Frequently, they use multiple modes of travel as opposed to relying on a single mode. In urbanized areas, a growing number of people of legal driving age are also choosing to not purchase an automobile. From 2001 to 2009, the average annual number of vehicle miles traveled by people 16- to 34-years old decreased from 10,300 to 7,900 miles per capita—a drop of 23 percent. They took fewer car trips, shorter car trips, and more trips via non-driving modes. This transportation behavior appears to be shifting for a variety of reasons, including higher gas prices, new licensing laws, improvements in technology that influence greater use of non-automobile modes, and changes in values and preferences. It is likely that these factors will have an impact for years to come (Davis, Dutzik, and Baxandall, 2012). These travel behaviors are relevant for the Amtrak Cascades route, because 22 percent of the population in the study area are age 17 and under. If this cohort adopts millennial travel trends, this population cohort will also show similar travel preferences.

These changing demographic trends contribute to an increasing demand for non-automobile intercity travel and could result in unprecedented ridership increases, setting the stage for more investment in passenger rail service.

1.3 Project Goals and Objectives

The OPR Project's goals and objectives described below identify the primary issues the Project intends to address. These goals and objectives served as the basis of the alternatives evaluation conducted by ODOT in 2014 that led to the identification of the build alternatives evaluated in this Draft EIS. The initial set of goals came out of the public and agency scoping process in 2012. The OPR Project team revised based on comments from the public, resource agencies, the Corridor Forum, and the Leadership Council. (For more information on the Corridor Forum and the Leadership Council, see Chapter 6.)

Goal 1: Improve passenger rail mobility and accessibility to communities in the Willamette Valley

Objectives:

1A – Provide a viable alternative to auto, air, and bus travel between Eugene and Vancouver, WA

1B – Provide reliable and frequent passenger rail service

1C – Support multimodal integration at each passenger rail station

1D – Allow for future passenger rail improvements, including higher speeds

Goal 2: Protect freight-rail capacity and investments in the corridor, and maintain safety

Objectives:

2A – Do not increase conflicts between passenger rail or freight rail and vehicles

2B – Protect freight-rail carrying capability

Goal 3: Plan, design, implement, maintain, and operate a cost-effective project

Objectives:

3A – Develop a strategy that can be reasonably funded and leveraged with a range of investment tools for construction and operation

3B – Serve the maximum number of people with every dollar invested

Goal 4: Provide an affordable and equitable travel alternative

Objectives:

4A – Provide a viable and affordable alternative for travelers

4B – Provide equitable investments and service, with consideration to race/ethnicity and income

Goal 5: Be compatible with passenger rail investments planned in Washington state

Objective:

5A – Provide passenger rail service to meet the existing and future passenger rail demand for an interconnected system in the Pacific Northwest High-Speed Rail corridor

Goal 6: Promote community health and quality of life for communities along the corridor

Objectives:

6A – Benefit communities within the corridor

6B – Minimize negative impacts to communities along the corridor

Goal 7: Protect and preserve the natural and built environments

Objectives:

7A – Support Oregon's commitment to the preservation of resource lands and to local land use and transportation planning

7B – Reduce greenhouse gas emissions in support of national and state policies to slow climate change

7C – Avoid and minimize impacts to the natural environment and cultural resources

CHAPTER 2

Alternative Development and Screening Process

2.1 Introduction

Chapter 2 addresses the foundation, assessment, and narrowing of options for improving intercity passenger rail service on the Oregon segment of the Pacific Northwest Rail Corridor (PNWRC). The primary topics of this chapter include:

- Corridor alignment concepts, existing and potential new stations, train technologies, and travel modes considered;
- Framework used for the screening and evaluation processes;
- Outcomes from the screening of corridor alignments, stations, technologies, and travel modes; and
- Outcomes from the preliminary alternatives evaluation process.

Figure 2-1, below, illustrates the Tier 1 EIS process for the Oregon Passenger Rail (OPR) Project.

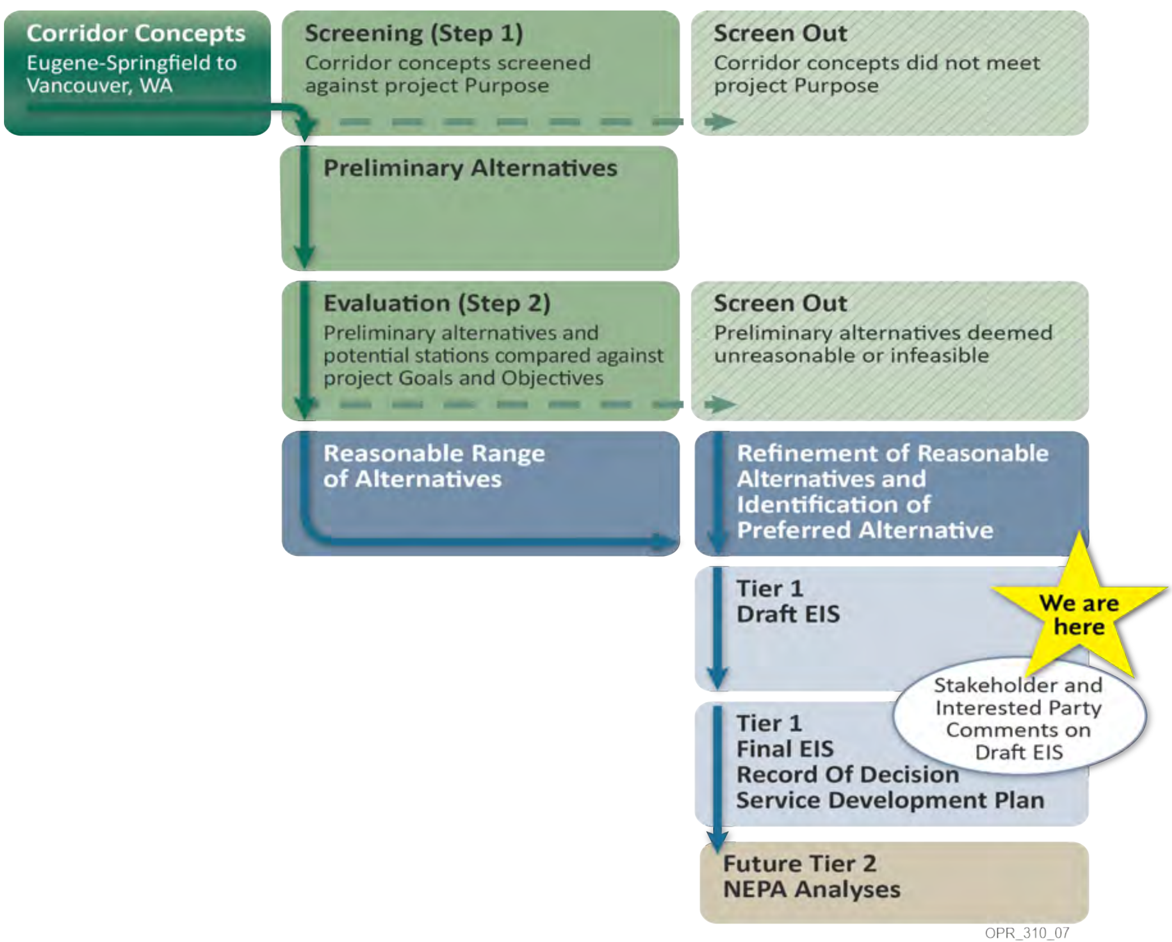

Figure 2-1. Tier 1 NEPA Process

2.2 Development of Corridor Concepts

In the fall of 2012, ODOT and FRA conducted public and agency scoping to solicit input on the initial "corridor concepts" for improved intercity passenger rail service on the Oregon segment of the PNWRC, which is a 466-mile-long passenger rail corridor between Eugene, Oregon, and Vancouver, British Columbia. Based on input received during the scoping period and information from previous regional and local planning studies, ODOT and FRA established a wide range of corridor concepts for initial study.[6] Corridor concepts were broadly defined as potential passenger rail alignments and approximate station locations between Eugene/Springfield, Oregon and Vancouver, Washington. Most corridor concepts suggested during the scoping period took advantage of existing rail or highway alignments where additional tracks or sidings would be adjacent to existing transportation facilities and therefore minimal additional right-of-way would be needed. ODOT considered construction of new tunnels where topographic conditions did not allow for at-grade or elevated structure alignments, and/or when existing environmental conditions could make it too impactful to add track capacity at-grade. The scoping process assumed that each corridor concept would operate, at maximum, six daily intercity passenger rail round trips between Eugene/Springfield and Portland, OR. This proposed service would match the existing service between Portland and Seattle. The corridor concepts identified from the scoping process are shown on Figures 2-2a and 2-2b, and described below.

2.2.1 Corridor Concepts – Rail Alignments

The OPR Project study area extends approximately 120 miles between Eugene/Springfield, Oregon and Vancouver, Washington. ODOT divided the study area into three geographic sections in order to help facilitate the assessment of corridor concepts within the context of the Step 1 screening process. The study area sections allowed for the potential hybridization of corridor concepts and provided flexibility in developing corridor concepts into preliminary alternatives for analysis in the Step 2 evaluation process. Delineation of the geographic section boundaries was influenced by locations where multiple concept alignments converged and by logical points directly north or south of communities with an existing or potential new passenger rail station.

The three corridor concept study area sections included:

- Section A – Eugene/Springfield to South of Albany (includes the metropolitan areas of Eugene and Corvallis; several options for conceptual alignments to join or switch before coming into Albany);
- Section B – South of Albany to Woodburn (includes the metropolitan areas of Albany and Salem; most conceptual alignments are in close proximity in the vicinity of Salem and Woodburn); and
- Section C – Woodburn to Vancouver, WA (includes the Portland metropolitan area; conceptual alignments follow existing transportation facilities and/or new tunnels).

For the concepts considered during screening, operating speeds on the alignments would vary. Maximum speeds would be based on requirements of the host railroad if shared with freight (e.g., currently 60 or 79 mph), or would be up to 110 mph on sections that would be constructed for passenger-only use. Specific speeds for each section of track were not defined at this stage for any of the corridor concepts; more detailed analyses were developed for the evaluation of preliminary alternatives.

[6] Relevant planning studies included the Oregon Rail Plan (2001), the Oregon Transportation Plan (2006), and the ODOT Intercity Passenger Rail Study (2009); these and other applicable studies and reports are included in the reference list, Chapter 8 of this DEIS.

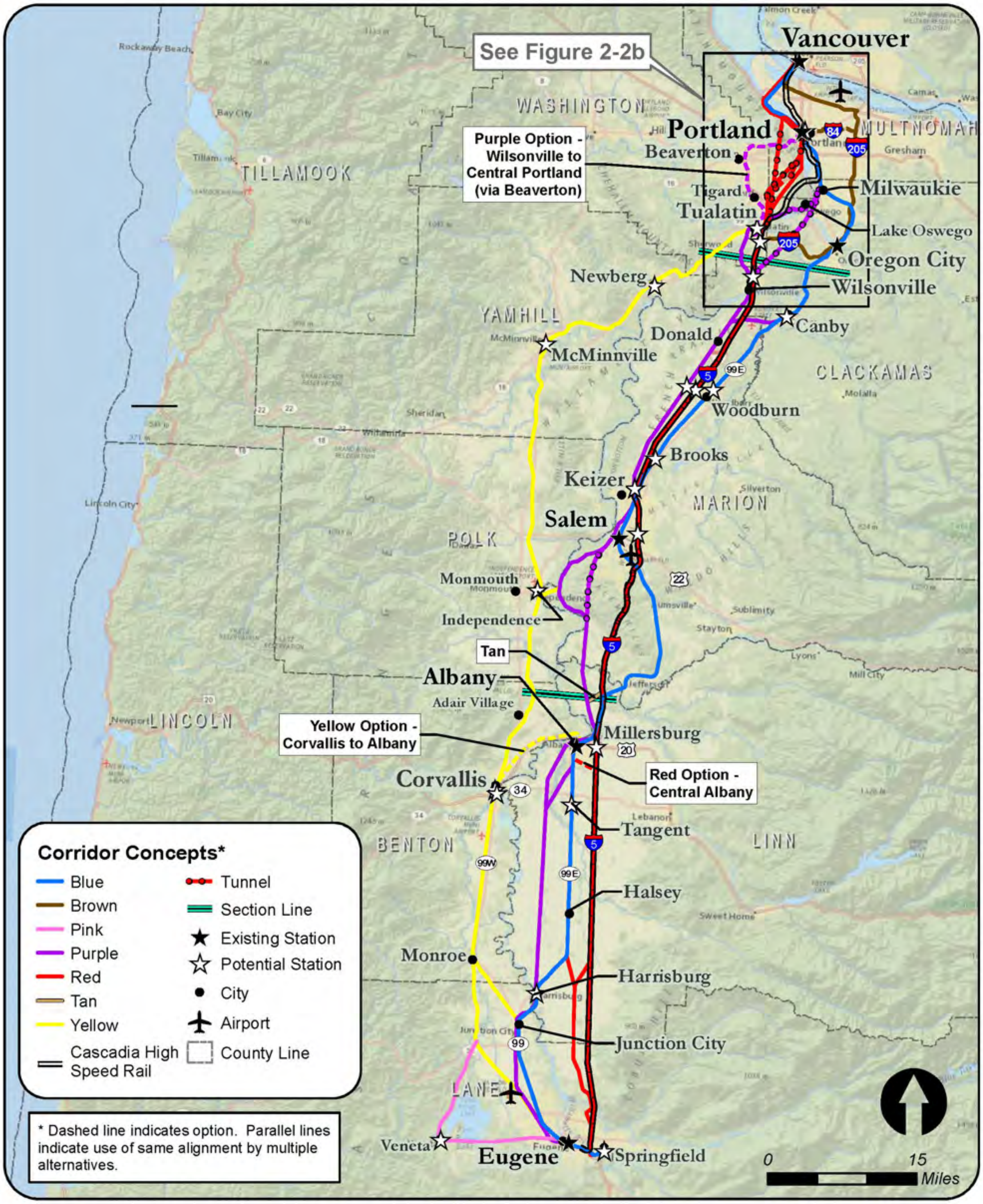

Figure 2-2a Corridor Concepts

Oregon Department of Transportation

Oregon Passenger Rail Eugene - Portland CHOOSING A PATH FORWARD

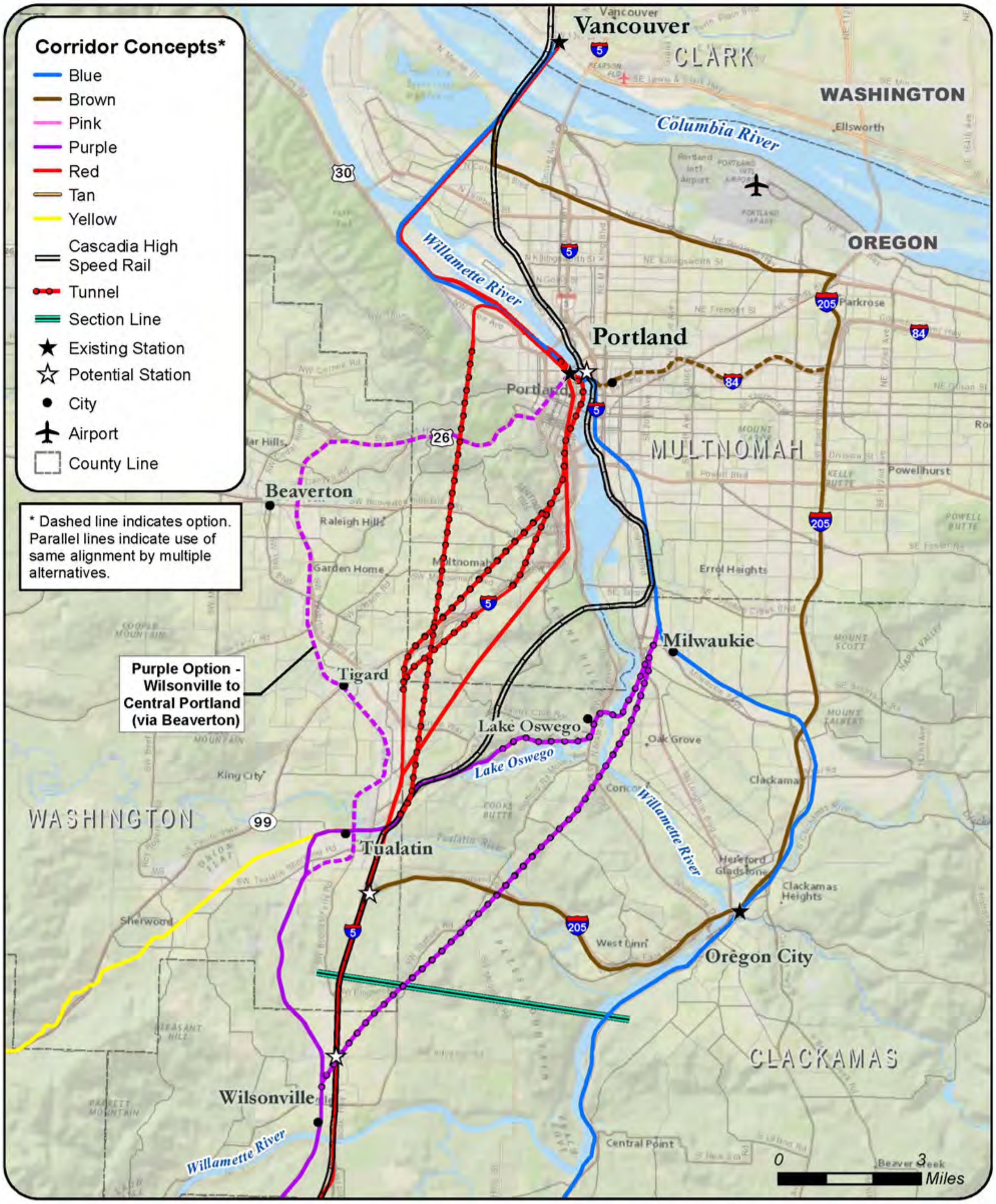

Figure 2-2b

Corridor Concepts - Portland Vicinity

Oregon Department of Transportation

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

Existing and potential new stations along the Oregon segment of the PNWRC are identified below for each corridor concept. Multiple stations are listed for each corridor concept; however, the Step 1 screening process assumed that any corridor concept extending the full distance between Eugene/Springfield and Portland would have the same number of intermediate station stops (three) as the current Amtrak Cascades service. Further descriptions of the analysis for existing and potential stations are presented in Section 2.2.2.

The **Blue corridor concept** would generally consist of new mainline track parallel to the existing Amtrak Cascades route within or near the Union Pacific Railroad (UPRR) right-of-way through Eugene/Springfield, Junction City, Albany, Salem, Keizer, Woodburn, Canby, Oregon City, Milwaukie, and Portland. The route would cross the Willamette River in Portland before continuing northward either on or near the existing BNSF Railway right-of-way to Vancouver, WA. Passenger rail trains would share track with freight trains along much of the Blue rail alignment and speeds would be dictated by the host railroad. Existing stations associated with the Blue corridor concept included Eugene, Albany, Salem, Oregon City, and Portland. Potential new station locations associated with the Blue corridor concept included Springfield, Harrisburg, Tangent, Brooks, Woodburn, and Canby.

The **Red corridor concept** would parallel I-5, either within or near the current highway right-of-way, starting at a new station in Springfield and heading north through Albany, Salem, Keizer, Wilsonville, Tualatin and Portland to Vancouver, WA. An option would begin in Springfield, travel north along an abandoned Southern Pacific rail alignment through Coburg, and then connect with the Red (or Blue) rail alignment south of Halsey. The Red rail alignment also assumed construction of new tunnels: one through the hills south of Salem, and a second and potentially third in the Portland metropolitan area. Near I-205, the Red rail alignment would separate from I-5 and continue north through a new long tunnel on the west side of the Willamette River. North of downtown Portland, the Red rail alignment would either continue north through NE Portland via a new tunnel, or connect with the Blue rail alignment to continue northward either on or near the existing BNSF Railway right-of-way to Vancouver, WA. The Red rail alignment would consist of largely new track devoted to intercity passenger rail service and have a maximum design speed of 110 mph. This maximum speed would only occur on sections of new greenfield track unconstrained by topography, track curvature, and other limiting factors. The only existing station location associated with the Red corridor concept was Portland's Union Station. Potential new stations included Springfield, Eugene, Albany, Salem, Keizer, Woodburn, Wilsonville, Tualatin, and Portland.

The **Purple corridor concept** would generally consist of new mainline track parallel to the existing freight rail line historically known as the Oregon Electric Railway (OER), which is currently operated by Portland and Western Railroad (PNWR). The Purple rail alignment would start in the Eugene/Springfield area and travel westward through Eugene, transitioning from the UPRR alignment to the PNWR alignment before turning north near the Eugene Airport. It would continue parallel the PNWR mainline through Junction City and Harrisburg. South of Highway 34 and west of Tangent, it would split into two options. One option would travel to the northeast, crossing the Calapooia River, Highway 34 and Highway 99E, connecting with the Blue rail alignment in south Albany. The other option would travel north across Highway 34 and into north Albany before connecting with the Blue rail alignment. North of Albany, the Purple rail alignment would return to parallel the PNWR mainline and continue through the Ankeny National Wildlife Refuge located south of Salem where it again would split into two options: one option would travel directly north through a new tunnel in the hills south of Salem while the other option would continue to follow the PNWR alignment skirting the south hills. The Purple rail alignment would continue through Salem paralleling the existing PNWR line. North of Donald, the Purple corridor concept would have multiple options: (1) turn east to Barlow and connect with the Blue rail alignment west of Canby; (2) continue to parallel the PNWR line to Wilsonville and Tualatin, transitioning to parallel the Tillamook Branch line to Rivergrove via a new tunnel along the north shore of Lake Oswego to Milwaukie and connecting to the Blue rail alignment; (3) travel to Tualatin and then into a new tunnel which would surface in Milwaukie before connecting to the Blue rail alignment; or (4) connect to the Red rail alignment north of Wilsonville. The Purple corridor concept would involve the intermingling of passenger and freight rail and would have limited sections with passenger-only traffic; the sections shared with freight would be limited in speed based on the host railroad, and the passenger-only sections would be designed to support a maximum speed of 110 mph. Existing station locations associated with the Purple corridor concept included Eugene, Albany, and Salem. Potential new stations were Springfield, Harrisburg, Keizer, Donald, Wilsonville, and Tualatin.

The **Yellow corridor concept** would originate in the Eugene/Springfield area and would be identical to the Purple corridor concept northward to the Eugene Airport, where it would either (1) continue north to Junction City and then west on a greenfield alignment to Monroe, or (2) travel approximately 8 miles west of Junction City on a greenfield alignment and then turn north to Monroe. Near Monroe, the Yellow rail alignment would be sited on an abandoned rail grade northward before intersecting the existing PNWR line through Corvallis, Independence, McMinnville, and Newberg to connect with the Purple rail alignment in Tualatin. The Yellow rail alignment would also include options to connect to the Purple or Blue alignment in Albany or east of Independence. The Yellow corridor concept would involve the intermingling of passenger and freight rail; the maximum design speed would be dictated by the host railroad. Existing stations considered with this concept included Eugene and Portland. Potential new station locations associated with the Yellow corridor concept were Springfield, Corvallis (2 locations), Independence, McMinnville, Newberg, and Tualatin.

The **Cascadia High-Speed Rail (HSR) corridor concept** was introduced by stakeholders during the EIS scoping process. This corridor concept would consist of a fully electric high-speed rail alignment from Eugene to Vancouver, WA. The alignment would be separate from existing rail right-of-way and have a maximum design speed of 180 mph or greater. The Cascadia HSR rail alignment would occupy the I-5 median at-grade where possible from Eugene to Tualatin. North of Tualatin, it would travel along a new dedicated right-of-way on a combination of new tunnels and elevated track along the Willamette River to the Rose Quarter and then north across the Columbia River on a new bridge. Proposed new stations associated with the Cascadia HSR corridor concept would be located in Eugene, Albany, Salem, Tualatin, and Portland. Based on additional suggestions from stakeholders during the EIS scoping process, ODOT and FRA considered the following partial corridor concepts and options:

2.2.1.1 Section A

The **Pink corridor concept** would travel west from the existing Eugene passenger rail station to Veneta on the Coos Bay Branch line, and then north on a greenfield rail alignment to connect to the Yellow alignment southwest of Junction City. A new station in Veneta could be associated with this option.

The **Yellow Option - Corvallis to Albany** would include new track parallel to the existing PNWR alignment between Corvallis and North Albany, connecting with the Blue alignment north of the existing Albany Station. Two potential new passenger rail stations in Corvallis were associated with this option.

The **Red Option - Central Albany** would connect the Red alignment north of Tangent to the existing Albany Station by improving the existing Albany & Eastern and UPRR rail alignments from south Albany into central Albany before reconnecting to the Red alignment north of Albany. This option would allow the use of the existing Albany station. No potential new passenger rail stations were associated with this option.

2.2.1.2 Section B

The **Tan corridor concept** would be a short greenfield connection between the Purple and Red alignments north of Millersburg. No potential new passenger rail stations were associated with this alignment.

2.2.1.3 Section C

The **Brown corridor concept** would start at the Red or Purple alignments north of Wilsonville and travel north within or adjacent to the I-5 right-of-way, then within or adjacent to the I-205 right-of-way through southeast Portland, past I-84 at the Gateway area along I-205 and east of Portland International Airport, then west on or adjacent to the existing UPRR Kenton line (aligned east-west near Portland International Airport) to tie into the Red alignment in north Portland. Potential station locations associated with the Brown corridor concept included a potential new station in Tualatin. For this concept, ODOT also considered a new station along the route in either north or northeast Portland.

The **Brown Option – I-5/I-205 to Central Portland** is the same as the Brown corridor concept except it would turn west at the I-84 Gateway area on or adjacent to the existing UPRR Graham line into the Rose Quarter area in central Portland. For the Brown option ODOT considered a potential new station in multiple areas of downtown Portland: the Gateway Area, the Rose Quarter, or Union Station.

The **Purple Option – Wilsonville to Central Portland (via Beaverton)** would operate on or adjacent to the existing PNWR line (TriMet's Westside Express Service [WES] commuter rail also shares this track) from Wilsonville to Beaverton, then turn west through the West Hills into downtown Portland via a new tunnel. A potential new passenger rail station in Wilsonville was associated with this alignment, and ODOT also considered a potential new station in Beaverton.

The **Red Option – 7.5-mile Tunnels** from Tigard to Portland Union Station included two options, both approximately 7.5 mile-long new tunnels that would extend from Tigard to downtown Portland. The western alignment option would have an at-grade section from the I-5/I-205 interchange area to the tunnel portal in southwest Portland; it would remain at-grade for the section into Union Station. The other option would start at Boones Ferry Road east of Durham, traverse south Portland, cross the Willamette River in the vicinity of the Sellwood Bridge, then hug the east shoreline before emerging north of the I-5/I-84 junction at the Steel Bridge. No new passenger rail stations were associated with these tunnels, as the concept would lead to Portland's Union Station.

The **Red Option – 10-mile Tunnel** would be a new deep-bore passenger rail tunnel through the Tualatin Mountains (also known as the West Hills) from Tualatin to the Northwest Industrial area of Portland, turning southeast to serve the existing Union Station by way of the BNSF mainline.

2.2.2 Corridor Concepts – Stations

Based upon input received from stakeholders and interested parties during the EIS scoping process, ODOT identified the communities listed below as potential locations for intercity passenger rail stations. The list below identifies all communities with existing or potential new stations, and which concept those stations could serve. Existing stations along the Oregon segment of the PNWRC are located in Eugene, Albany, Salem, Oregon City, and Portland.

Section	Community	Existing or New Station (or Both)	Concept(s) Served
A	Eugene	Both existing and new	Blue, purple, yellow (existing) Cascadia HSR
	Springfield	New	Blue, purple, yellow, red
	Veneta	New	Pink (option)
	Harrisburg	New	Blue, purple
	Corvallis	New	Yellow (two potential locations)
	Tangent	New	Red
B	Albany	Both existing and new	Blue, Purple, Yellow (existing) Red (two potential locations; Red would use a new station along I-5
	Independence	New	Yellow
	Salem	Both existing and new	Two potential locations; Red would use a new station along I-5, Blue and Purple would use existing Amtrak station
	Keizer	New	Purple or Red
	Brooks	New	Blue
	Woodburn	New	Three different potential locations; Blue, Red, or Purple would use different locations
C	McMinnville	New	Yellow
	Newburg	New	Yellow
	Canby	New	Blue and Purple (option)
	Wilsonville	New	Red and Purple
	Tualatin	New	Yellow, Purple, Red
	Beaverton	New	Purple (option)
	Oregon City	Existing	Red, Blue
	Portland	Both existing and new	Blue, Red, Purple (existing or new), Cascadia HSR (new)

Existing and potential new stations associated with specific corridor concepts are shown previously on Figures 2-2a and 2-2b. Some potential new station locations, such as Monmouth, Milwaukie, and Lake Oswego, were identified but did not become associated with corridor concepts. For additional information regarding the consideration of existing and potential new passenger rail stations, see the Alternatives Selection Report (ODOT, 2014c) and the Station Area Assessments (ODOT, 2014e).

2.2.3 Transportation Modes and Train Technologies

Multiple transportation modes and train propulsion technologies were suggested through the public and agency scoping process. Descriptions of the suggested modes and technologies are found below.

Transportation Modes:

- Intercity passenger rail
- Commuter rail
- Enhanced bus service
- Highway capacity improvements

Locomotive Technologies:

- Locomotive hauled (existing technology)
- Diesel multiple units
- Dual mode/power
- Electric
- Magnetic levitation (Maglev)

2.2.3.1 Modes

- Intercity Passenger Rail – Passenger rail service between cities (e.g., the existing Amtrak Cascades service). In its June 2009 HSIPR NOFA, FRA defined Intercity passenger rail service as, *"a group of one or more scheduled trains (round trips) that provide Intercity Passenger Rail transportation between bona fide travel markets (not constrained by State or jurisdictional boundaries), generally with similar quality and level-of-service specifications, within a common (but not necessarily exclusive or identical) set of identifiable geographic markets."* 74 Fed. Reg. 29900, 29906 (June 23, 2009).
- Commuter Rail – Passenger rail service with multiple stops within cities; generally focused on travel within metropolitan areas, or between major centers with intermediate stops (e.g., Westside Express Service (WES) serving the west side of the Portland metro area, and the Sounder in the Seattle area). Commuter rail is defined in 49 U.S.C. § 24102 as, "*short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced fare, multiple ride, and commuter tickets and morning and evening peak period operations.*"
- Enhanced Bus Service – Improvements to existing intercity bus service (e.g., existing Thruway Motorcoaches). For this project, enhanced bus service relates to intercity passenger bus service.
- Highway Capacity Improvements – Infrastructure investments to expand motorized vehicle capacity on the highway system in the project area (e.g., adding travel lanes to Interstate 5).

2.2.3.2 Technologies

- Diesel Locomotive Hauled – FRA defines this category of train technology diesel-powered, paired with passenger coaches that are capable of operating at speeds up to 125 mph. ODOT and WSDOT currently operate diesel-powered, multi-car train sets manufactured by Talgo and have made recent investments in new train sets and locomotives for shared service within both states.
- Diesel Multiple Units – A diesel multiple unit or DMU is a multiple-unit train powered by on-board diesel engines. A DMU requires no separate locomotive, as the engines are incorporated into one or more of the carriages. This technology is commonly used in Europe where heavier DMUs share tracks at the same time with freight. DMUs are also in limited use by commuter rail systems in the United States. Lighter DMUs require temporal separation with freight traffic.
- Dual Mode / Dual Power – These locomotives are able to operate under both diesel-electric and all-electric power. New Jersey Transit uses the latest dual mode technology, the ALP-45DP manufactured by Bombardier. If electrification is provided on any portion of passenger rail right-of-way, dual power locomotives could be utilized. Dual Mode/Dual Power passenger coaches are capable of operating at speeds up to 125 mph under electric power and 100 mph under diesel power.
- Magnetic Levitation (Maglev) – Magnetic levitation (Maglev) is an advanced transportation technology in which magnetic forces lift, propel, and guide a vehicle over a specially designed guideway. Maglev does not require wheels or other mechanical parts at higher speeds for support or propulsion. Without wheels or other components to cause resistance, cruising speeds up to 310 mph are said to be

technically attainable. There is no public or commercial application of this technology in the United States.

2.3 Screening of Corridor Concepts

In early 2013, ODOT and FRA developed a screening and evaluation framework and initiated a two-step screening and evaluation process. ODOT used the screening and evaluation to develop a reasonable and feasible range of build alternatives to study in more detail in this Tier 1 Draft EIS. The overall screening and evaluation process consisted of the following two steps:

Step 1, Screening. ODOT conducted the first step of the framework in winter 2012 through spring 2013. For this initial screening step, ODOT assessed the range of corridor concepts identified during the scoping period against elements of the OPR Project's Purpose statement. ODOT further developed and refined corridor concepts, including alignments and station locations, that passed the screening into preliminary alternatives. ODOT and FRA eliminated from further consideration those corridor concepts that failed the screening process. This is described in Sections 2.3.1 and 2.3.2 below. Section 2.3.3 describes the screening of suggested modes and technologies.

Step 2, Evaluation. ODOT defined preliminary alternatives in terms of the general location of the mainline track, location of sidings and stations, whether crossings would be at-grade or grade-separated, and whether structures (e.g., bridges, culverts) would need to be replaced. Conceptual cost estimates were developed for each preliminary alternative. The preliminary alternatives were then evaluated according to how effectively they met the OPR Project evaluation criteria, which are based on the Purpose and Need statement as well as Goals and Objectives derived from stakeholder input. The Goals and Objectives for the OPR Project are listed in Chapter 1, Section 1.3. The evaluation of preliminary alternatives is described in Section 2.4 below.

For additional information on the screening and evaluation processes, see the Alternatives Selection Report (ODOT, 2014c).

2.3.1 Step 1, Screening – Corridor Concept Alignments

ODOT assessed the corridor concepts against a series of screening questions using readily available environmental resource and land use GIS data provided by cities, counties, and regulatory agencies; engineering inventory information provided by state and local jurisdictions; and spatial data available via the Internet (such as U.S. Census Bureau data). Table 2-1 lists the screening questions and notes their association with the OPR Project's Purpose statement (see Chapter 1).

Table 2-1. Screening Questions

Project Purpose (from Purpose and Need Statement)	Screening Questions (Yes or No)
Improve the frequency, convenience, speed, and reliability of passenger rail service to provide riders with an efficient, safe, equitable, and affordable alternative to highway, bus, and air travel.	1. Would the concept improve travel time for rail passengers between Eugene/Springfield, OR, and Vancouver, WA? 2. Would the concept serve communities with the highest populations within or near the corridor?
Be a cost-effective investment.	3. Could the concept provide cost-effective intercity passenger rail?[a]
Protect freight-rail carrying capability.	4. Could the concept preserve or expand existing freight-rail carrying capability?
Support the implementation of regional high-speed rail in the PNWRC between the Eugene-Springfield, OR, metropolitan area and Vancouver, BC.	5. Would the concept support service consistent with the FRA regional high-speed rail designation for the PNWRC?
Be compatible with the Washington State portion of the PNWRC.	6. Would the concept be compatible with the Washington State portion of the PNWRC?

Project Purpose (from Purpose and Need Statement)	Screening Questions (Yes or No)
Promote economic development.	**7.** Could the concept enhance the potential for increased economic development?
Avoid or minimize community and environmental impacts.	**8.** Could the concept be constructed in a manner that would avoid substantial regulatory hurdles and/or avoid or minimize substantial impacts to the community or the natural environment?
Integrate with existing and planned multimodal transportation networks	**9.** Would the concept support multimodal connections (such as commuter rail, other rail transit, bus, bicycle, and pedestrian services)?

[a] Sufficient data on cost-effectiveness were not available during screening, so this screening question was not used to screen corridor concepts.

Corridor concepts (which included rail alignments as well as existing and potential new stations) were required to pass all screening questions in order to move on to Step 2, Evaluation. Table 2-2 lists the main and partial corridor concepts (described in Section 2.2.1) and identifies the results of the screening process.

Table 2-2. Corridor Concepts – Step 1, Screening Results[a]

Corridor Concept	Section A	Section B	Section C
Blue	Advanced to Step 2, Evaluation	Advanced to Step 2, Evaluation	Advanced to Step 2, Evaluation
Red	Advanced to Step 2, Evaluation	Advanced to Step 2, Evaluation	**Eliminated** except for section on I-5 linking to Brown concept
Purple	Advanced to Step 2, Evaluation	**Eliminated Albany to Salem** Portion from Keizer to Donald and connection to Canby advanced to Step 2, Evaluation	Advanced to Step 2, Evaluation between Woodburn and Wilsonville and Donald to Oregon City **Eliminated north of Wilsonville and Oregon City (connected to Brown and Blue Alternatives, respectively)**
Yellow	Advanced to Step 2, Evaluation	**Eliminated**	**Eliminated**
Pink	**Eliminated**	N/A	N/A
Tan	N/A	**Eliminated**	N/A
Brown	N/A	N/A	**Eliminated** except I-5/I-205 to Oregon City portion advanced to Step 2, Evaluation[b]
Cascadia High-Speed Rail	**Eliminated**	**Eliminated**	**Eliminated**
Yellow Option – Corvallis to Albany (OR 34)	Advanced to Step 2, Evaluation	N/A	N/A
Red Option – Central Albany	Advanced to Step 2, Evaluation	N/A	N/A
Purple (Wilsonville to Milwaukie via Tualatin and Lake Oswego)	N/A	N/A	**Eliminated**
Purple Option – Wilsonville to Central Portland (via Beaverton)	N/A	N/A	**Eliminated**

Corridor Concept	Section A	Section B	Section C
Red Option – 7.5-mile Tunnel Options	N/A	N/A	**Eliminated**
Red Option – 10-mile Tunnel Option	N/A	N/A	**Eliminated**
Brown Option – I-5/I-205 to Central Portland	N/A	N/A	Advanced to Step 2, Evaluation; became Red[b]

[a] All potential new stations associated with alignments that were eliminated were also eliminated.

[b] The Brown line from I-5/I-205 to Oregon City and Central Portland became part of the Red C-2 line in Step 2, Evaluation.

The rationale for the elimination of main and partial corridor concepts as a result of the Step 1 screening process is summarized below in Table 2-3. The concepts that were screened out are shown in Figure 2-3.

Table 2-3. Rationale for Elimination of Corridor Concepts

Corridor Concept	Rationale for Elimination
All Sections	**All Sections**
Cascadia High-Speed Rail	This concept failed Screening Question #6 in Sections A, B, and C and Screening Question #8 in Section C. It is not compatible with the Washington State portion of the PNWRC (Question #6) and it would not avoid or minimize community and environmental impacts in Section C (Question #8).
Section A	**Eugene/ Springfield to South of Albany**
Pink	This concept failed Screening Question #1. It would not improve travel time because the alignment travels out of direction to serve a community of 4,500 people.
Purple (north of Calapooia River)	This concept failed Screening Questions #8 and #9. The alignment would not be constructible in a manner that avoids or minimizes substantial community impacts (Question #8). It would not connect to the central node of the transit system in Albany (Question #9).
Section B	**South of Albany to Woodburn**
Yellow Option - Corvallis to Albany	Elimination of the Purple concept north of Albany eliminates the viability of this concept.
Yellow (Corvallis to Tualatin)	This concept failed Screening Questions #1 and #2. It would not improve travel time because the alignment travels out of direction between Eugene/Springfield and Vancouver, WA (Question #1). The section north of Independence would bypass the Salem-Keizer urban area - the second highest population concentration within the study corridor (Question #2).
Purple (Albany to Salem)	This concept failed Screening Question #8 (community and environmental impacts) because it would traverse the Ankeny National Wildlife Refuge, travel through a major mapped landslide area, and travel through some of Salem's neighborhoods with highest concentration of low-income and minority populations (environmental justice populations), and would cause substantial disruption to commercial and industrial area in Salem.

Corridor Concept	Rationale for Elimination
Tan	Elimination of the Purple concept north of Albany eliminates the viability of this concept.
Section C	**Woodburn to Portland**
Yellow	See Section B, Yellow (Corvallis to Tualatin).
Purple (Wilsonville to Milwaukie via Tualatin and Lake Oswego)	This concept failed Screening Question #8. The alignment through Tualatin and Lake Oswego would not be constructible in a manner that avoids or minimizes substantial community impacts.
Purple (Wilsonville to Milwaukie via a Tunnel)	This concept failed Screening Question #9. It would not support multimodal connections due to conflicts between intercity passenger trains and WES commuter trains.
Purple Option – Wilsonville to Central Portland (via Beaverton)	This concept failed Screening Questions #4, #8, and #9. It could not preserve or expand existing freight-rail carrying capability (Question #4). It would not avoid or minimize community and environmental impacts (Question #8) and it would not integrate with existing and planned multimodal transportation networks (Question #9).
Brown (north of Oregon City)	This concept failed Screening Questions #1, #8, and #9. The alignment would follow I-205 out of direction to cross the Columbia River and align with the route into Washington state (Question #1). It would result in unavoidable community disruption to EJ populations (Question #8). It would not connect to the central node of the transit system in the downtown core area of Portland (Question #9).
Red Option – 10-mile Tunnel Option	This portion of the Red corridor concept from Tualatin to the northwest industrial area of Portland, via a short surface route and an approximately 10-mile long new tunnel, did not pass screening question #8 (community and environmental impacts). The portion of the Red corridor concept between Wilsonville and I-205 was retained to allow a connection to the Brown concept.
Red Option – 7.5-mile Tunnel Options	This option would involve a new tunnel between Tigard and the Portland waterfront area near Union Station. Two alignment variations were considered, and both failed Screening Question #8. These 7.5-mile tunnel options would not avoid or minimize community and environmental impacts (Question #8).

2.3.2 Step 1, Screening – Corridor Concept Stations

Passenger rail stations eliminated at this stage were limited to those stations that would not be served by the remaining corridor concept alignments. Consequently, the stations eliminated from consideration during Step 1 included Veneta (associated with the eliminated Pink alignment); Monmouth, McMinnville, Independence, and Newberg (associated with the Yellow alignment eliminated north of Corvallis); and Lake Oswego (associated with the Purple alignment eliminated north of Wilsonville). All other communities with stations that were suggested during the scoping period advanced to Step 2 of the evaluation framework.

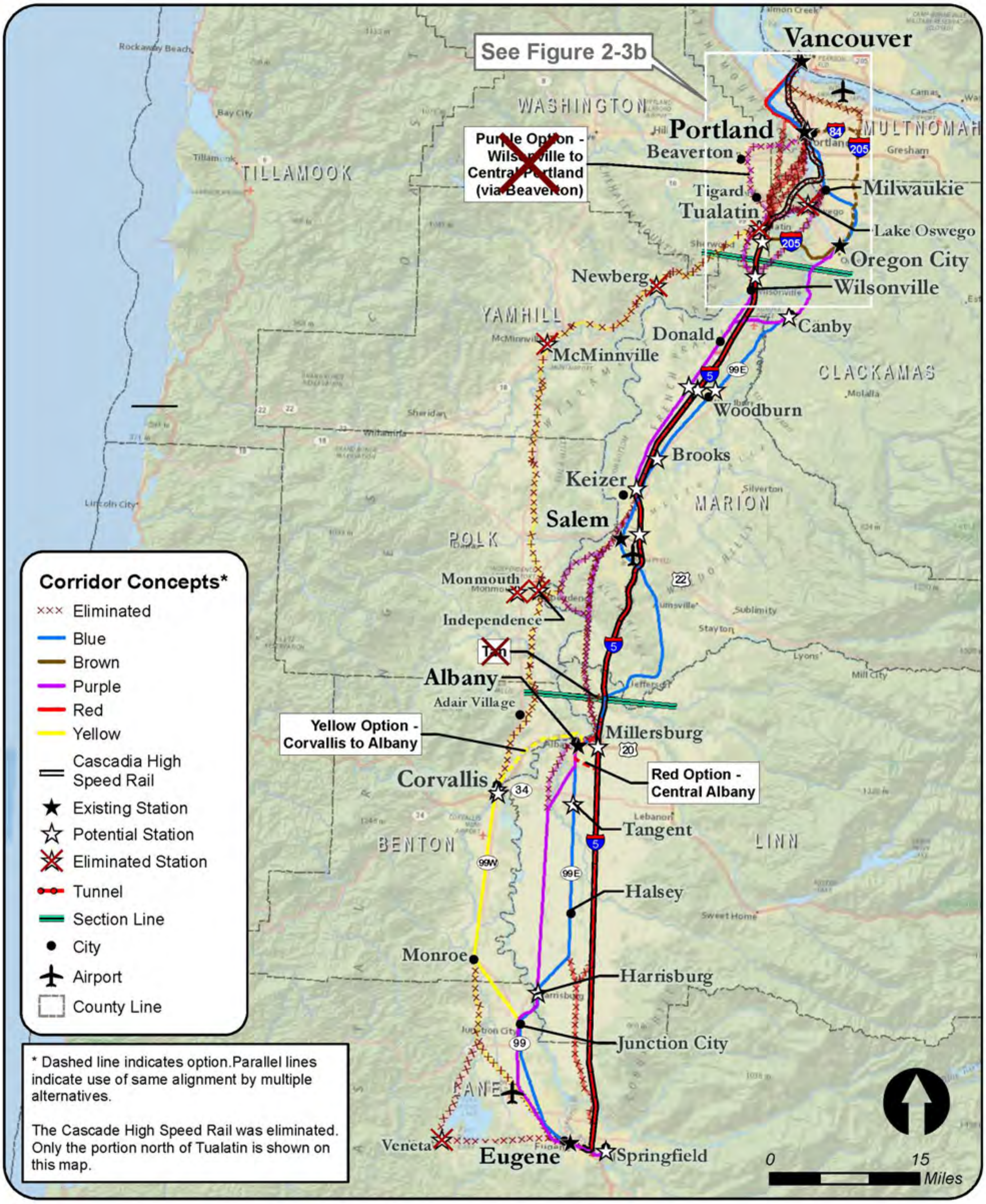

Figure 2-3a Corridor Concepts - Eliminated

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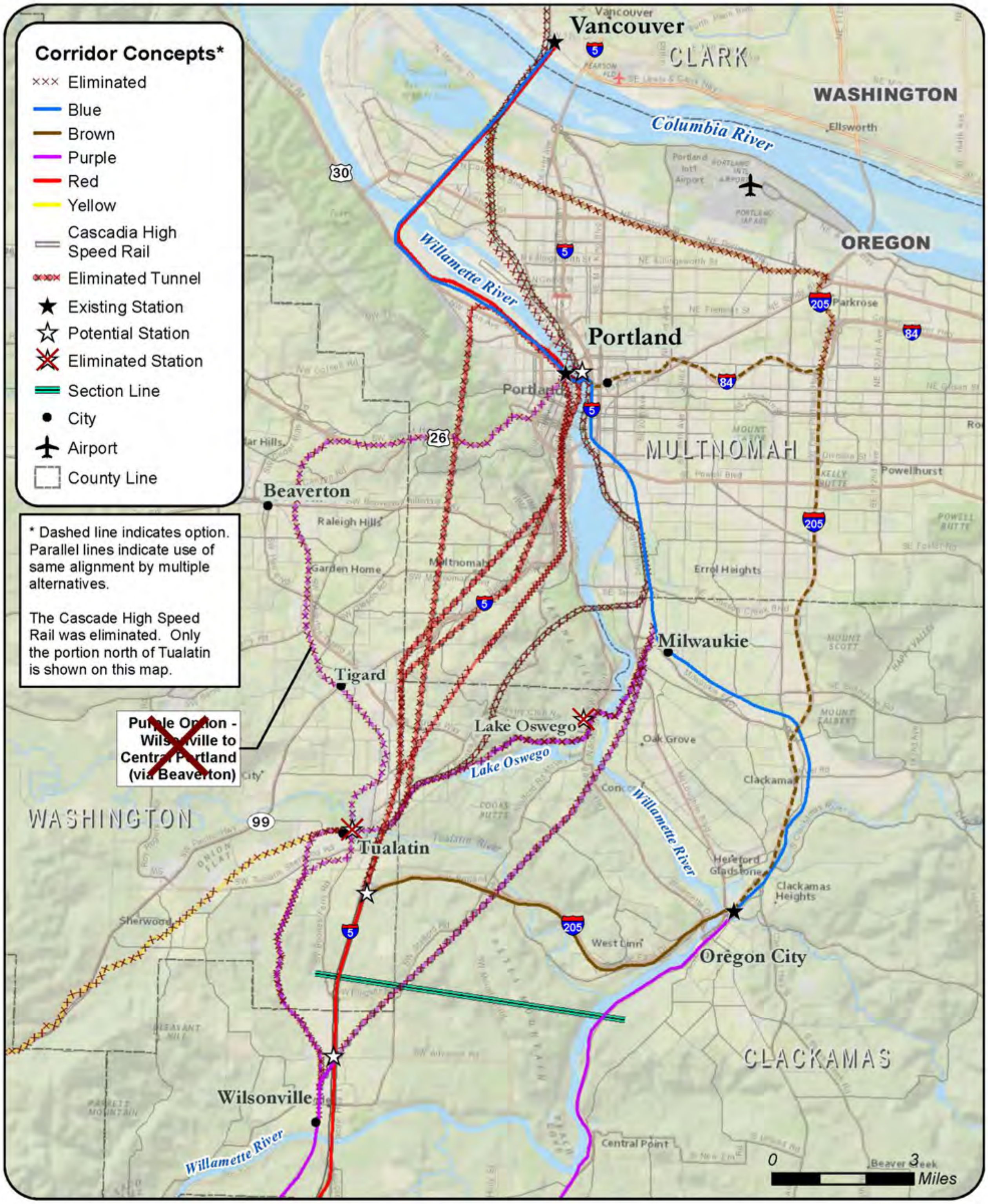

Figure 2-3b Corridor Concepts - Eliminated - Portland Vicinity

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2.3.3 Transportation Modes and Train Technologies

ODOT compared each of the transportation modes and train technologies against the screening questions (Table 2-1). Three of the modal concepts and two of the technology concepts did not pass all of the screening questions, as indicated in Table 2-4 below.

Table 2-4. Locomotive Technologies and Transportation Modes – Screening Results

Modes	Passed All Screening Questions?
Intercity passenger rail	Yes
Commuter rail	No – Did not pass screening question #1 or screening question #5. Commuter rail is not consistent with the project's Purpose, to support ongoing implementation of regional high-speed intercity passenger rail in the PNWRC. Travel times would only increase with commuter rail technology when compared to travel times on today's Amtrak Cascades service due to increased number of station stops.
Enhanced bus service	No – Did not pass screening question #5 or screening question # 6. Enhanced bus service could not provide service consistent with the FRA regional high-speed rail designation for the PNWRC. Enhanced bus service would not be compatible with the intercity passenger rail service provided or planned in Washington State.
Highway capacity improvements	No – Did not pass screening question #5 or screening question #6. Highway capacity improvements would be inconsistent with the FRA regional intercity passenger rail designation of the Pacific Northwest Rail Corridor because these two modes are substantially different. For the same reason, highway capacity improvements also would not be compatible with Washington State's plans for passenger rail development.
Technologies	**Passed All Screening Questions?**
Locomotive hauled (existing technology)	Yes
Diesel multiple units	Yes
Dual mode/power	Yes
Electric	No – Did not pass screening question #6. Electric propulsion technology would not be compatible with service provided or planned in Washington State.
Magnetic levitation (Maglev)	No – Did not pass screening question #6. Maglev technology would not be compatible with service provided or planned in Washington State.

2.4 Evaluation of Preliminary Alternatives

After completing screening, ODOT and FRA developed preliminary alternatives from those concepts that passed the screening step. ODOT defined preliminary alternatives in terms of the general location of the mainline track, location of sidings and stations, whether crossings would be at-grade or grade-separated, potential speeds for different sections of the alignment, and whether structures (e.g., bridges, culverts) would need to be replaced. ODOT developed conceptual cost estimates for each preliminary alternative. ODOT then evaluated the preliminary alternatives according to how effectively they met the OPR Project evaluation criteria, which are based on the Purpose and Need statement as well as Goals and Objectives derived from stakeholder input. The Goals and Objectives for the OPR Project are listed in Chapter 1, Section 1.3. The evaluation process and results are presented below.

2.4.1 Step 2, Evaluation – Preliminary Alternative Alignments

Following the screening of corridor concepts, ODOT refined and developed concepts not eliminated in Step 1 into preliminary alternatives for subsequent analysis in the Step 2 evaluation process. ODOT refined the corridor concepts considering the project Purpose and Need, Goals and Objectives, and known community and environmental constraints. Engineering detail was developed to the level needed to allow ODOT to evaluate each preliminary alternative based on the measures of effectiveness. The preliminary alternative alignments are summarized below. The geographic section boundaries from the Step 1 screening process were slightly adjusted help facilitate the Step 2 evaluation process as well as the potential hybridization of preliminary alternative sections. The primary section boundary adjustments were grouping Albany with Eugene in the southern-most section, and moving the boundary between the central and northern section north to the southern part of the Portland metropolitan area.

The section boundaries for the Step 2 evaluation process were:

- Section A – Eugene/Springfield to North of Albany (the remaining routes converge just north of Albany, so this break point was moved north)
- Section B– North of Albany to North of Wilsonville (keeping the Salem, Keizer, and Woodburn cities together in a section, with analysis designed to accommodate potential mixing and matching of the preliminary alternatives in the vicinity of Keizer)
- Section C – North of Wilsonville to Vancouver, WA (includes the greater Portland metropolitan area; due to the highly developed nature of Portland metropolitan area and the challenging topography of the west side, remaining options in the area were limited)

Detailed descriptions of the preliminary alternatives can be found in the Alternatives Selection Report, Appendix E (ODOT, 2014c). Unlike the corridor concepts in Step 1, ODOT evaluated and “scored” both the preliminary alternatives and potential station locations on a comparative basis using measures of effectiveness that varied by criterion. Thus, ODOT developed scores for both the preliminary alternatives and the potential stations. Travel time analysis for the preliminary alternatives assumed three stops along the route between Eugene-Springfield and Portland (Albany-Corvallis, Salem-Keizer, and one in the south portion of the Portland metropolitan area). The evaluation of potential station locations is presented in Section 2.4.2.

In addition to the main corridor concepts that passed the Step 1 screening process (shown in Figure 2-3 above), ODOT developed a limited set of potentially feasible alignment options that could: (1) optimize cost or operations, or (2) minimize environmental impacts. These options were developed based on professional judgment and additional input from stakeholders. ODOT and FRA also considered the following refined options in their evaluation of preliminary alternatives:

- **Section A, Yellow Alternative, Highway 34 Option.** This new rail alignment from Corvallis to west of Tangent adjacent to Highway 34 would serve a potential new station in Corvallis and connect with the existing Amtrak Cascades route (on the UPRR line) in south Albany.
- **Section B (1), Blue Alternative, Parish Gap Option.** This option was developed to avoid several low-speed curves and to reduce potential adverse impacts to the Jefferson and Marion communities.
- **Section B (2), Purple Alternative, Aurora Option.** This option would bypass downtown Aurora, thereby minimizing adverse impacts within the city.
- **Section C, Blue and Red Alternatives, Eastside Options 1 and 2.** These options would provide routes through northeast and north Portland en route to Vancouver, WA. Eastside Option 1 would include a new tunnel through the bluff near the University of Portland and then follow the existing route over the Columbia River to Vancouver, WA. Eastside Option 2 was developed to minimize new tunnel costs and adverse impacts through north Portland compared to Eastside Option 1; it would join the BNSF Railway

alignment north of Swan Island. These options were developed to allow for a direct route from a potential new station in Portland's Rose Quarter area (eastside) north to Vancouver, bypassing Portland's Union Station. Either option could be paired with the Blue or Red Alternative.

Figure 2-4 illustrates the preliminary alternative alignments and potential station locations considered in the evaluation. To aid the reader, Table 2-5 identifies the naming convention associations between the previous corridor concepts and the preliminary alternatives studied in the Step 2 evaluation process. While the corridor concept colors were retained, each preliminary alternative section was also assigned a section identity, such as A-1 or B-2.

Table 2-5. Naming Convention Crosswalk between Corridor Concepts and Preliminary Alternatives

Corridor Concepts	Section A (Eugene-Springfield to north of Albany)	Preliminary Alternatives Section B (North of Albany to south of Wilsonville)	Section C (South of Wilsonville to Vancouver, WA)
Blue	Blue A-1	Blue B-1 Blue Parish Gap Option	Blue C-1 Blue Eastside Option 1 Blue Eastside Option 2
Red	Red A-2 Red Central Albany Option	Red B-2	Red C-2[a] Red Eastside Option 1 Red Eastside Option 2
Purple	Purple A-3	Purple B-3 Purple Wilsonville Option Purple Aurora Option	N/A
Yellow	Yellow A-4 Yellow Highway 34 Option	N/A	N/A

[a] The C-2 (Red) alignment follows the former Brown alignment from I-5/I-205 to Oregon City, north on I-205, and west on I-84 to the Steel Bridge, connecting with the C-1 (Blue) alignment to Portland's Union Station and then northward either on or near the existing BNSF Railway right-of-way to Vancouver, WA.

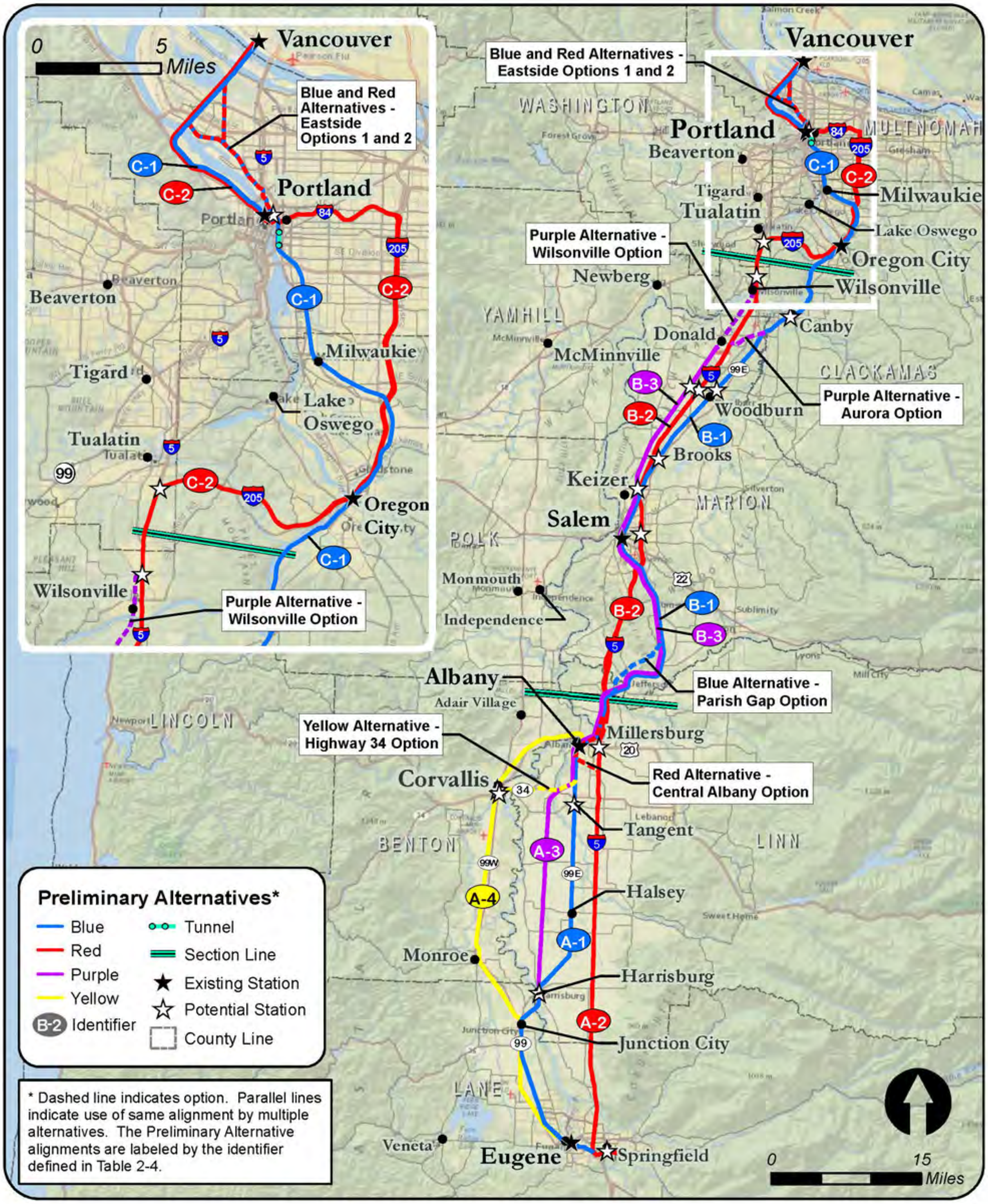

Figure 2-4 Preliminary Alternatives

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ODOT developed the OPR Project evaluation framework prior to conducting the Step 1 screening process and Step 2 evaluation process. ODOT and FRA derived all screening questions and evaluation criteria directly from the OPR Project Goals and Objectives. For the Step 2 Evaluation, measures of effectiveness were developed for each evaluation criterion in order to facilitate criteria assessment and the relative comparison of preliminary alternatives. Table 2-6 lists the evaluation criteria and corresponding measures of effectiveness. For additional information on the Step 2 Evaluation, including more information on the evaluation criteria and how the analysis was conducted, see the Alternatives Selection Report (ODOT, 2014c).

Table 2-6. Evaluation Criteria and Measures of Effectiveness

Evaluation Criteria	Measures of Effectiveness
1A – Provide a viable alternative to auto, air, and bus travel between Eugene, OR and Vancouver, WA	Average passenger rail trip time between Eugene and Portland
1B – Provide reliable and frequent passenger rail service	Capacity to serve 6 round trip trains between Eugene and Portland per day and qualitative assessment of delay
1C – Support multimodal integration at each potential passenger rail station	Qualitative assessment of the availability of existing and new transit service, and citywide bicycle and pedestrian facilities (including recreation and tourism opportunities) in potential station communities
1D – Allow for future passenger rail improvements, including higher speeds	Qualitative assessment of the ability to accommodate higher speeds and/or greater frequencies for passenger trains in the future
2A – Does not increase conflicts between passenger rail and/or freight rail and vehicles	Quantitative assessment of number of grade crossings along preliminary alternative alignments
2B – Protect freight rail carrying capacity	Qualitative assessment of potential impact on existing or future freight rail capacity or impact on existing or potential freight rail shippers
3A.1 – Phasing of improvements	Qualitative assessment of the ability to phase improvements over time
3A.2 – Construction cost	Constructed scale representing order of magnitude construction cost
3B – Serve the maximum number of people with every dollar invested	Relative size of attractors based on travel market assessment; existing and projected population and number of jobs in communities with potential stations
4A – Provide a viable and affordable alternative for all travelers	*Insufficient information to evaluate this criterion*
4B.1 – Equitable investments and service	Percentage of low-income, Hispanic, and minority populations within 1-mile of potential stations compared to percentage of these populations within 10 miles of potential stations
4B.2 – Environmental Justice impacts	Number of Census Block Groups with low-income and minority populations (within 500 feet of proposed track) higher than the section's average
5A – Provide passenger rail service to meet the existing and future passenger rail demand for an interconnected system in the Pacific Northwest Rail Corridor	*All preliminary alternatives would be compatible with rail infrastructure in WA state, thus this criterion was not used to assess tradeoffs between preliminary alternatives*
6A – Benefit communities within the corridor	Qualitative assessment of the potential to improve communities through enhancement of an existing station or insertion of a new station/station area; Qualitative assessment of the multimodal connectivity of an existing or potential station's location in relation to regional attractions

Evaluation Criteria	Measures of Effectiveness
6B.1 – Community cohesion impacts	Assessment of the number of community resources (parks, museums, recreational areas, religious institutions, libraries, hospitals and schools) and commercial and residential parcels within 100 feet of proposed infrastructure and whether there would be a substantial increase in rail traffic
6B.2 – Impacts to sensitive noise receptors along the corridor	Number of sensitive noise receptors within a 500 feet distance of each side of the proposed infrastructure
7A.1 – Farmland impacts	Exclusive Farm Use-zoned lands potentially impacted
7A.2 – Land use and transportation plan consistency	Assessment of consistency with adopted regional and local comprehensive plans
7B – Reduce greenhouse gas emissions in support of national and state policies to slow climate change	Qualitative assessment of greenhouse gas emissions from preliminary alternatives, based on anticipated VMT reduction due to mode shift and temporary construction-related emissions
7C.1 – Threatened and Endangered species impacts	Qualitative assessment of potential impacts to habitat, populations or individuals of threatened or endangered species and their critical habitat and impacts to non-listed fish and wildlife species
7C.2 – Wetland impacts	Percent of study area that contains high value wetlands plus percent all wetlands potentially impacted
7C.3 – Geology impacts	Miles of proposed track through areas with known unstable slopes
7C.4 – Section 4(f) impacts	Number of known Section 4(f) resources within 100 feet of proposed infrastructure where statute-protected features could be directly impacted
7C.4 – Cultural resources impacts	Known cultural resources (historic properties and archaeological resources) within 100 feet of proposed infrastructure

ODOT shared the results of the Step 2 Evaluation with the public in fall 2013. During the month of November, ODOT held a series of five open houses, conducted multiple stakeholder meetings, and conducted an on-line open house. Three-hundred-ninety-four people attended the open houses, and 802 people visited the online open house. (See Chapter 6 for more detail on the public involvement process.) The preliminary alternative alignments that advanced or were eliminated by the evaluation process are listed below in Table 2-7 and shown on Figure 2-5. Table 2-8 summarizes the rationale for eliminating specific sections of the preliminary alternative alignments.

Table 2-7. Preliminary Alternatives Evaluation Results

Preliminary Alternative	Section A	Section B	Section C
Blue	A-1 Advanced to Tier 1 Draft EIS	B-1 Advanced to Tier 1 Draft EIS **Parish Gap Option Eliminated**	C-1 Advanced to Tier 1 Draft EIS **Eastside Option 1 Eliminated** **Eastside Option 2 Eliminated**
Red	A-2 Advanced to Tier 1 Draft EIS Central Albany Option Advanced to Tier 1 Draft EIS	B-2 (south of Keizer) Advanced to Tier 1 Draft EIS **B-2 (north of Keizer) Eliminated**	C-2 (Wilsonville to Oregon City) Advanced to Tier 1 Draft EIS **C-2 (Oregon City to Vancouver, WA) Eliminated** **Eastside Option 1 Eliminated** **Eastside Option 2 Eliminated**
Purple	**A-3 Eliminated**	**B-3 (Donald to Canby and Oregon City) Eliminated** B-3 (Keizer to Wilsonville) Advanced to Tier 1 Draft EIS **Aurora Option Eliminated**	N/A
Yellow	**A-4 Eliminated** **Highway 34 Option Eliminated**	N/A	N/A

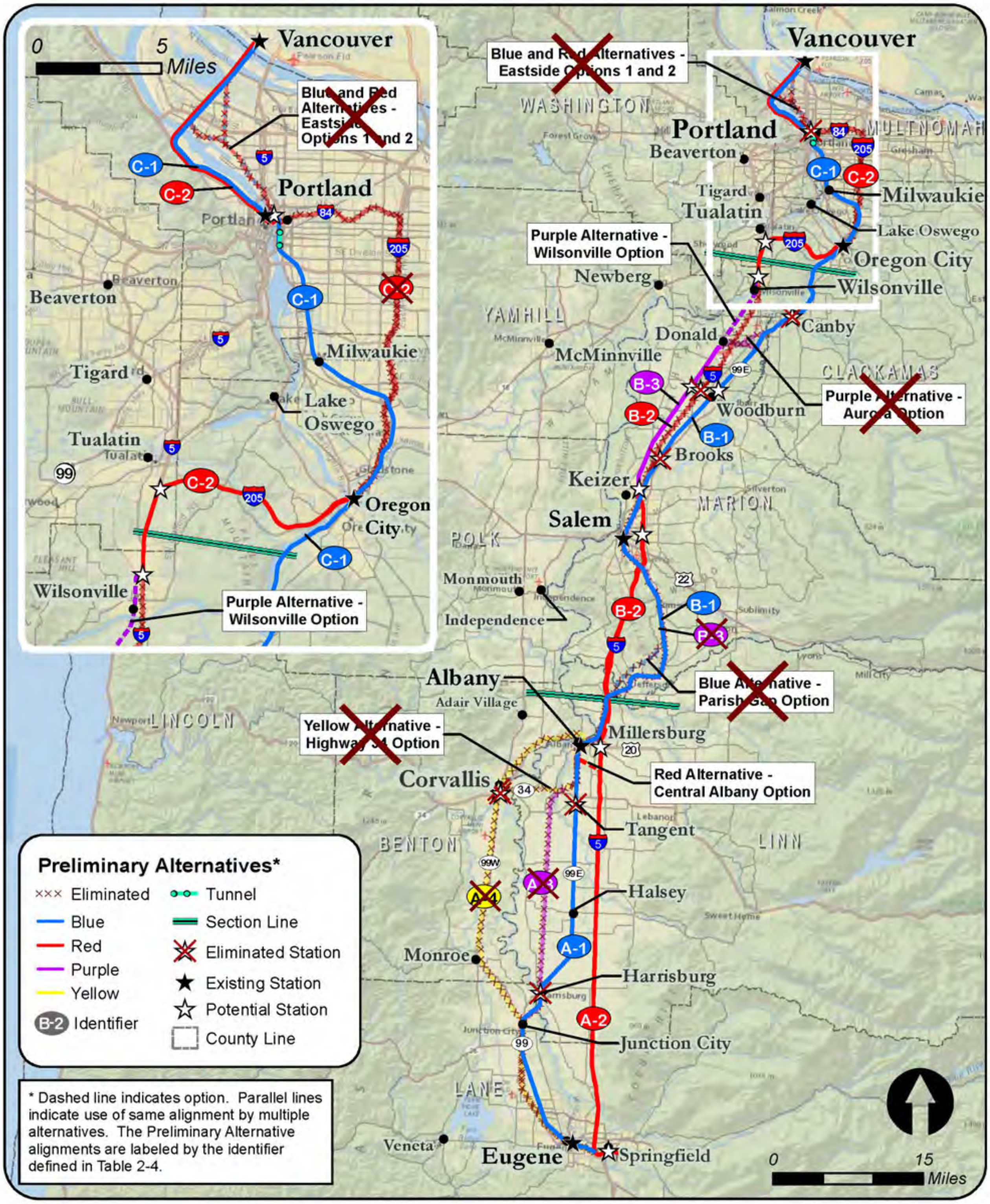

Figure 2-5 Preliminary Alternatives - Eliminated

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Table 2-8. Rationale for Elimination of Preliminary Alternatives

Preliminary Alternative	Rationale for Elimination
Section A	**Eugene/Springfield to North of Albany**
Purple A-3	This alignment has the highest number of rail infrastructure ownership and operations switches. This causes concern about reliability. This alignment has a limited ability to phase improvements over time. The Purple alternative also assumes a complete rebuild of the railway bed portions of the PNWR mainline, which would contribute to an approximately 40 percent higher construction cost than the lowest-cost alternative. There would be greater impacts to farmland and wetlands compared to the other preliminary alternatives.
Yellow A-4	This alignment would have the highest travel time in Section A, 54 minutes, for both the main Yellow A-4 preliminary alternative and the Yellow Highway 34 Option. It would have the highest number of at-grade crossings relative to the other preliminary alternatives in Section A. There would be less opportunity to phase improvements over time because relatively long segments would need to be constructed to provide a serviceable link. Construction costs would be more than 60 percent higher than the lowest-cost preliminary alternative. The main Yellow A-4 preliminary alternative would impact substantially more residential parcels than the other preliminary alternatives in Section A.
Yellow Highway 34 Option	This alignment would have the highest travel time in Section A (54 minutes, the same as the main Yellow A-4 preliminary alternative). It would have the highest number of at-grade crossings of all preliminary alternatives in Section A except for the main Yellow A-4 preliminary alternative. There would be less opportunity to phase improvements over time because relatively long segments would need to be constructed to provide a serviceable link. Construction costs would be more than 60 percent higher than the lowest-cost preliminary alternative. There is greater potential to impact listed, proposed, and non-listed fish and wildlife species than other preliminary alternatives because a new alignment would be required through a natural area between Corvallis and Albany.
Section B (1)	**North of Albany to South of Keizer**
Blue Parish Gap Option	The Parish Gap option would not improve overall travel time or otherwise improve reliability compared to the main Blue preliminary alternative or other preliminary alternatives. The Parish Gap option would cost approximately 20 percent more than the main Blue preliminary alternative, and its construction could not be phased over time. Thus the option would cost more than the main Blue preliminary alternative and would not improve travel time or reliability. The Parish Gap option would impact more high-value farmland than the other preliminary alternatives and more total potential farmland than the Blue preliminary alternative.
Red (between Albany and Keizer)	Travel-time savings and improved mobility within this section would occur primarily south of Keizer, compared to the other options. Travel-time savings were minor north of Keizer, especially compared to the Purple preliminary alternative. It would have the highest cost of any of the preliminary alternatives, including approximately 50 percent more than the Blue preliminary alternative, and it would have a limited ability to be phased. Greater potential farmland impacts than other preliminary alternatives in Section B.

Preliminary Alternative	Rationale for Elimination
Section B (2)	**South of Keizer to Wilsonville**
Red (between Keizer and Wilsonville)	Travel-time savings and improved mobility would occur primarily south of Keizer. Travel-time savings were minor north of Keizer, especially compared to the Purple preliminary alternative. It would have the highest cost of any of the preliminary alternatives, including approximately 50 percent more than the Blue and Purple preliminary alternatives, and it would have a limited ability to be phased. It would have greater potential farmland impacts than other preliminary alternatives in Section B.
Purple (Donald to Oregon City, including Aurora Option)	Travel times would be higher than the Purple Wilsonville option and same as Blue preliminary alternative. Costs would be moderately higher than the Blue preliminary alternative and Purple Wilsonville option. There are a higher number of sensitive noise locations (residential and commercial parcels specifically) that could be impacted by noise than the Purple Wilsonville option. There would be higher track mileage through unstable slope locations than Purple Wilsonville option (1.6 miles vs. 0.04 miles, respectively).
Section C	**Wilsonville to Vancouver, WA**
Blue East Side Options	The Eastside options would not have the ability to be phased, and construction costs were estimated to be between 80 percent and 90 percent higher than for the main Blue preliminary alternative (following the existing PNWRC route). The Eastside options would not provide service to the historic Union Station, Portland's designated passenger-rail transportation hub.
Red C-2 (Oregon City to Portland via I-205/I-84)	Travel time would be the highest of the preliminary alternatives and options in Section C, including substantially higher than for the Blue preliminary alternative and Blue east side options because of slow speeds along the Graham Line. Costs would be less than the Red east side options, but approximately 240 percent higher than those for the main Blue preliminary alternative, with less opportunity to phase improvements over time. It could impact a substantially higher numbers of residential and commercial parcels by noise compared to the Blue preliminary alternative and Blue east side options. It could displace higher numbers of community resources, and residential and commercial parcels compared to the other preliminary alternative.
Red Eastside Options between Oregon City and Vancouver, WA	The travel time would be substantially higher than for the Blue preliminary alternative and Blue east side options in Section C because of slow speeds along the Graham Line. Costs would be the highest of the preliminary alternatives, including between 260 percent and 270 percent higher than those for the Blue preliminary alternative, with less opportunity to phase improvements over time. Compared to the other preliminary alternatives, it could impact the highest numbers of residential and commercial parcels by noise. It could displace the highest numbers of community resources, and residential and commercial parcels compared to the other preliminary alternatives.

2.4.2 Step 2, Evaluation – Preliminary Alternative Stations

Communities currently hosting an existing passenger rail station or potentially hosting a new station (shown in Figure 2-5) were evaluated based on most applicable evaluation criteria (see Table 2-6 above), which included:

- 1C – Support multimodal integration at each potential passenger rail station
- 3B – Serve the maximum number of people with every dollar invested
- 4B.1 – Provide equitable investments and service
- 6A – Benefit communities within the corridor

In support of the evaluation of passenger rail stations, ODOT also prepared a station area assessment that outlined data and analysis for each potential station community. The purpose of the station area assessment was to provide direction related to the proposed alternatives in communities to result in maximum economic development, multimodal access, and train operations. The assessment also took into account public input during scoping and outreach to stakeholder and agency groups (ODOT, 2014e).

The Step 2 Evaluation resulted in the elimination of several potential new station areas. These potential station areas, as well as the rationale for their elimination, include:

- ***Harrisburg (associated with the Blue and Purple preliminary alternatives):*** This potential new station had very low performance in relation to existing and potential future multimodal connections at the station area, including local and regional transit service and pedestrian and bicycle network. The relative size of attractors (residential and employment areas as well as schools, medical facilities, and other services) is very small.
- ***Tangent (associated with the Blue preliminary alternative):*** This potential new station had very low performance in relation to existing and potential future multimodal connections at the station area, including local and regional transit service and pedestrian and bicycle network. The relative size of attractors (residential and employment areas as well as schools, medical facilities, and other services) is very small.
- ***Corvallis:*** Both potential new stations were eliminated with the Yellow alignment (including the Highway 34 option).
- ***Brooks (associated with the Blue preliminary alternative):*** This potential new station had very low performance in relation to existing and potential future multimodal connections at the station area, including local and regional transit service and pedestrian and bicycle network. The relative size of attractors (residential and employment areas as well as schools, medical facilities, and other services) is very small.
- ***Canby (associated with the Blue preliminary alternative and the Purple Aurora option):*** This potential new station had low performance in relation to existing and potential future multimodal connections at the station area, including local and regional transit service and pedestrian and bicycle network. The relative size of attractors (residential and employment areas as well as schools, medical facilities, and other services) is small.
- ***Portland (Rose Quarter):*** This potential new station was eliminated with the Red and Blue alignment eastside options.

Following the Step 2 evaluation process, the existing and potential new station areas that remain under consideration for one or more of the build alternatives are listed below in Table 2-9.

Table 2-9. Existing and Potential New Station Areas

Section	Existing Stations	Potential New Stations
A	Eugene Station (Blue) Albany Station (Blue, Red- Central Albany Option)	Springfield (Red) Albany (Red)
B	Salem Station (Blue)	Salem (Red) Keizer (Red or Purple) Woodburn (Blue, Purple, Red) (three locations)
C	Oregon City Station (Blue) Portland (Union Station) (Blue or Red)	Wilsonville (Purple, Red) Tualatin (Red) Portland (Blue or Red)

2.4.3 Evaluation of Transportation Modes and Train Technologies

The passenger rail mode was the only transportation mode to pass all Step 1 screening questions. No further assessment of the passenger rail mode was conducted in the Step 2 Evaluation.

Three locomotive technologies emerged from screening into the evaluation process:

- Locomotive Hauled
- Diesel Multiple Units
- Dual Mode/Power

During the assessment of locomotive technologies in the Step 2 evaluation process, ODOT conducted research on the dual mode technology. The dual mode/power technology was found to require electrification of the rail line (typically through an overhead catenary) at an added cost. Unless substantial portions of the alignment were electrified, the technology would not achieve the benefit of higher speeds compared to the existing diesel technology. Further, the electrification of the line would require increased overhead clearance on existing and proposed rail alignments due to the overhead catenary lines. Electrification of joint passenger/freight corridor have potential impact on the height of freight containers. Because of the added cost and impacts associated with electrification without any travel time or ridership benefits, the dual mode/power technology was eliminated from further consideration. The locomotive hauled and diesel multiple units technologies have moved forward into the Draft EIS for further consideration.

2.4.4 Step 2, Evaluation – Conclusions

The alternatives which advanced to the Tier 1 DEIS analysis included a no-build alternative and two build alternatives. The build alternatives and associated station locations are illustrated in Figure 2-6 and summarized below, and described in more detail in Chapter 3.

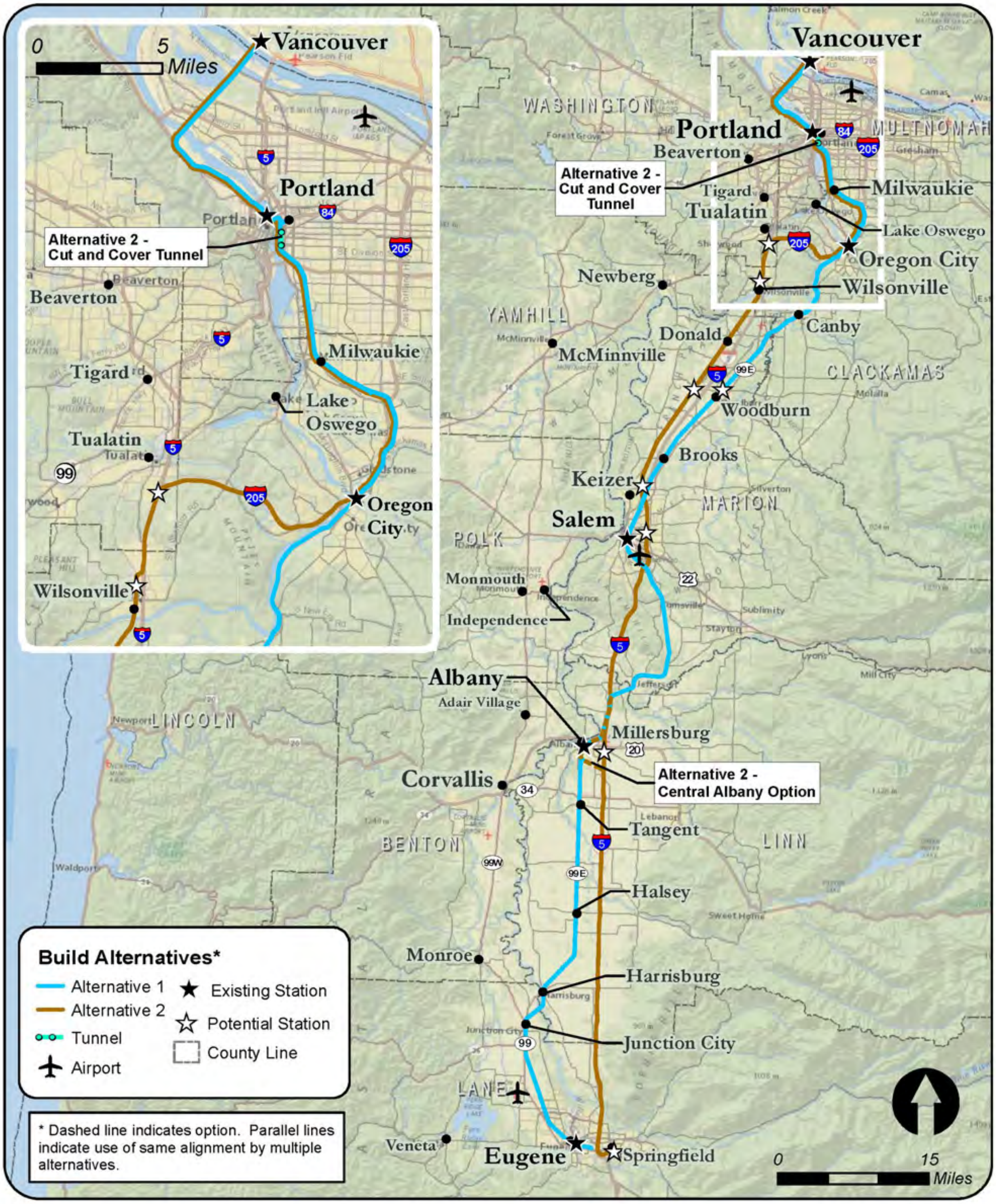

Figure 2-6 **Build Alternatives**

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Alternative 1 (formerly the Blue preliminary alternative) would parallel the existing Amtrak Cascades passenger rail route from Eugene north to Portland. A second mainline track would be added in sections where needed to accommodate additional passenger rail service while maintaining the current level of freight operations, as estimated through rail capacity modeling analysis conducted for the project (see Chapter 3 for more information). The maximum speed would be 79 mph. Communities with potential stations for Alternative 1 include: Eugene, Albany, Salem, Woodburn, Oregon City, and Portland (all are existing stations except for Woodburn, which would be a new station).

Alternative 2 (a hybrid of portions of the "Red," "Purple" and "Blue" preliminary alternatives) would add new mainline track throughout the majority of the route where adjacent to the existing I-5 and I-205 alignments. Alternative 2 would also add mainline track adjacent to the existing PNWR line between Keizer and Wilsonville and to the existing UPRR line north of Oregon City. No additional mainline track is proposed across or north of the Steel Bridge in Portland. The Central Albany Option, which would connect the Red alignment to the existing Albany Station, also advanced to the Tier 1 DEIS analysis. The maximum speed in passenger-only sections would be 110 mph. With the exception of a proposed tunnel below SE 2nd Avenue in Portland, Alternative 2 would be identical to Alternative 1 between Oregon City and Vancouver, WA. Communities with potential stations for Alternative 2 include: Springfield, Albany, Salem or Keizer, Woodburn, Wilsonville or Tualatin, and Portland (all would be new stations except for Portland and Albany with the Central Albany Option).

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CHAPTER 3

Alternatives Advanced for Further Study

This chapter describes the OPR Project alternatives advanced for further study, which include two build alternatives (Alternative 1 and Alternative 2) as well as a No Action Alternative. Figure 3-1 shows the build alternative alignments and highlights the location of existing and potential new stations.

The two build alternatives are:

- ***Alternative 1 –*** This build alternative would be constructed within or immediately adjacent to the existing Amtrak Cascades passenger rail route (i.e., the Union Pacific Railroad (UPRR) line) between Eugene and Portland. Sections of mainline track and sidings would be added where needed to accommodate additional passenger rail service while maintaining the current level of freight rail operations. The route would serve seven passenger rail round trips per day—six on the Amtrak Cascades and one on the Coast Starlight (a “6+1” schedule). Alternative 1 would serve existing stations (Eugene, Albany, Salem, Oregon City and Portland).[7]
- ***Alternative 2 –*** This build alternative would involve construction of new mainline track and sidings throughout the majority of the route where it would be adjacent to the existing I-5 and I-205 alignments. New mainline track would also be added adjacent to the existing Portland and Western Railroad (PNWR) line between Keizer and Wilsonville and to the existing UPRR line north of Oregon City. The route would serve seven round trips per day—six on the Amtrak Cascades and one on the Coast Starlight (a “6+1” schedule). Alternative 2 would serve the existing Portland station, and would have new stations in Springfield, Albany, and in Salem or Keizer. A station to serve the southern portion of the Portland metropolitan area could be located in Wilsonville or Tualatin. Alternative 2 has one option:

  The Alternative 2 with Central Albany Option – This option would be the same as Alternative 2 except in the vicinity of Albany, where the route would diverge from the I-5 area to serve the existing Albany station.

[7] When ODOT began identifying potential project impacts, Alternatives 1 and 2 included a possible Woodburn Station. In 2016, ODOT and WSDOT adopted a Station Stop Policy for Amtrak Cascades service that would require any new station to meet defined criteria. Though Woodburn does not currently meet these criteria and is not included in the service and operations analysis of the Build Alternatives, future project development could include a station in Woodburn. To preserve information developed for potential new Woodburn Station locations, those locations continue to be shown on project maps and potential environmental impacts are broadly described in Chapter 4. Additional analysis of ridership, travel time, environmental impacts and costs would need to occur during the environmental analysis for the future project development prior to implementing a new station in Woodburn.

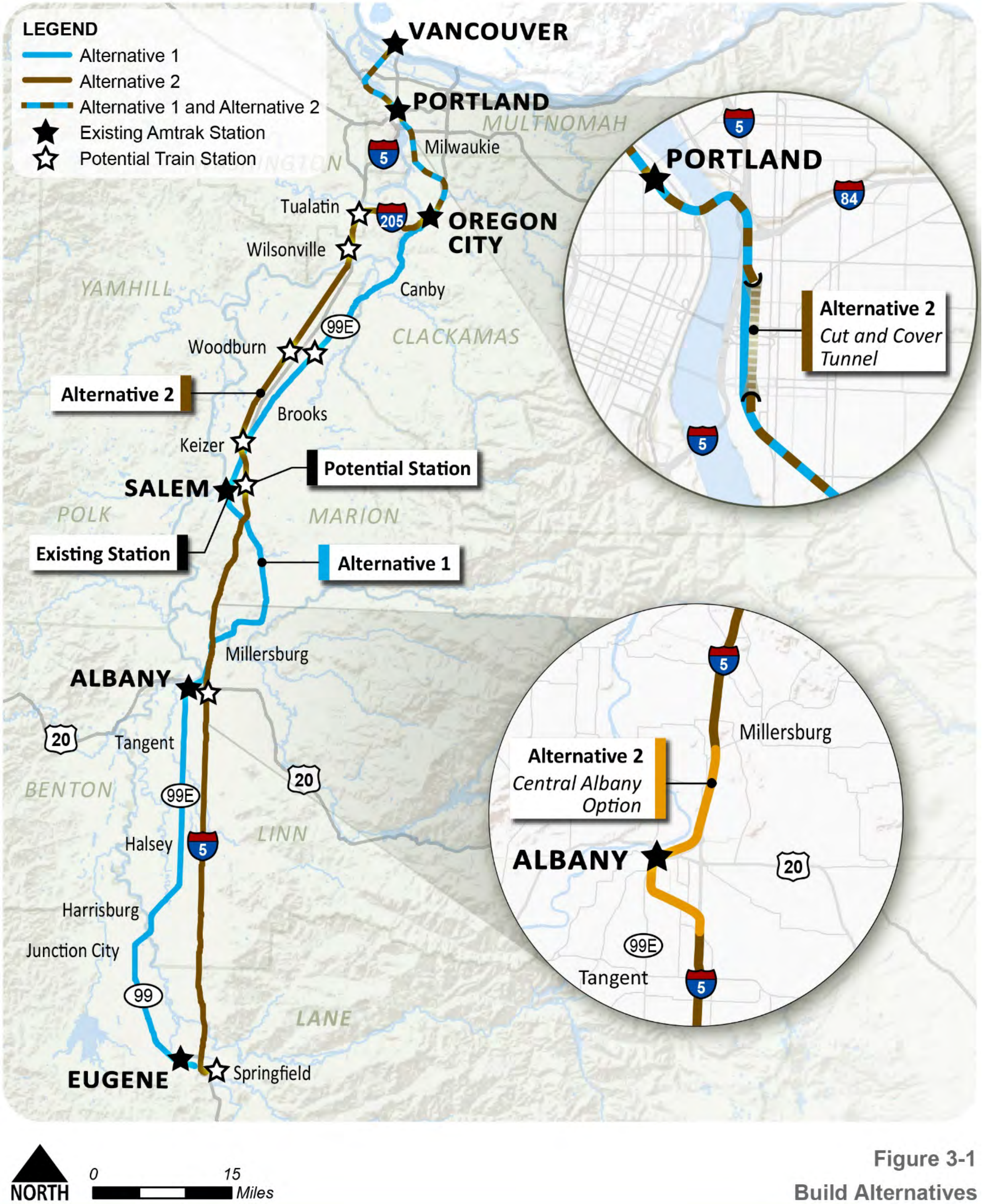

Figure 3-1
Build Alternatives

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3.1 No Action Alternative

The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) implementing regulations require Federal agencies to include an alternative of "no action" to serve as baseline in the Environmental Impact Statement (EIS) for comparison with the proposed action and other reasonable alternatives carried forward. Analysis of a no action alternative provides a benchmark for comparison with the potential impacts of the build alternatives, and helps decision-makers and the public understand the consequences of taking no action.

The OPR Project No Action Alternative consists of the continuation of the existing Amtrak Cascades passenger train route, stations, and service between Eugene and Portland. A mix of freight and passenger trains currently use the UPRR and BNSF trackage that also serves as the Amtrak route. BNSF Railway (BNSF) owns the existing Amtrak route in Oregon north of Portland's Union Station, and UPRR owns the route south of Portland's Union Station. In addition to the Amtrak Cascades passenger rail service, ODOT operates "Thruway" intercity motor coach bus service with that provides six round trips per day between Eugene and Portland, and one round trip per day between Salem and Portland.

The No Action Alternative includes all committed improvements (that is, projects with dedicated or obligated funding) to the existing intercity passenger rail system, the intercity highway system, and other modes of transportation available to the public (particularly aviation and intercity bus services) in the OPR Project study area (this study area extends from Eugene-Springfield, OR, to Vancouver, WA). Under the No Action Alternative, the intercity passenger rail service improvements proposed under Alternatives 1 or 2 would not take place.

The No Action Alternative is described below according to the following parameters:

- ***3.1.1 Route and Infrastructure*** – anticipated improvements and maintenance on the existing system.
- ***3.1.2 Stations*** – descriptions of stations that would be served by the No Action Alternative.
- ***3.1.3 Operational and Service Assumptions*** – information on schedules and number of daily round trips on rail and bus.
- ***3.1.4 Ridership*** – presentation of estimated ridership in 2035 overall and by station.
- ***3.1.5 Other Transportation Projects*** – information on committed transportation projects in the project area.

3.1.1 Route and Infrastructure

The No Action Alternative consists of the current intercity bus and passenger rail route and operations between Eugene and Portland. The passenger rail service would continue to serve existing stations in Eugene, Albany, Salem, Oregon City and Portland. The bus service would continue to serve existing stops in Eugene, Albany, Salem, Woodburn, and Portland.

The No Action Alternative does not include changes to current track configuration or operations; however, as part of an ongoing safety improvement program that is independent of the OPR Project, Oregon Department of Transportation (ODOT) and UPRR will be closing two at-grade crossings in Linn County (C. Street in Shed and Twin Butte W. Dr. 29 in Halsey, with 146 at-grade crossings to remain on the route), and will install crossing arms and flashing lights at three at-grade crossings in Linn County (Pugh Dairy Drive in Shed, Oak Plain Drive 212 in Halsey, and Griffith Road in Hallawell). Appendix C contains a list of the at-grade crossings in the project area. In addition, Congress requires railroad mainlines with regularly scheduled intercity and commuter rail passenger service to implement Positive Train Control (PTC) by December 31, 2018. PTC uses communication-based/processor-based train control technology to provide a system to prevent train-to-train collisions, derailments due to excessive speed, and the movement of a train through a mainline switch in the wrong position. The No Action Alternative would include PTC improvements required by Congress.

The No Action Alternative would include maintenance activities that would be consistent with existing efforts, and these activities would continue to be the responsibility of the freight railroad owners and operators in accordance with their operating agreements with ODOT and Amtrak.

3.1.2 Stations

Amtrak intercity passenger trains currently serve five rail stations in the following Oregon cities within the OPR Project study area: Eugene, Albany, Salem, Oregon City and Portland. The existing stations have varying amenities, as well as parking and accommodation for transit, bicycle and pedestrian access. The Thruway bus service has two stops in Eugene (one at the Eugene Station and the second on the University of Oregon campus) and also stops at the Albany, Salem and Portland rail stations. One of its daily routes stops in Woodburn, at the Woodburn Transit Center near the I-5 and Highway 214 interchange. The No Action Alternative would continue existing train and bus service to these locations.

3.1.3 Operational and Service Assumptions

Within the Oregon portion of the Pacific Northwest Rail Corridor (PNWRC), the Amtrak Cascades intercity passenger rail service operates between Eugene and Portland. The Amtrak Cascades route proceeds through Washington and terminates in Vancouver, BC. Oregon is also served by Amtrak’s Coast Starlight service, with one daily round trip between Los Angeles and Seattle, and the Amtrak’s Empire Builder, which runs between Portland and Chicago daily, through Vancouver, WA. The current intercity passenger rail service consists of three round trips per day between Eugene and Portland (two Amtrak Cascades trains and one Amtrak Coast Starlight train—a “2+1” schedule), and six round trips per day between Portland and Vancouver, WA (a “4+2” schedule). In 2017, the Washington State Department of Transportation (WSDOT) will increase to a “6+2” schedule between Portland and Vancouver, WA, and “6+1” from Vancouver, WA to Seattle. The No Action Alternative would provide the same Amtrak Cascades passenger train frequency (a “6+2” schedule between Portland and Vancouver, WA; and a "2+1" between Eugene and Portland) in 2035.

In addition to the Cascades passenger rail service provided by Amtrak, ODOT operates “Thruway” intercity bus service that provides six round trips per day between Eugene and Portland, and one round trip per day between Salem and Portland. Under the No Action Alternative, ODOT would implement a programmed action to extend the intercity bus service round trip between Salem and Portland to also serve Albany and Eugene, thus increasing this service to seven round trips per day between Eugene and Portland.

Table 3-1 shows the current Amtrak Cascades scheduled times. The Coast Starlight has different travel times, as noted. ODOT anticipates that these travel times would not change under the No Action Alternative. The total train travel time between Eugene and Portland is 2 hours and 35 minutes; times between individual city pairs for northbound and southbound trains vary due to planned “recovery” time in the schedule, which accounts for potential delays found along the route. Thruway bus travel times vary based on time of day and planned stops, ranging from 2 hours and 30 minutes to 2 hours and 55 minutes between Eugene and Portland. Thruway buses serve two Eugene locations (Eugene Station and the University of Oregon), the Albany, Salem, and Portland train stations, and provide limited service to Woodburn.

Table 3-1. Existing Amtrak Cascades Passenger Train Schedule Time (Fall 2016)

Section	Amtrak Cascades	
	Northbound (hh:mm)	Southbound (hh:mm)
Eugene – Albany	00:41	01:00
Albany – Salem	00:30	00:29
Salem – Oregon City	00:43	00:43
Oregon City – Portland	00:41	00:23
Total Travel Time	**02:35**	**02:35**

Note: Time is shown in hours and minutes (hh:mm). The Coast Starlight has a scheduled time from Eugene to Portland of 2:56 and from Portland to Eugene of 2:45, and Thruway bus times range from 2:30 to 2:55 between the two cities, with intermediate stops.

3.1.4 Ridership

Because of increases in population and employment and the associated intercity travel market growth forecasted to occur within and beyond the study area, intercity passenger rail and bus ridership would be higher under the No Action Alternative than under existing conditions. Table 3-2 shows station activity (riders on and off) for existing conditions (2015) and projected 2035 No Action Alternative conditions. The figures include both the Amtrak Cascades train service and Thruway bus service.

Table 3-2. Annual Amtrak Cascades Train and Thruway Bus Station Activity – Existing (2015) and 2035 Conditions for No Action Alternative

Station	Station Activity (Number of riders both on and off)		
	Existing Conditions (2015)	No Action Alternative (2035)	Percent Growth: Existing Conditions to No Action Alternative
Eugene	85,800	172,500[a]	101%
Albany	31,800	54,800[a]	72%
Salem	65,300	97,100	49%
Oregon City	15,100	17,000	13%
Portland[b]	458,800	961,100	109%
Total[c]	**656,800**	**1,302,500**	**98%**

[a] There were no plans to extend the current Portland to Salem bus south to Eugene when the ridership forecasting was done. Therefore, numbers for Albany and Eugene do not include a seventh bus round trip.

[b] Activity at Portland's Union Station encompasses all Amtrak Cascades train and Thruway bus passengers in Portland, including those from north of the Portland market.

[c] Numbers do not sum due to rounding.

Source: Amtrak Cascades Incremental Model Results (Williams, 2015).

3.1.5 Other Transportation Projects

Under the No Action Alternative, ODOT expects other forms of long-distance and regional transportation (such as commercial airline and bus services) to continue operating within the Eugene to Vancouver, WA study area in the same manner as presently occurs.

As listed in Table 3-3, the No Action Alternative includes all committed projects in ODOT's 2015-2018 Statewide Transportation Improvement Program (STIP; ODOT, 2017). The STIP includes 10 projects on Interstate 5 (I-5) and two projects on Interstate 205 (I-205) within the OPR Project study area. The I-5 and I-205 projects will maintain or make minor improvements to the existing highways. The STIP also includes highway upgrades and active transportation improvement projects on OR 99E. While the current STIP does not include any construction projects that would substantially increase capacity on these highways, it does include preliminary engineering to design and acquire ROW for several projects along I-5, and planning and NEPA work for a future project to expand capacity on I-205 in the study area. The STIP also includes ongoing transportation planning, transit facilities and equipment capital investments, transit operating and maintenance activities, and Transportation Demand Management program funds that are distributed to Metropolitan Planning Organizations (MPOs), non-urban transportation organizations, and transit agencies in the OPR Project study area to advance transportation plans, and promote increased use of transit, carpools, vanpools, transit, bicycling, walking and teleworking.

Table 3-3. Study Area STIP Projects

MPO/County	Type	STIP Project Name	Description
		Interstate Projects	
Central Lane/Lane	Preservation	I-105 Willamette River and 1st to 7th Avenue viaducts	Deck overlay; joints; bridge rail; concrete repairs
Albany Area/Linn	Preservation	I-5: N. Albany - Halsey	Grind and patch concrete
Albany Area/Linn	Preliminary Engineering and ROW	I-5 Santiam Highway – Viewcrest Dr. (Albany)	Project development to add capacity on northbound I-5 by adding a lane from the Knox Butte on-ramp to the Viewcrest interchange. ODOT will also add a southbound on-ramp at Knox Butte, and continue that lane to the Santiam Hwy off ramp
Salem/Keizer Area/Linn	Preliminary Engineering	I-5: Delaney Road to Albany	Project Development to add a third lane on I-5 between Delaney Road and Albany
Salem/Keizer Area/Marion	Modernization (noise abatement)	I-5: Kuebler interchange phase 2 sound wall (Salem)	Build sound wall to mitigate noise from I-5
Salem/Keizer Area/Marion	Modernization (noise abatement)	I-5: Salem area bridge end panel raising	Raise end panels
Not Applicable/Marion	Preservation	I-5: Willamette River (Boone) Bridge - Woodburn	Grind existing surfacing and inlay the travel lanes
Not Applicable/Marion	Preliminary Engineering	I-5: Aurora-Donald Interchange (exit 278) IAMP & EA	Facility plan and NEPA for a future interchange project
Salem/Keizer Area/Marion	Preservation	I-5: Woodburn - Salem	Paving project
Salem/Keizer Area/Marion	Preliminary Engineering	I-5: Kuebler Boulevard to Delaney RD widening	Design and ROW acquisition to add a third lane both NB and SB between the Kuebler and Delaney Interchange

MPO/County	Type	STIP Project Name	Description
Metro/Clackamas	Modernization	I-205; Pacific Highway – Abernethy Bridge	Concrete overlay, deck joint and panel repair on multiple bridges, and inlet and manhole adjustments as needed. Replace impacted ramp meter loops on Stafford, 10th, and OR42 with radar detection. Include 10th St paving
Metro/Clackamas	Preliminary Engineering	I-205: Stafford Road - OR99E	Planning and NEPA to add a third lane in each direction between Stafford Road and OR43 and a fourth lane on the Abernethy Bridge to help separate through traffic
Metro/Clackamas	Modernization	I-5: Lower Boones Ferry ramps and SB aux lane to I-205	Construct a SB auxiliary lane from Lower Boone Ferry Rd to the I-205 Interchange and widen the NB Lower Boones Ferry Exit Ramp
Highway Projects			
Central Lane/Lane	Preservation	OR569: SCS CANAL & UPRR BRIDGE REPAIR	Bridge rail; seismic; deck overlay; joints; concrete repair; spot paint
Not Applicable/Linn	Preliminary Engineering	OR99E: American Drive to south city limit (Halsey)	Highway, curb, gutter, landscaping and utility relocation design on OR99E through downtown Halsey
Not Applicable/Marion	Modernization	Jefferson-Marion Highway: Marion Creek Bridge Replacement	Bridge replacement
Metro/Clackamas	Preliminary Engineering	French Prairie Bridge: Boones Ferry Rd to Butteville Rd	Planning and design for construction of bike/pedestrian/emergency vehicle bridge crossing over Willamette River
Metro/Multnomah	Preservation	OR99E: SE Harold ST - SE Harrison ST including Crystal Springs Creek Bridge Replacement	Pavement preservation, Americans with Disabilities Act (ADA) upgrades, sign replacement and replace Crystal Springs Bridge

MPO/County	Type	STIP Project Name	Description
Transit Projects			
Central Lane/Lane	Construction	West Eugene EmX Extension (Lane Transit District)	Construction from downtown to West Eugene
Central Lane/Lane	Preliminary Engineering	Multiple Routes: Eugene (Lane Transit District)	Complete NEPA process for possible BRT system expansion
Rail Projects			
Not Applicable/Linn	Safety	Rail Crossing Improvements (UPRR) (Linn)	Install automatic signals at three crossings and close two crossings between Albany and Eugene
Salem/Keizer Area/Marion	Enhancement	Baggage depot restoration (Salem)	The existing rail depot building is being renovated into a bus station. Updated building exterior to meet historic requirements. Another phase will improve the site for buses and autos.
Salem/Keizer Area/Marion	Safety	Mill Street-UPRR: Enhance Pedestrian Safety at Rail Crossings	Adding lights to existing masts to improve pedestrian safety crossing at Mill St. and UPRR.
Not Applicable/Marion	Safety	St. Louis Road rail crossing safety project (Marion)	Install automatic gate signals at PNWR railroad crossing

The STIP includes funding for ODOT’s Rail Crossing Safety Program, and two projects in the STIP are for rail crossing improvements on the UPRR line. One project in Linn County will install automatic signals at three crossings and close two crossings between Albany and Eugene. The other project in Marion County will add lights to existing masts to improve pedestrian safety crossing at Mill Street and the UPRR line. The STIP also includes funding for a highway/rail crossing program but does not specify improvement locations.

In addition, Lane Transit District (LTD) is expanding their Emerald Express (EmX) bus rapid transit system that currently serves Eugene and Springfield to the east of downtown Eugene. Beginning service in fall 2017, the West Eugene EmX Extension will connect LTD’s downtown Eugene Station with west Eugene via bus rapid transit. This EmX extension will bring high-capacity transit within just one-quarter mile of the Eugene Amtrak Station, and it will provide access to numerous regional destinations, including the University of Oregon campus, downtown Springfield, and West Eugene.

3.2 Build Alternatives

This section presents the two build alternatives (Alternative 1 and Alternative 2) and one design option (Alternative 2 with Central Albany Option) that were advanced for further study in this EIS. ODOT identified the infrastructure improvements for the build alternatives described below by developing conceptual designs based on Rail Traffic Controller (RTC) analysis conducted for the OPR Project. RTC is a computer program that simulates rail line operations. These RTC simulations help to inform how the build alternatives would operate with different levels of freight and passenger service. ODOT used the RTC results to identify areas that have existing and future infrastructure deficiencies and developed proposed potential improvements for addressing rail capacity and operations in those areas. ODOT then used these proposed improvements to forecast future ridership, identify potential impacts and develop cost estimates.

The build alternatives are described below according to the following parameters:

- ***3.2.1 Route and Rail Improvements*** – anticipated improvements needed to support each of the build alternatives, including descriptions of the route, track needs, rail connections to industries and assumptions used to conduct RTC modeling efforts.
- ***3.2.2 Station Opportunities*** – descriptions of existing and potential new stations for each alternative.
- ***3.2.3 Operational and Service Assumptions*** – information on schedules and number of daily round trips. Each build alternative would provide six round trips per day on the Amtrak Cascades, one round trip on the Coast Starlight, and one round trip on Thruway bus between Eugene and Portland.
- ***3.2.4 Ridership*** – presentation of estimated ridership in 2035 overall and by station for each alternative.
- ***3.2.5 Train Technologies*** – description of the potential propulsion technologies for the passenger rail service: diesel locomotive-hauled or diesel multiple units (DMUs).
- ***3.2.6 Cost*** – estimated capital costs, as well as operations and maintenance (O&M) costs, for each build alternative. The O&M costs include potential revenues for the build alternatives.

Figure 3-1 shows the build alternatives and highlights the location of existing and potential new stations.

3.2.1 Route and Rail Improvements

3.2.1.1 Alternative 1

Alternative 1 would improve the existing passenger rail route between Eugene and Portland, OR, with the addition of parallel track in multiple sections within or immediately adjacent to the existing alignment. The current Amtrak Cascades passenger rail service operates on existing UPRR track between Eugene and Portland Union Station. North of Union Station, the Amtrak Cascades service operates on existing BNSF track. The proposed track improvements would be built adjacent to the host railroad mainlines, as described below and shown schematically in Figure 3-2.

Under Alternative 1, passenger trains would continue to share track with freight trains, and the route would serve seven passenger rail round trips per day—six Amtrak Cascades and one Coast Starlight (a “6+1” schedule). Between Eugene and Portland, train frequency under Alternative 1 would reflect an increase in four round trips per day over the No Action Alternative. North of Portland Union Station, Alternative 1 would be the same as the 2035 No Action Alternative (eight round trips per day, a 6+2 schedule). More information on the service assumptions for Alternative 1 is included in Section 3.2.3.

Alternative 1 would add new railroad track or modify existing track at select sections on the UPRR alignment in order to facilitate four more passenger rail round trips per day while maintaining freight rail carrying capability between Eugene and Portland. Track modifications or additions would consist of mainline track, sidings, crossovers, and industry connections built or modified as needed to maximize the efficiency of freight and passenger rail operations throughout the full route. In most places, the new track for Alternative 1 would be offset 20 feet east of the existing UPRR mainline track, and could require acquisition of linear strips of new right-of-way (ROW) to the east of the existing UPRR ROW.

ODOT identified where new mainline track would be needed based on the results of operational modeling conducted for the OPR Project. The additional mainline track and sidings would be built at specific locations chosen to maintain rail operational efficiency and minimize costs. Alternative 1 avoids the siting of railroad improvements within urban areas and across rivers whenever possible in order to minimize potential impacts to sensitive resources as well as to minimize infrastructure costs. Wherever possible, Alternative 1 places the new track in locations where sidings previously existed to take advantage of existing railroad grades and infrastructure to reduce costs and impacts.

ODOT made several assumptions about road crossings in areas where Alternative 1 track improvements would be made, including:

- No new at-grade road crossings or grade-separation of existing at-grade road crossings would be constructed.
- If an existing crossing has lights and gates, it would be upgraded to include lights and gates to accommodate the additional track.
- If an existing crossing does not have lights and gates, the recommendation to upgrade, close, or retain the crossing was primarily based on the roadway type and use.
- In locations with an existing grade separation (the road goes over or under the railroad), the grade separation would be retained and modified as needed.

ODOT and the Federal Railroad Administration (FRA) are not proposing to close any crossings under this Tier 1 NEPA process, but could decide to close some crossings during future Tier 2 Federal environmental review processes.

The Alternative 1 alignment (the full route between Eugene and Portland) has 148 existing at-grade crossings; nine of these are passive crossings (crossings without active warning devices, such as flashing lights or gates). ODOT and UPRR will be closing two of the nine passive at-grade crossings and upgrading three of the passive crossings to active crossings by installing crossing arms and flashing lights. Within the sections proposed for track improvements under Alternative 1, there are 73 at-grade crossings, including three of the aforementioned passive crossings that are planned to be upgraded or closed (also part of the No Action Alternative) to reduce the risk of vehicle-train collisions at these locations.

Figure 3-2 shows the full route for Alternative 1 as well as the specific areas where track improvements are proposed. Beginning at the southern end of the proposed alignment, approximately 1.5 miles southeast of the Eugene Station, Alternative 1 would build a new track east of and parallel to the existing UPRR mainline. This new mainline track would continue north approximately 13.5 miles to a location south of Junction City. An existing siding track in this area would connect to this new mainline and become part of the UPRR mainline track. The proposed new track in this section would add two bridges over existing pedestrian undercrossings: one to accommodate the existing Ruth Bascom Bike Path and another to accommodate the unnamed pedestrian undercrossing adjacent to it.

Adjacent to, and directly west of the existing Eugene Station, planned rail infrastructure improvements include the Eugene Stub Tracks Project, which is a separate Federal NEPA action that would add train layover capacity to the Eugene Station for passenger rail service. Section 4.19.4 summarizes the environmental impacts associated with this proposed action, which was documented as a Categorical Exclusion under NEPA due to independent utility. Ultimately, the Eugene Stub Tracks Project must be built to achieve the level of passenger and freight train operations planned for the OPR Project in Alternative 1. Because construction funding for the Eugene Stub Tracks project is not yet reasonably foreseeable, the Alternative 1 capital cost estimate includes the construction cost of this project (approximately $23.4 million).

Between the Eugene Station and the location where the new mainline track would reconnect with the existing mainline south of Junction City, Alternative 1 would add six crossovers to facilitate freight and passenger train movements. Two crossovers between the Eugene Station and the UPRR Eugene Yard would allow the industries transporting freight from Coos Bay to cross onto the UPRR mainline without significant operational impacts from additional passenger rail service at the station. Two crossovers directly north of the UPRR Eugene Yard limits would facilitate moves into and out of the rail yard. Two crossovers south of the reconnection to the mainline near Junction City would allow trains to access the new mainline to the south and the existing siding to the north. The result of the proposed improvements would be a fully double-tracked section between Eugene and Junction City.

A new mainline track would connect to an existing siding north of Harrisburg and continue north for approximately 6.6 miles, reconnecting with the existing mainline at the north end of Halsey. A pair of crossovers 3 miles south of Halsey would facilitate passenger and freight movements through this track section.

One mile south of Tangent, a new mainline track would be built that would run north and connect to an existing siding (the Hallawell siding) that is located approximately 2.7 miles north of Tangent. A crossover would be added just north of the center of Tangent to facilitate movement into and out of existing industries (freight customers), and a pair of crossovers located in the vicinity of the connection to the Hallawell siding would facilitate movements between the new mainline track and the existing mainline. A new mainline track would connect to the north end of the Hallawell siding, reconnecting to the main line at the southern end of the UPRR Albany Yard. Just south of the Albany Yard, the AERC line branches from the UPRR line to the south toward Mill City. Alternative 1 would add a series of turnouts through Albany and adjust the AERC connections to facilitate passenger operations into and out of the Albany Station.

A mile north of Albany, a new mainline track approximately 1.6 miles in length would be built that would connect to the existing siding south of Millersburg. The existing siding, which serves the local industries, would then connect to a new mainline that would itself continue north and connect to the existing Millersburg siding. The north end of the Millersburg siding would be extended an additional 1.5 miles, crossing under I-5. A new crossover in that northern section would facilitate movements between the existing UPRR mainline and the new mainline track.

A new mainline track approximately 3.4 miles in length would be built starting about 3 miles south of Marion that would connect to the existing siding through Marion. The existing siding would be extended north an additional 1 mile. A set of crossovers through the existing siding would allow efficient usage of the existing siding and ease train movements into Marion to the south and Turner to the north.

South of the existing UPRR Salem Yard, Alternative 1 would include improved transitions that would allow freight trains to use an existing siding and passenger trains to use the existing UPRR mainline. An industry track realignment and a pair of proposed crossovers between the mainlines would allow freight train movements into and out of the Salem Yard, thus facilitating service for area industries without reducing service for freight or passenger rail moving through this area.

North of downtown Salem, Alternative 1 would add a new 7,500-foot siding and modify rail connections to the industries east of the alignment. North of Keizer and through Brooks, Alternative 1 would provide a new 6,700-foot siding and a pair of crossovers, modified connections to existing industries, and another new crossover to allow access to industries in Brooks.

Starting at the north end of an existing siding about 1.4 miles south of Woodburn, Alternative 1 would add a new mainline track approximately 4.4 miles in length west of the existing UPRR mainline through Woodburn, connecting back into the existing mainline at approximately 1 mile south of Hubbard.

North of the Molalla River, Alternative 1 would add new mainline track approximately 4.7 miles in length west of the existing UPRR mainline, starting at the north end of an existing siding. The new mainline would run north through Canby, eventually shift over to the east side and then connect to an existing siding 1 mile south of Rock Island. Connections to existing industries and to the Oregon Pacific Railroad would be modified, and a new set of crossovers would be added to allow access to and from the existing mainline track.

Two miles north of the Oregon City Station, Alternative 1 would add a new mainline track west of the existing UPRR mainline. This new mainline track would shift over to the east of the UPRR mainline near Milwaukie and run north to the Steel Bridge in Portland, adding almost 12.5 miles of new mainline track in this area. Just east of where the UPRR mainline goes under SE 82nd Avenue as it leaves Clackamas, Alternative 1 would add a new crossover to facilitate access to the industries south of I-205. A connection to local industries south of Milwaukie would be connected to the new mainline.

In Milwaukie, the new mainline track that started north of the Oregon City Station would turn north, continuing to parallel the existing mainline track, and travel under several existing bridges – the Springwater Trail, SE Tacoma Street and Bybee Boulevard. The new mainline track would cross over Johnson Creek. Several new crossovers would be added in this area to facilitate movement in and out of existing industries and the UPRR Brooklyn Yard.

The new mainline track would run along the east side of the UPRR Brooklyn Yard, crossing under Holgate Boulevard, and at the same time reconnecting to the existing industry tracks on the east. A new pair of crossovers would facilitate yard access and train positioning. The new main track would continue north toward central Portland, running on the east side of the existing UPRR mainline and ending just south of the Steel Bridge that crosses the Willamette River. Although Figure 3-2 does not show any project-level improvements north of Portland Union Station, infrastructure improvements in that section would consist of those proposed in separate Federal NEPA actions, specifically the proposed Willbridge Crossovers and North Portland/Peninsula Junction projects. This Tier 1 EIS does not address the potential environmental effects of these projects, because they were separate NEPA actions due to independent utility. These projects are marked on the map for reference. However, the two projects must be built to achieve the level of passenger and freight train operations planned for the OPR Project. The North Portland portion of the North Portland/Peninsula Junction project is funded for construction, thus is not included in the Alternative 1 costs. Because construction funding for the Willbridge Crossover project (approximately $8.1 million) and the Peninsula Junction portion of the North Portland/Peninsula Junction project (approximately $4.1 million) is not yet reasonably foreseeable, the capital cost estimate for Alternative 1 includes the construction costs of these two projects.

In all, proposed construction under Alternative 1 would include 395,200 feet (74.8 miles) of new track, 300 feet of elevated track, crossovers, and 41 stream crossings (23 bridges and 17 culverts). Alternative 1 would affect 73 existing at-grade railroad crossings along this 125-mile route.

3.2.1.2 Alternative 2

Between Springfield and Oregon City, Alternative 2 would consist of a mostly new rail route composed primarily of single track and would follow I-5, an existing freight rail route and I-205, as shown in Figure 3-2. It would parallel the current passenger rail route north of Oregon City. The Alternative 2 track improvements would be constructed primarily adjacent to the existing I-5 and I-205 freeways, the existing PNWR line between Keizer and Wilsonville, and adjacent to the existing UPRR alignment north of Oregon City. Alternative 2 would add new mainline railroad track throughout the full route between Springfield and Portland. Between Keizer and Wilsonville, and north of Oregon City, Alternative 2 track would be shared with freight traffic, on the PNWR and UPRR lines. Along the passenger rail-only sections of the route, siding tracks and crossovers would be placed every 10 to 12 miles to facilitate passing operations. The new rail line between Springfield and Keizer, and between Wilsonville and Oregon City, and the cut-and-cover tunnel section in inner southeast Portland, would be for the exclusive use of passenger rail service. Alternative 2 would serve seven round trips per day—six Amtrak Cascades and one Coast Starlight (a "6+1" schedule). Between Portland's Union Station and Vancouver, WA, Alternative 2 would be the same as the 2035 No Action Alternative and Alternative 1 (eight round trips per day, a 6+2 schedule).

Similar to Alternative 1, Alternative 2 would not change crossings that are currently at-grade to grade-separated. However, where a current crossing is grade-separated, it would be reconstructed to accommodate new passenger tracks or a new grade-separated passenger crossing would be built adjacent to the existing crossing. Under Alternative 2, where an at-grade crossing exists along a railroad alignment, it would be considered for upgrading (if necessary) or would be closed. For example, under Alternative 2, the 15 at-grade passive crossings along the PNWR mainline would be upgraded or closed, resulting in improved safety. Alternative 2 would add one new at-grade crossing at Boeckman Road and SW 95th Avenue in Wilsonville (250 feet east of the existing PNWR mainline at-grade crossing). Alternative 2 would require this new crossing to be able to move rail traffic from the PNWR mainline to the I-5 alignment.

Fifty-two at-grade crossings are present along the Alternative 2 alignment (65 for the Alternative 2 with Central Albany Option). The improvements associated with Alternative 2 would result in the closure or upgrade of 21 existing passive crossings. Highlights of the Alternative 2 alignment include:

- Alternative 2 would begin in Springfield near LTD's existing Springfield Station (a transit center). The proposed alignment would cross South 5th Street, South 2nd Street, and East 19th Avenue at grade because of the proximity to the potential new station and to diverging movements (places where one rail line diverges from another, for example, to connect to a freight rail customer's site).
- Alternative 2 would require two new crossings of the Willamette River in Springfield, one adjacent to the UPRR railroad bridge south of A Street, and the second parallel to the I-5 bridge. The second crossing would pass through the Eastgate Woodlands along I-5. The second Willamette River crossing would be just east of the recently constructed I-5 Willamette River Bridges. High-tension power lines located immediately east of I-5 in Springfield run north for approximately 4.2 miles to a substation at the northern city limits. These high-tension power lines and towers could require relocation, because the track alignment would also be located on the east side of I-5.
- The approximately 59.5-mile long section of the alignment from Springfield to south Salem is relatively flat and straight, traveling through farmland within the southern Willamette Valley. In order to cross the hills south of Salem, the Alternative 2 alignment would require large cuts and fills.
- North of Salem, near Keizer, the Alternative 2 alignment would depart from the I-5 alignment, cross to the west side of the freeway, and run parallel to the existing PNWR line. The existing track would be upgraded, and additional mainline track and sidings would be added throughout this 23.5-mile long section. The alignment would follow this line along relatively flat and straight geometry until crossing the Willamette River on the existing PNWR rail bridge directly south of Wilsonville.
- The alignment would depart from the PNWR line in Wilsonville, where it would cross Boeckman Road at grade. From Boeckman Road, the alignment would travel approximately 0.7 mile along the west side of I-5, slowly elevating, until crossing into the median for approximately 3 miles, where it would turn to the east to follow the existing I-205 freeway alignment towards Oregon City.
- Along I-205, the Alternative 2 alignment would be located in the median until transitioning to the south side of the freeway west of 10th Street. This section would include tight horizontal curves to stay as close as possible to the freeway, thus reducing operating speeds. Excavation into rock would be required as the alignment heads toward the Willamette River crossing just west of Oregon City.
- North of Oregon City, Alternative 2 would be similar to Alternative 1, with new track paralleling the existing UPRR mainline into southeast Portland.

In addition to these highlights of Alternative 2, in southeast Portland, the Alternative 2 alignment would deviate from the Alternative 1 alignment and enter a cut-and-cover tunnel that would run below SE 2nd Avenue for approximately 3,300 feet (0.63 mile). This tunneled track would be exclusively for passenger-rail use. The southern tunnel portal would be located south of SE Market Street, and the northern tunnel portal would be located north of SE Stark Street. The Alternative 2 route would rejoin the existing Amtrak Cascades, No Action and Alternative 1 alignment before crossing over the Steel Bridge in Portland. The cut-and-cover tunnel would require ROW acquisition at the approach to each portal, and would likely involve the purchase of large commercial parcels and displacement of existing buildings and businesses. Multiple street sections would need to be closed to construct the north portal (near SE Oak Street). SE Oak Street would be permanently closed in the vicinity of SE 2nd where the portal to the tunnel would be developed.

No infrastructure improvements are proposed for Alternative 2 from the east approach to the Steel Bridge through the remainder of the OPR Project study area north of this location. Although Figure 3-2 does not show any project-level improvements north of Portland's Union Station, infrastructure improvements in that section would consist of those proposed in separate Federal NEPA actions, specifically the proposed

Willbridge Crossovers and North Portland/Peninsula Junction projects. The Tier 1 EIS Build Alternatives do not address the potential environmental effects of these projects, because they are separate environmental actions due to independent utility. However, the two projects must be built to achieve the level of passenger and freight train operations planned for the OPR Project, and are described below and in the cumulative impacts section of Chapter 4 (Section 4.19.4). The North Portland portion of the North Portland/Peninsula Junction is funded for construction. The Alternative 2 capital cost estimate includes the construction costs of the Willbridge Crossover project (approximately $8.1 million) and the Peninsula Junction portion of the North Portland/Peninsula Junction project (approximately $4.1 million) because these projects have yet not secured construction funding. Figure 3-2 shows the route for Alternative 2 as well as the areas that include planned improvements.

3.2.1.3 Alternative 2 with Central Albany Option

The Alternative 2 with Central Albany Option varies from Alternative 2 near Albany. This option would allow service to the existing passenger rail station in Albany and would not require a new station in Albany near I-5.

Near the south edge of Albany, the Central Albany Option would depart from the Alternative 2 alignment along I-5. This new alignment would be elevated above I-5 and cross from the east side to the west side of I-5. It would then travel to the west, running parallel to the existing AERC track for approximately 2.5 miles. From that point, the Central Albany Option would run parallel to the UPRR line into downtown Albany and serve the existing Amtrak station. The Central Albany Option alignment would continue eastward through Albany parallel to the UPRR mainline and return to the Alternative 2 alignment on the east side of I-5 north of Millersburg. The Alternative 2 with Central Albany Option would include 11 at-grade crossings along the 10.7 miles of new track through Albany.

3.2.1.4 Additional Projects

In addition to the improvements described above to support the build alternatives, three projects in Oregon are being developed under separate NEPA analyses. These projects are:

- Willbridge Crossovers: Replaces the two main line crossovers with larger turnouts to reduce freight train congestion and allow passenger trains to crossover at a higher speed. Trains using the Willbridge Crossovers will be able to travel at speeds up to 40 miles per hour (mph), faster than the existing 10 mph for passenger trains. (Categorical Exclusion signed by FRA on 10/8/2015)
- North Portland / Penn Junction: Realignment of track predominantly within existing rail right-of-way (ROW) and on an active rail line. Upgrades the existing turnouts with larger turnouts and broadened curves to allow trains to travel at increased speeds. (Categorical Exclusion signed by FRA on 10/16/2016)
- Eugene Stub Tracks: Provides additional storage track with provisions for power service at Eugene Station to allow the overnighting of Amtrak trains. (Categorical Exclusion signed by FRA on 8/31/2017)

Each of these projects has independent utility; that is, they would be usable and a reasonable expenditure even if no additional transportation improvements in the area are made. All three of the projects have obtained NEPA clearance through independent analysis. However, because funding has not been identified for implementation of the projects (except the North Portland portion of that project), they were not included in the No Build analysis for the OPR Project. Because each project would lend critical benefits to the OPR Project, this document discloses the costs of the projects in Section 3.2.6 and provides an overview of the environmental impacts associated with the projects in Section 4.19.

Figure 3-2
(Map 1 of 7)

Build Alternatives Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

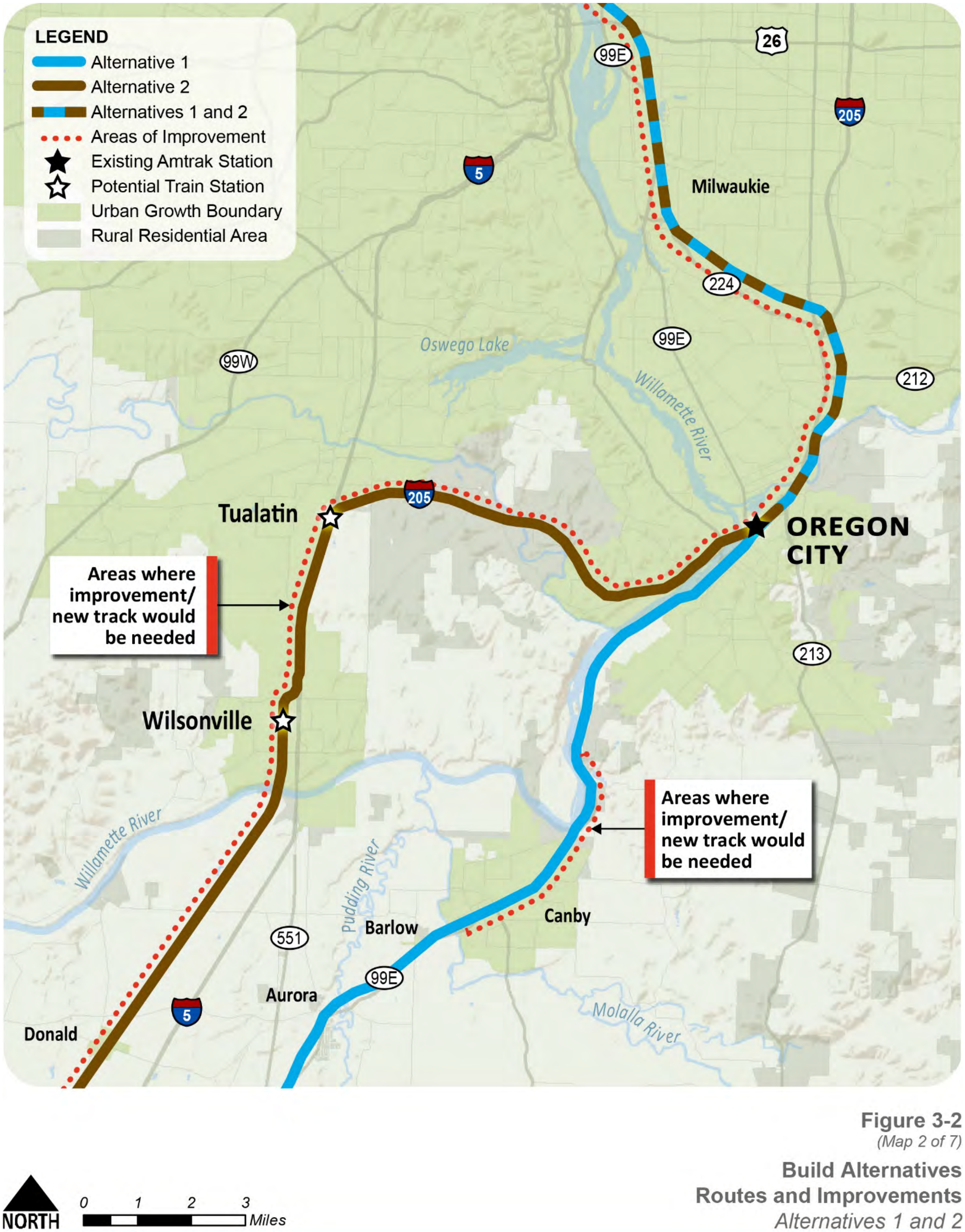


Figure 3-2
(Map 2 of 7)

Build Alternatives Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

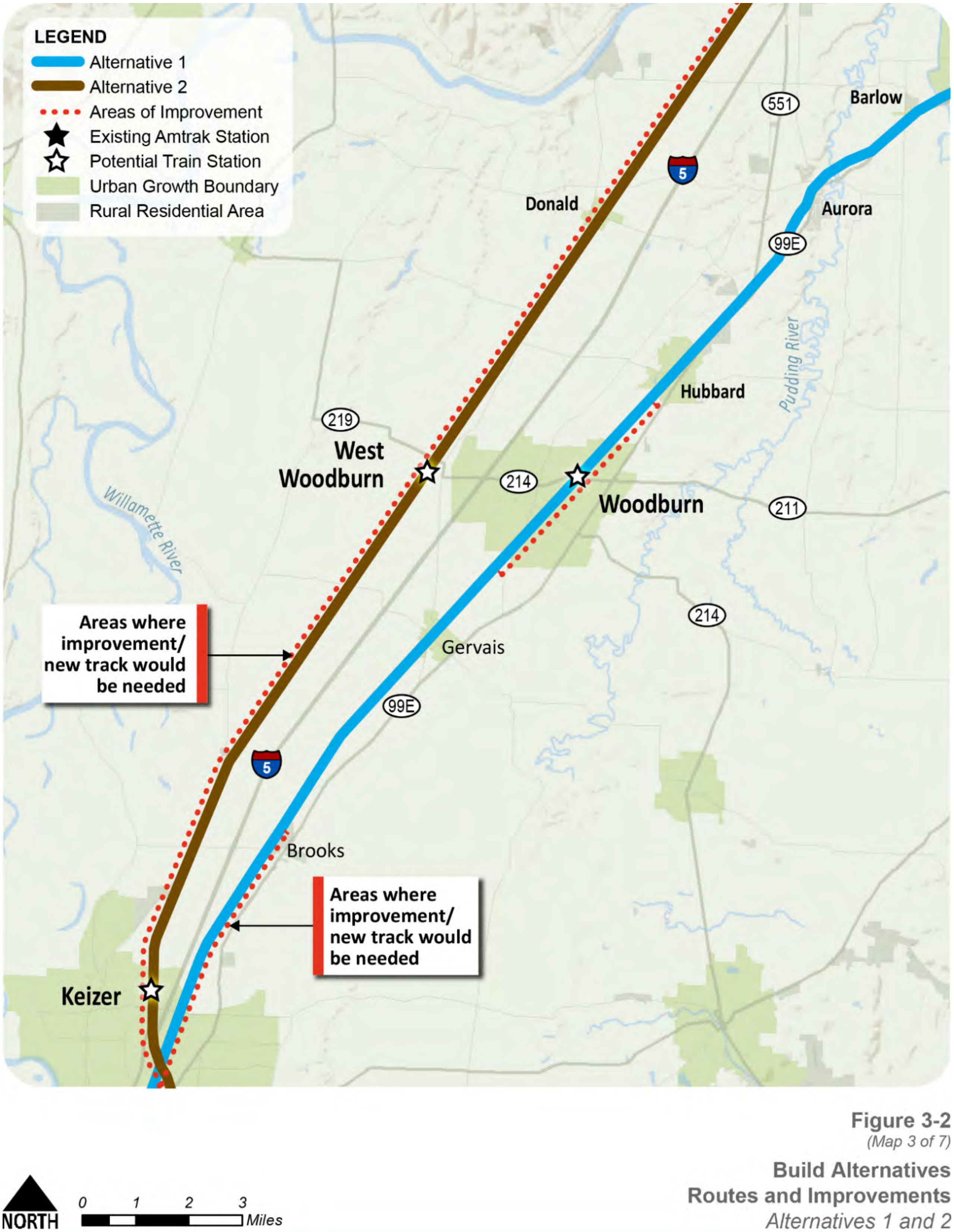


Figure 3-2
(Map 3 of 7)

Build Alternatives
Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

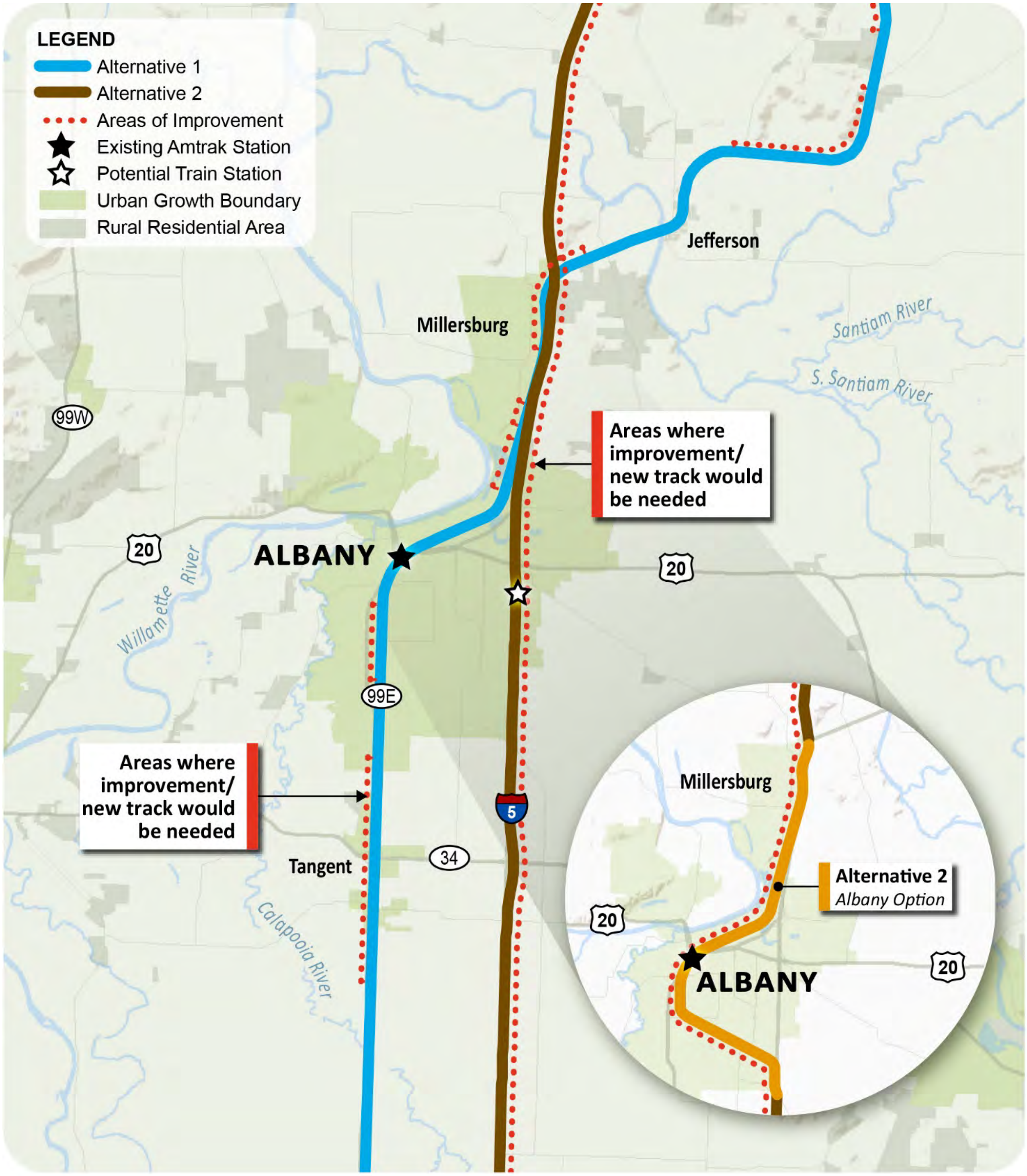
Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

Figure 3-2
(Map 4 of 7)

Build Alternatives
Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD



NORTH 0 1 2 3 Miles

Figure 3-2
(Map 5 of 7)

Build Alternatives
Routes and Improvements
Alternatives 1, 2, 2-Central Albany Option

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

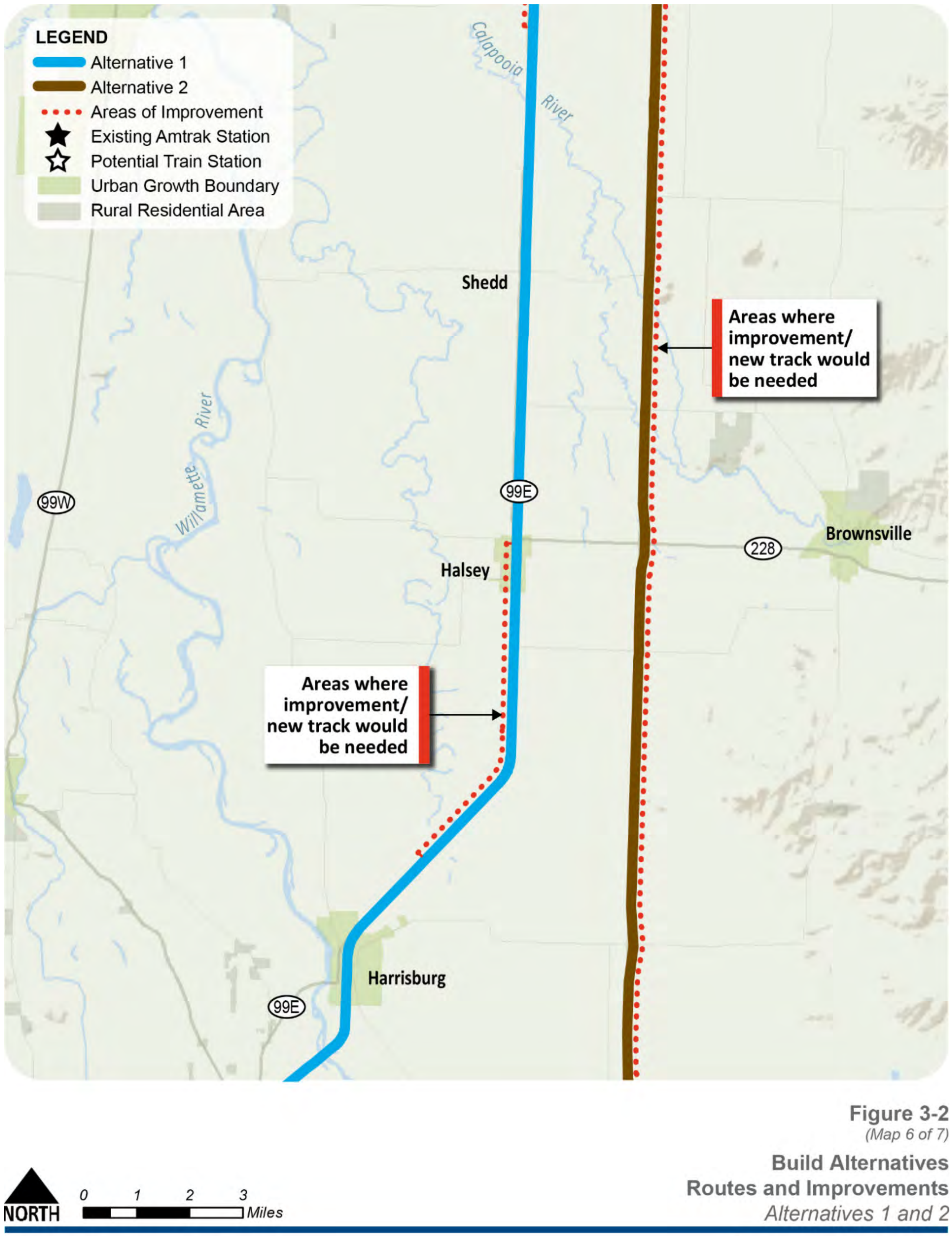


Figure 3-2
(Map 6 of 7)
Build Alternatives
Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

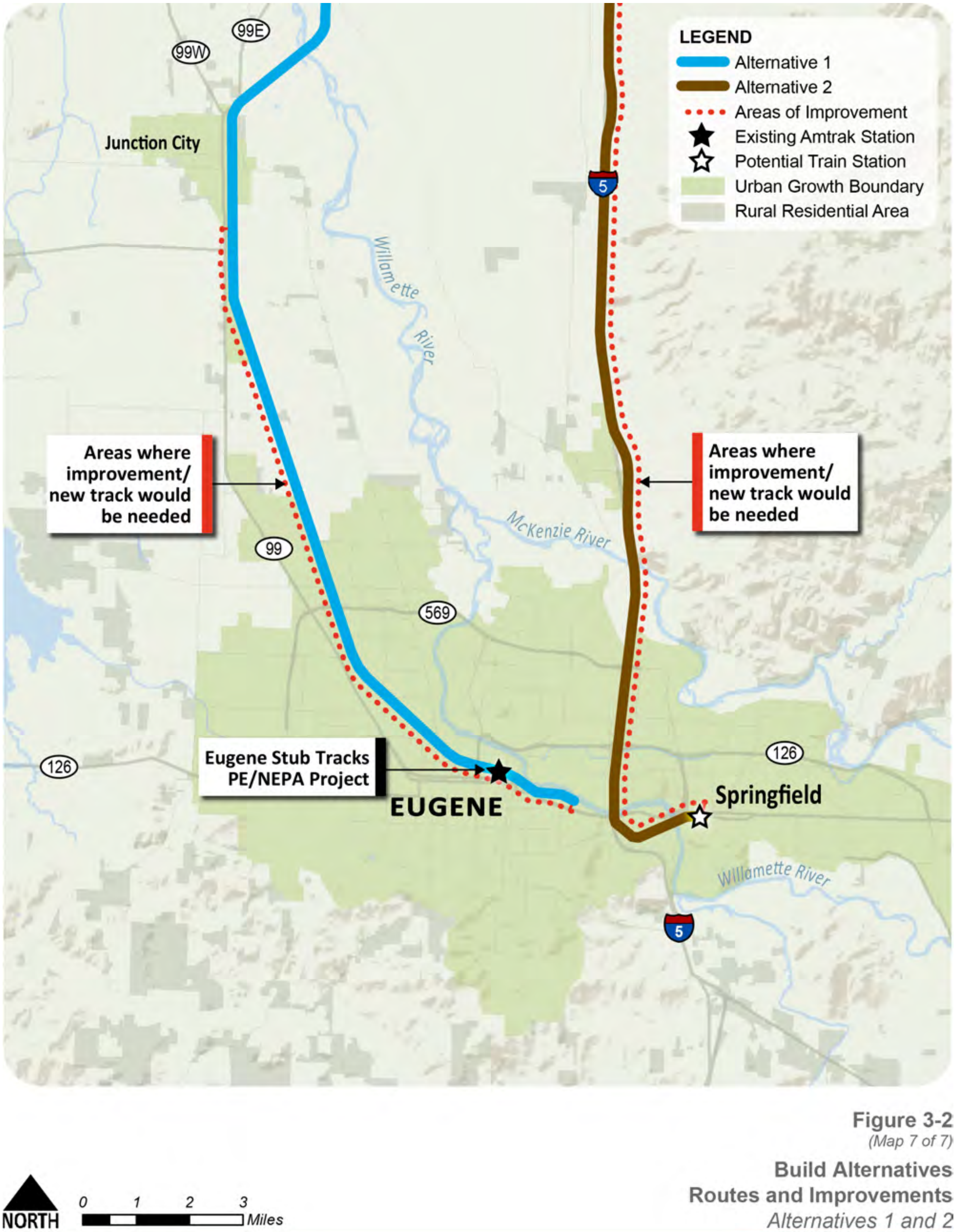


Figure 3-2
(Map 7 of 7)
Build Alternatives
Routes and Improvements
Alternatives 1 and 2

Tier 1 DEIS Alternatives

Oregon Passenger Rail
Eugene - Portland
CHOOSING A PATH FORWARD

3.2.2 Station Opportunities

Figure 3-2 shows the existing and potential new stations associated with each build alternative. Alternative 1 would use the five existing stations served by the current Amtrak Cascades passenger rail service in Oregon, which are located in or near Central Business Districts. Alternative 2 would also use five stations and proposes multiple new station locations that would be located near I-5 and generally away from downtown city cores. Potential new station locations are identified in general terms only to allow analysis of potential impacts. Final decisions on any new stations and specific locations would be made in association with future Tier 2 studies. The *Station Stop Policy for Amtrak Cascades Service,* jointly issued by ODOT and WSDOT on June 1, 2016, gives the PNWRC administrators the responsibility for evaluating proposals to add, remove or skip station stops for the Amtrak Cascades service. The companion *Station Stop Policy Guidance Document* (ODOT and WSDOT, 2016) describes the process for evaluating proposed station changes. Proposals to add stations beyond the five proposed under the build alternatives need to be considered through the Station Stop Policy[8].

The travel time and RTC modeling efforts used in the identification of the track-related improvements for the build alternatives limited the number of passenger rail stations for each alternative to five; this number of stations is consistent with the existing conditions and future conditions under the No Action Alternative.

3.2.2.1 Alternative 1

Alternative 1 would use the existing stations along the current Amtrak Cascades route, and no improvements to the existing stations are proposed in this Tier 1 EIS.

Table 3-4 lists the passenger rail stations associated with Alternative 1.

Table 3-4. Alternative 1 Passenger Rail Stations

Station	Existing or New?	Location
Eugene	Existing	433 Willamette Street, Eugene
Albany	Existing	110 10th Ave SW, Albany
Salem	Existing	500 13th Street SE, Salem
Oregon City	Existing	1757 Washington Street, Oregon City
Portland’s Union Station	Existing	800 NW 6th Avenue, Portland

3.2.2.2 Alternative 2

Alternative 2 would require new passenger rail stations south of Portland’s Union Station. Each of the potential new stations would be located adjacent to the proposed alignment, generally near I-5. Table 3-5 lists the passenger rail stations associated with Alternative 2. Figure 3-2 shows their general locations. This EIS assesses a 20-acre study area around each potential new station location. Assessment of potential impacts associated with the construction of potential new stations under Alternative 2 considered the station building or buildings, parking, access and egress routes, and other needed infrastructure. Decisions on new station locations would need to follow the *Station Stop Policy for Amtrak Cascades Service* (ODOT and WSDOT, 2016).

[8] As noted in the introduction to this Chapter, when ODOT began identifying potential project impacts, Alternatives 1 and 2 included a possible Woodburn Station. In 2016, ODOT and WSDOT adopted a Station Stop Policy for Amtrak Cascades service that would require any new station to meet defined criteria. Though Woodburn does not currently meet these criteria and is not included in the service and operations analysis of the Build Alternatives, future project development could include a station in Woodburn. To preserve information developed for potential new Woodburn Station locations, those locations continue to be shown on project maps and potential environmental impacts are broadly described in Chapter 4. Additional analysis of ridership, travel time, environmental impacts and costs would need to occur during the environmental analysis for the future project development prior to implementing a new station in Woodburn.

Table 3-5. Alternative 2 Passenger Rail Stations

Station	Existing or New?	Location
Springfield	New	Near existing transit center adjacent to UPRR tracks
Albany[a]	New	Near I-5; suburban setting at eastern edge of urban growth boundary
Salem or Keizer	New	Salem: near I-5 in retail commercial setting 2 miles east of downtown Salem Keizer: near I-5 adjacent to regional shopping center
Wilsonville or Tualatin	New	Wilsonville: near I-5 outside downtown and adjacent to existing transit center Tualatin: in the median of the I-5 and I-205 freeways
Portland's Union Station	Existing	800 NW 6th Avenue, Portland

[a] The Alternative 2 with Central Albany Option would not include this station, because the existing Albany Station would be used instead.

3.2.3 Operational and Service Assumptions

Both of the build alternatives would include six Amtrak Cascades train round trips and one Coast Starlight train round trip per day, as well as supplemental Thruway bus service between Portland and Eugene. Some of the current Thruway bus service is scheduled so that it connects in Portland with Amtrak Cascades trains between Portland and Seattle. As shown Table 3-6, ODOT would incrementally replace Thruway bus service with passenger rail trips if a build alternative is implemented. The new round trips between Springfield/ Eugene and Portland would be scheduled to match with trains that currently start or end at Portland's Union Station.

Table 3-6. Number of Amtrak Cascades Trains and Thruway Buses –
2017 Existing Conditions and 2035 Conditions for No Action Alternative and Build Alternatives

Station Location[a]	Existing Conditions (2016)		No Action Alternative (2035)		Alternative 1 (2035)		Alternative 2 (2035)[b]	
	Trains (NB/SB)	Buses (NB/SB)	Trains (NB/SB)	Buses (NB/SB)[c]	Trains (NB/SB)	Buses (NB/SB)[c]	Trains (NB/SB)	Buses (NB/SB)[c]
Springfield	-	-	-	-	-	-	6/0	1/0
University of Oregon	-	6/0	-	7/0	-	1/0	-	1/1
Eugene	2/0	6/6[d]	2/0	7/7[d]	6/0	1/1[d]	-	-
Albany	2/2	6/6	2/2	7/7	6/6	1/1	6/6	1/1
Salem or Keizer	2/2	7/6	2/2	7/7	6/6	2/1	6/6	2/1
Woodburn	-	2/2	-	2/2	-	1/1	-	1/1
Oregon City	2/2	2/1	2/2	2/1	6/6	-	-	-
Wilsonville or Tualatin	-	-	-	-	-	-	6/6	2/2
Portland	4/2	0/7	6/2	0/7	6/6	0/2	6/6	0/2

NB=Northbound; SB=Southbound

[a] Refer to Table 3-4 for Alternative 1 station locations, and Table 3-5 for Alternative 2 station locations.

[b] Also includes Alternative 2 with the Central Albany Option.

[c] The numbers of Thruway buses and locations that they serve in 2035 under any alternative are for planning purposes only, and are subject to change.

[d] Thruway buses stop to drop off passengers only (no boardings).

Sources: Amtrak Cascades Schedule (February, 2016) and consultation with ODOT Rail and Public Transit Division.

Table 3-7 shows the year 2035 forecast passenger rail travel times between Springfield/Eugene and Portland for each alternative. Bus travel times were not estimated.

The original Alternative 1 operational analyses were based on a projected six round trips per day on a fully double-tracked UPRR alignment. In December 2014, ODOT conducted additional operational analyses for Alternative 1 to consider whether the planned additional infrastructure could be reduced while preserving rail performance. The Alternative 1 operational model was revised to consider six, four and three round trips per day on varying amounts of additional infrastructure. Based on that analysis, it was determined that, even with a reduction in the originally assumed full double-tracking, Alternative 1 could support six round trips per day with the previously identified improvements (see Section 3.2.1.1.).

The original Alternative 2 operational analysis was also based on a projected six round trips per day. ODOT did not conduct operational analysis and modeling of fewer round trips for Alternative 2 because of the limited opportunities to reduce infrastructure and costs. A large portion of the Alternative 2 route would be on a new single-track alignment with a few sidings to allow passenger trains to pass. Fewer round trips could allow elimination of one or two sidings but would not significantly reduce the cost of Alternative 2.

Table 3-7. Passenger Train Travel Times for DEIS Alternatives (2035)

Route	No Action Alternative	Alternative 1	Alternative 2[a]
Total Travel Time (Eugene/Springfield to Portland)	02:35	02:20	02:02

Notes:

Travel times assume three station stops between Eugene/Springfield and Portland.

[a] Travel time for Alternative 2 with the Central Albany Option would be slightly longer than shown for Alternative 2, because the route would travel an additional 2.5 miles to accommodate the stop at the existing Albany Station.

3.2.4 Ridership

Alternative 1 is estimated to have the highest Amtrak Cascades ridership of the alternatives, with about 90 percent higher ridership than in the No Action Alternative. Alternative 2 would have slightly lower ridership than Alternative 1 even though the travel time between Springfield and Eugene would be 18 minutes less for Alternative 2 than Alternative 1. Alternative 2 would move multiple existing station locations away from downtown city cores. As a result, fewer estimated riders would opt for passenger rail travel under Alternative 2 than under Alternative 1. Table 3-8 shows the existing (2015) and 2035 forecast Amtrak Cascades (including Thruway Bus) ridership between Eugene and Portland.

Table 3-8. Amtrak Cascades Service Ridership: Eugene to Portland (2015 and Estimated 2035)

Eugene to Portland	Actual 2015	No Action (2035)	Alt 1 (2035)	Alt 2 (2035)
Train	105,000	197,000	646,000	631,000
Bus	89,000	193,000	93,000	92,000
Total	**194,000**	**390,000**	**739,000**	**723,000**

3.2.4.1 Alternative 1

In 2035, total ridership (both Amtrak Cascades train and Thruway bus) for Alternative 1 is projected to be 739,000 annual passengers (including 646,000 rail passengers) compared to 390,000 annual passengers under the No Action Alternative. Similar to the No Action Alternative, under Alternative 1, the Portland's Union

Station and Eugene Station would have the two highest numbers of passenger boardings and alightings (passengers getting on or off the train or bus) of all the stations, while Oregon City and Albany Stations would have the two lowest. Table 3-9 shows the existing station activity and the projected activity for the No Action Alternative and Alternative 1 in 2035.

Table 3-9. Annual Amtrak Cascades Train and Thruway Bus Station Activity – Existing and 2035 Conditions for No Action Alternative and Alternative 1

	Station Activity (Number of riders both on and off)			Percent Growth	
Station	**Existing Conditions (2015)**	**No Action Alternative (2035)**	**Alternative 1 (2035)**	**Existing Conditions to Alternative 1**	**No Action Alternative to Alternative 1**
Eugene	85,800	172,500[a]	362,300	322%	110%
Albany	31,800	54,800[a]	119,300	275%	118%
Salem	65,300	97,100	203,700	212%	110%
Oregon City	15,100	17,000	40,500	168%	138%
Portland[b]	458,800	961,100	1,136,900	148%	18%
Total[c]	656,800	1,302,500	**1,862,700**	**184%**	**43%**

[a] There were no plans to extend the current Portland to Salem bus south to Eugene when the ridership forecasting was done. Therefore, numbers for Albany and Eugene do not include a seventh bus round trip.

[b] Activity at Portland's Union Station encompasses all Amtrak Cascades train and Thruway bus passengers in Portland, including those from north of the Portland market.

[c] Numbers may not sum due to rounding.

Source: Amtrak Cascades Incremental Model Results (Williams, 2015).

3.2.4.2 Alternative 2

In 2035, total ridership (both Amtrak Cascade trains and Thruway buses) under Alternative 2 is projected to be about 723,000 passengers per year compared to approximately 390,000 passengers per year under the No Action Alternative. That is an increase of 170 percent over existing ridership and an 85 percent increase over projected ridership for the No Action Alternative (Williams, 2015). Similar to the No Action Alternative, Portland's Union Station and the potential new Springfield station would have the two highest numbers of passenger boardings and alightings of all the stations, while the potential new Albany and Wilsonville stations would have the two lowest. Forecast ridership and the expected market share of passenger rail trips are not anticipated to be much different between Alternative 2 and the Alternative 2 with Central Albany Option. Table 3-10 shows the existing station activity and the projected activity for the No Action Alternative and Alternative 2 in 2035.

Table 3-10. Annual Amtrak Cascades Train and Thruway Bus Station Activity – Existing and 2035 Conditions for No Action Alternative and Alternative 2 Central Albany Option

	Station Activity (Number of riders both on and off)			Percent Growth	
Station	**Existing Conditions (2015)**	**No Action Alternative (2035)**	**Alternative 2 Central Albany Option (2035)**	**Existing Conditions to Alternative 2 Central Albany Option (2035)**	**No Action Alternative to Alternative 2 Central Albany Option (2035)**
Springfield[a]	85,800	172,500[b]	350,400	308%	103%
Albany	31,800	54,800[b]	122,500[c]	285%	124%
Salem[d]	65,300	97,100	203,500	212%	110%

Station	Station Activity (Number of riders both on and off)			Percent Growth	
	Existing Conditions (2015)	No Action Alternative (2035)	Alternative 2 Central Albany Option (2035)	Existing Conditions to Alternative 2 Central Albany Option (2035)	No Action Alternative to Alternative 2 Central Albany Option (2035)
Wilsonville[e]	15,100	17,000	39,800	164%	134%
Portland[f]	458,800	961,100	1,125,500	145%	17%
Total[g]	656,800	1,302,500	1,841,700	180%	41%

[a] Existing conditions and No Action Alternative values represent ridership at the existing Eugene Station. The analysis for Alternative 2 assumed a new station would be located near the potential new Springfield station (an existing transit center).

[b] There were no plans to extend the current Portland to Salem bus south to Eugene when the ridership forecasting was done. Therefore, numbers for Albany and Eugene do not include a seventh daily bus round trip.

[c] All alternative values represent ridership at the existing Albany Station.

[d] Existing conditions and No Action Alternative values represent ridership at the existing Salem Station. The analysis for Alternative 2 assumed a new station would be located along I-5.

[e] Existing conditions and No Action Alternative values represent ridership at the existing Oregon City Station. The analysis for Alternative 2 assumed a new station would be located at the Wilsonville South Metro Area Regional Transit (SMART) Transit Center.

[f] Activity at Portland's Union Station includes all Amtrak Cascades train and Thruway bus passengers in Portland, including those from north of the Portland market.

[g] Numbers may not sum due to rounding.

Source: Amtrak Cascades Incremental Model Results (Williams, 2015).

3.2.5 Passenger Train Engine Technology

Train engine technologies considered for the OPR Project build alternatives include the existing technology (diesel locomotive-hauled) as well as the diesel multiple units (DMU) technology. These technologies, as well as those screened out from further analysis, are introduced in Chapter 2 (Section 2.2.3).

Locomotive-hauled trains are diesel-powered and are paired with passenger coaches that are capable of operating at speeds up to 125 mph. The existing Amtrak Cascades fleet uses locomotive hauled trains, and their continued use would not introduce new maintenance or operational training requirements. Additionally, Washington State recently purchased eight next generation diesel-electric locomotives to include in the fleet for Amtrak Cascades service throughout the PNWRC.

DMUs are multiple-unit trains powered by on-board diesel engines that are also capable of operating at speeds up to 125 mph. A DMU requires no separate locomotive, as the engines are incorporated into one or more of the carriages. While DMUs would introduce a new technology to the fleet, they would use the same type of fuel (diesel) and track infrastructure as diesel locomotive hauled trains. Therefore, while it would be possible to integrate DMUs into the Amtrak Cascades service, DMUs would require separate maintenance and operational considerations.

This EIS assumes that either train engine technology would be suitable for the PNWRC.

3.2.6 Costs

This section presents preliminary construction and O&M costs for the build alternatives. The construction cost estimates include right-of-way, engineering and environmental costs, and a contingency factor. As previously noted in 3.1.6, the cost estimates presented in this chapter reflect a level of accuracy commensurate with the conceptual engineering work and analysis performed for the development of this Tier 1 evaluation. ODOT would refine these costs as the project progresses, and would evaluate specific project costs and implementation strategies for the design of the passenger rail system in any future Tier 2 NEPA process.

3.2.6.1 Capital Costs

Initial planning-level capital costs for each of the build alternatives are provided in Table 3-11. The capital cost estimates for each build alternative include the planned ODOT-owned train overhaul cost that applies to the No Action Alternative (see 3.1.6), the cost to construct infrastructure improvements along the route, including track and station improvements, ROW costs, the cost to buy new train equipment and a contingency factor of 30 percent.

Table 3-11. Estimated Capital Costs of Build Alternatives (dollars in millions, 2015 dollars)

	Alternative 1		Alternative 2		Alternative 2 with Central Albany Option	
Section	**Low**	**High**	**Low**	**High**	**Low**	**High**
Train Overhaul	$5	$12	$5	$12	$5	$12
Construction Cost	$870[a, b]	$1,025[a, b]	$3,622[c]	$4,442[c]	$3,657	$4,537
New Train sets (2)[d]	$40	$40	$40	$40	$40	$40
Total[e]	$915	$1,077	$3,667	$4,494	$3,702	$4,599

[a] Total cost to construct improvements to accommodate both increased passenger service and estimated freight growth in 2035. ODOT estimates that the construction of improvements to accommodate increased passenger service would cost between $695 million and $801 million.

[b] Construction cost for Alternative 1 includes estimated cost of the PE/NEPA projects identified in the operational modeling for the project. Willbridge: $8.1 million; Penn Junction $4.1 million; Eugene Stub Tracks $23.4 million. Funding for the North Portland project ($13.2 million) has been identified via a Connect Oregon grant and matched dollars from UPRR.

[c] Construction cost for Alternative 2 includes estimated cost of the PE/NEPA projects identified in the operational modeling for the project. Willbridge: $8.1 million; Penn Junction $4.1 million. Funding for the North Portland project ($13.2 million) has been identified via a Connect Oregon grant and matched dollars from UPRR.

[d] Train set costs are based on ODOT's recent purchase of two Talgo Series 8 train sets. DMU trainsets assumed to be of similar cost with contingency. If DMUs selected, they would be added to existing fleet as needed.

[e] Numbers may not sum because of rounding.

The construction cost for Alternative 2 is an estimate of the cost to build that alternative all at one time. If Alternative 2 were built in phases, the Amtrak Cascades trains would continue to use parts of the existing UPRR alignment. To add more daily round trips before full build-out, ODOT would have to construct improvements to the UPRR alignment to accommodate the increased passenger trips. The cost of those improvements would depend on which phase of Alternative 2 was built first and the number of new round trips that were added. With a phased construction of Alternative 2, all improvements to the UPRR south of Oregon City would be abandoned when Alternative 2 was fully built.

ODOT estimates that two additional passenger rail train sets would be needed to accommodate increased service between Eugene/Springfield and Portland. A train set is composed of locomotive, passenger cars and service cars (e.g., dining car, baggage car) that would serve the passenger line. The cost of procuring each new train set is assumed to be $20 million, which would account for a FRA-compliant DMU train set or a locomotive hauled train set. If DMU technology is used for future increased passenger rail service, this EIS assumes that the entire fleet would *not* be converted to that technology; instead, the new DMUs would be used alongside the existing locomotive fleet. This mixed-use approach would require different maintenance procedures and associated training than used for the existing diesel locomotive hauled technology. For the purposes of this EIS, maintenance costs were assumed to be those associated with locomotive hauled units, and are based on current experience (see Section 3.2.6.2, Operations and Maintenance Costs).

3.2.6.2 Operations and Maintenance Costs

Amtrak operates the Cascades passenger rail service for Oregon and Washington. WSDOT, ODOT, and Amtrak negotiate O&M cost every year. ODOT also pays separately for maintenance of the state-owned passenger trains. Currently ODOT pays about $17.75 million per year for O&M for the two daily Amtrak Cascades round trips between Eugene and Portland. Those costs include about $12.5 million paid to Amtrak to operate the service and about $5.25 million paid to Talgo and Amtrak for maintenance of the two state-owned trains. ODOT developed estimated O&M costs for Alternatives 1 and 2 primarily based on the current O&M costs. Actual O&M costs would be negotiated as additional round trips are added. Conservatively, full build-out of Alternative 1 or Alternative 2 would triple the number of Amtrak Cascades daily round trips from two to six. In addition, ODOT would have to purchase two additional passenger trains to operate either alternative, thus doubling the current number of state-owned passenger trains from two to four.

Alternative 1 would continue to operate on the current UPRR route; therefore, estimated O&M costs for Alternative 1 are based on current costs. Again, ODOT conservatively estimates that payments to Amtrak would triple, because the number of daily round trips would triple. The cost to maintain the state-owned trains would double, because the number of state-owned passenger trains would double. ODOT estimates annual O&M costs for Alternative 1 to be about $48 million, including about $37.5 million for Amtrak and $10.5 million for maintenance of the state-owned passenger trains.

O&M costs for Alternative 2 would be higher than those for Alternative 1, because about two-thirds of Alternative 2 would be state-owned and used only by passenger trains. When the Amtrak Cascades trains operate on shared track owned by a freight railroad, ODOT shares the maintenance cost with the host railroad. When the Amtrak Cascades trains operate on state-owned track used only for passenger rail, ODOT must pay the full maintenance cost. ODOT estimates that O&M costs for Alternative 2 would be about $51.5 million a year, including about $41.0 million paid to Amtrak and $10.5 million for maintenance of the state-owned passenger trains.

3.2.7 Phasing Opportunities

The two build alternatives have very different opportunities to phase implementation over time. This section describes how ODOT could phase implementation of the build alternatives. For either alternative, phasing could be structured to add one round trip in each phase. ODOT would replace Thruway bus trips with Amtrak Cascade train trips.

3.2.7.1 Alternative 1 Phasing

Phasing for Alternative 1 would be flexible and coordinated closely with the railroad owners and operators. Because Alternative 1 follows the existing route, infrastructure investments could be broken up into relative small, lower-cost elements, so that ODOT could implement Alternative 1 incrementally as funding becomes available. ODOT could also implement the elements deemed most valuable to support expanded service, and expand service incrementally from two round trips to the six round trips that are considered full build-out for this alternative. This approach would allow ODOT to add round trips over time as the demand for additional passenger service grows.

3.2.7.2 Alternative 2 Phasing

In contrast to Alternative 1, Alternative 2 would need to be implemented in a few large phases in order to connect sections of new alignment to existing alignment. Potential phases could be Springfield to Albany, Albany to Salem, Salem to Oregon City, and north of Oregon City.

Even if implementation of Alternative 2 was broken into sections between these cities, each of the large phases could cost more than $1 billion. The most recent Federal transportation funding programs have required at least a 20 percent state and local match, so Oregon's local share would be at least $200 million per phase.

In addition, in a phased implementation scenario, ODOT could add round trips to the Amtrak Cascades service before Alternative 2 could be fully built out, requiring improvements along the existing alignment. These improvements would later be abandoned for passenger rail use. However, these improvements would provide a lasting benefit to freight rail. The environmental impacts of these improvements are uncertain because a phasing plan has not been determined. Any phasing approach and requirements for rail infrastructure improvements along the existing route would be subject to negotiation with the host railroad.

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CHAPTER 4

Affected Environment and Environmental Consequences

4.1 Introduction

This Tier 1 Environmental Impact Statement (EIS) is being prepared in compliance with the National Environmental Policy Act (NEPA) (42 United States Code (USC) §4321 et seq.) to analyze and disclose the potential effects of improving intercity passenger rail service along the Oregon section of the Pacific Northwest Rail Corridor (PNWRC). Sections 1502.15 and 1502.16 of the Council on Environmental Quality (CEQ) NEPA regulations require an EIS to succinctly describe the environment of the area or areas to be affected or created by the alternatives under consideration and to describe the environmental impacts of the alternatives including the proposed action. The CEQ NEPA regulations also require an EIS to identify any adverse environmental effects that cannot be avoided should the proposal be implemented, the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. In addition, because the Federal Railroad Administration (FRA) is the Federal lead agency for the Oregon Passenger Rail (OPR) Project, this EIS also complies with FRA's Procedures for Considering Environmental Impacts (Environmental Procedures) (64 Federal Register 28545, May 26, 1999).

This chapter describes the affected environment and compares the potential environmental consequences for the No Action Alternative and each of the Build Alternatives consistent with CEQ regulations and FRA's Environmental Procedures. In addition, this chapter discusses potential best management practices (BMPs), minimization measures, and mitigation strategies to reduce or eliminate adverse effects.

4.1.1 Overview of Chapter

The following summarizes the structure and content of each resource-based section in this chapter.

- **Legal Requirements.** This subsection lists and briefly describes laws and regulations in addition to NEPA and the CEQ's NEPA implementing regulations (as noted in the preceding Introduction) that are relevant to the discipline/resource analysis. The laws and regulations are separated into Federal, state, and local requirements.
- **Methods.** This subsection summarizes the process used to gather data and the methods used to assess and evaluate potential effects on the resource. This section also describes discipline-/resource-specific considerations that would be evaluated in Tier 2 NEPA documents (see subsection 4.1.2, Tiered NEPA Analysis).
- **Study Area.** This subsection describes the discipline-/resource-specific study area for analyzing potential impacts.
- **Affected Environment.** This subsection describes conditions that would be potentially affected by the build alternatives (i.e., the existing conditions). This description is used as a baseline for assessment of effects for the alternatives considered.
- **Environmental Consequences.** This subsection identifies and compares the potential direct and indirect effects, as well as construction impacts, of the No Action Alternative and the two build alternatives (Alternative 1 and Alternative 2) relative to the environmental context (the Affected Environment).

- **Potential Mitigation.** This subsection describes conceptual avoidance and minimization strategies applied to the OPR Project. This subsection also includes a list of mitigation strategies that would be further developed in Tier 2 NEPA documents (see subsection 4.1.2, Tiered NEPA Analysis).

4.1.2 Tiered NEPA Analysis

This chapter addresses the potentially affected environment and provides an analysis of the potential effects of improving intercity passenger rail service at a generalized, program level based on a preliminary conceptual level of engineering and passenger rail service planning for two build alternatives and a No Action Alternative. The build alternatives have not been refined to optimize performance and schedule, to reduce cost, or to avoid specific properties or individual environmental resources. That is, this Tier 1 EIS evaluates the potentially adverse and beneficial effects of No Action and Build Alternatives within the study area, given a conceptual level of design and service, without identifying specific track alignments, infrastructure locations and/or specific rail station locations within the respective subject corridors.

As stated previously in 1.1.5, Tiered Approach to the National Environmental Policy Act, if FRA selects a build alternative at the conclusion of this Tier 1 NEPA analysis, it is expected that ODOT would implement the OPR Project in phases. Phases will be added as demand increases and as funding becomes available. One or more of the components or operable segments of the selected alternative for the OPR Project could be developed as individual projects to advance into final design and construction. ODOT anticipates seeking a combination of Federal and state funding to advance the OPR Project into final design and construction, however, currently no funding has been identified to advance the project. If ODOT advances the OPR Project into final design and construction and Federal funding permits, or other Federal approval is involved, a Tier 2 NEPA analysis, led by the appropriate Federal agency.

4.2 Transportation

This section discusses transportation-related legal requirements, methods for analysis, the transportation study area and affected environment, and potential environmental consequences of alternatives for the OPR Project. This section also discusses potential mitigation strategies.

4.2.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, **FRA's Procedures for Considering Environmental Impacts** are applicable to this Tier 1 transportation analysis**.** Section 14.(n)(13) of FRA's environmental procedures require an EIS to include consideration of "impacts on transportation, including impacts on both passenger and freight transportation, by all modes, from local, regional, national, and international perspectives. The EIS should include a discussion of both construction period and long-term impacts on vehicular traffic congestion."

4.2.2 Methods

This transportation analysis utilized both qualitative and quantitative assessments to characterize the potential passenger rail travel market and transportation system, and to evaluate the potential transportation impacts of the alternatives. Several factors were evaluated, including mode share as a percentage of the total trip market, travel times, ridership, delay and safety at rail crossings, connectivity and accessibility at existing and potential new stations, and freight train delays and operations.

The *Oregon Passenger Rail Analysis of Travel Markets Technical Report* (ODOT, 2014d) compiled and examined quantitative data from several sources to identify the potential market for intercity passenger rail. Oregon Department of Transportation (ODOT) and FRA used this information, along with operation simulations and ridership forecasting, to analyze potential shifts in travel-mode choice towards improved intercity passenger rail.

To evaluate the potential transportation system impacts of the No Action Alternative and the build alternatives, the analysis compares 2035 ridership and travel times with current ridership and travel times.

Safety conditions at rail crossings are qualitatively summarized in terms of potential conflicts between rail and auto/non-motorized transportation modes, and in terms of delays on surface streets caused by rail traffic.

Connectivity and accessibility at existing and potential new stations are discussed in qualitative and quantitative terms based on existing and planned conditions at the station locations, along with projected increases in station activity. In addition, results from the *Oregon Passenger Rail Revealed Preference Survey* (NuStats, 2014) of both Amtrak Cascades and Thruway bus passengers traveling within the study area are used to help determine the potential impacts of increased station activity. Specifically, the survey reflects how people currently get to and from each of the stations, and is therefore used to predict how new riders would access the stations.

The potential freight-related delay for passenger trains and the potential impacts associated with freight capacity are qualitatively evaluated.

Tier 2 Analysis

ODOT and FRA will conduct project-level analyses of transportation conditions and potential impacts for individual projects proposed subsequent to the OPR Project if a build alternative is selected in the Tier 1 Final EIS and Record of Decision. This could include, but would not be limited to, detailed traffic analyses, planning and design of potential connectivity and access improvements near stations, and site-specific measures to address traffic and safety impacts of railroad crossings.

4.2.3 Study Area

The transportation study area includes the existing intercity passenger rail system (including stations), the intercity highway system, and other modes of transportation available to the public (particularly aviation and intercity bus services) between Eugene and Portland. The transportation study area also includes the 20-acre area around potential new station locations. Appendix D, Figure D-1 shows major transportation facilities in the study area.

The travel market study area for intercity passenger rail is more extensive than the study area for other transportation impacts, because, to identify a market of potential travelers, a broader catchment area that reflects travel movements between station locations is taken into consideration. In other words, the ridership model includes people who would travel from locations outside of the immediate study area to access the passenger rail system to make their trip.

4.2.4 Affected Environment

This section discusses the potential travel market for intercity passenger rail and the existing transportation system between Eugene and Portland, particularly existing modes of travel, safety conditions at rail crossings, and station connectivity and accessibility. The section also addresses freight operations.

4.2.4.1 Travel Market

The travel market for Amtrak Cascades passenger rail includes counties where the existing Amtrak Cascades rail alignment between Eugene and Portland is located, as well as counties from which it has the potential to draw additional riders. As such, the travel market spans 10 counties and 14,000 square miles with a population of over 3 million residents (see **Table 4.2-1**). More than 85 percent of these residents live in urban/suburban areas totaling approximately 2,500 square miles (ODOT, 2014a).

Table 4.2-1. Counties in the Travel Market

County
Benton
Clackamas
Lane
Linn
Marion
Multnomah
Polk County
Washington County
Yamhill County
Clark County (Washington)

Source: ODOT, 2014a.

There are approximately 10.3 million daily person trips (a trip by one person by any transportation mode) within the travel market. On a typical weekday, 18 percent of these trips are for home-based work travel, 53 percent are for home-based other travel (from home to another location, not work), and 29 percent are for trips that are not home-based (between locations that do not include home).

The travel market analysis for the OPR Project uses the *Oregon Travel and Activity Survey* (Oregon Modeling Steering Committee, 2011) to identify those trips within the travel market that are likely candidates for intercity passenger rail. This segment of the travel market is referred to in this document as the potential Amtrak Cascades intercity passenger rail market. The data indicates that the vast majority of the 10.3 million daily trips within the travel market are shorter regional and local trips (i.e., less than 25 miles). Intercity passenger rail typically services trips of 100 to 200 miles, with Amtrak passenger data indicating another potential market for shorter trips in the approximately 50-mile range (ODOT, 2016). Therefore, the shorter regional and local trips are not likely candidates for intercity passenger rail, and should not be considered when determining the potential Amtrak Cascades intercity passenger rail market. Subtracting these shorter trips results in an estimated 114,000 potential daily person trips between the station communities and the surrounding areas of Eugene, Albany, Salem, Oregon City (including Lake Oswego), and the greater Portland area. Therefore, the current potential Amtrak Cascades intercity passenger rail market (114,000 daily person trips) represents just over 1 percent of all existing daily person trips in the total travel market (10.3 million daily person trips).

Of the total potential intercity passenger rail market (114,000 daily person trips), the two largest markets are the bi-directional Portland-Salem market (13,000+ daily person trips) and the bi-directional Portland-Eugene market (2,800+ daily person trips).

The *Oregon Passenger Rail Revealed Preference Survey* (NuStats, 2014) gathered data from Amtrak Cascades rail and bus passengers traveling between Eugene, Oregon (OR), and Vancouver, WA. Of those riders, rail had a slightly larger share of the intercity transit market (55 percent rail; 45 percent Thruway bus). According to the survey, the most common purpose for trips for both bus and rail passengers (36 percent total) was to visit friends or relatives, followed by vacation/recreation (23 percent total). Only 6 percent of passengers were using Amtrak Cascades rail or Thruway bus services to commute to and from work, and another 6 percent were using rail or bus to travel to and from school (NuStats, 2014). Approximately 49 percent of riders indicated that they do not have a private vehicle available to them to make the trip that they were surveyed on, and 18 percent of passengers have zero vehicles in their household.

4.2.4.2 Transportation System Conditions

This section documents the primary existing modes of travel potentially affected by the OPR Project, with information on operations, ridership, and travel time. As such, the study area is limited to the existing intercity passenger rail system, Interstate 5 (I-5), and other modes of transportation available to the public (particularly passenger airlines and intercity bus services) between Eugene and Portland.

Passenger Rail and Thruway Bus

The current Amtrak Cascades passenger rail service between Eugene and Portland consists of three round trips per day (two *Amtrak Cascades* trains plus one *Amtrak Coast Starlight* train). In addition, Cascade Point (Amtrak Thruway) buses, sponsored by ODOT and operated by MTR Western, provide six round trips per day between Eugene and Portland, with a seventh round trip between Salem and Portland. As described in Chapter 3, Amtrak Cascades trains stop in Eugene, Albany, Salem, Oregon City, and Portland. Thruway buses stop in each of these locations, plus Woodburn.

Ridership

In 2015, intercity ridership between Eugene and Portland via Amtrak Cascades passenger trains was approximately 105,000 and 89,000 for Thruway buses—a total annual ridership of 194,000. Based on those numbers, passenger rail represented a larger percentage of Amtrak Cascades ridership than Thruway bus (54 percent versus 46 percent, respectively).

Travel Time

According to published schedules,[9] travel time between Eugene and Portland on the Amtrak Cascades is two hours and 35 minutes (2:35). **Table 3-1** in **Chapter 3** shows existing passenger-train travel times between stations.

The scheduled travel time between Eugene and Portland via Thruway bus varies between two hours, 25 minutes (2:25) and three hours, 5 minutes (3:05), depending on the time of day and the number of intermediate stops. The Amtrak Cascades service in Oregon had an on-time performance of 82.3 percent in calendar year 2016.

Other Modes of Travel

In addition to passenger rail and Thruway bus, people use automobiles, commercial bus services, and passenger airlines as means to travel between Eugene and Portland. Each of these travel modes is discussed in more detail below.

Automobile Travel

Automobile travel makes up about 99 percent of all trips between Eugene and Portland, with drivers primarily using I-5, which is a four- to six-lane limited-access highway. The maximum posted speed limit on I-5 varies between 50 and 65 miles per hour (mph), depending on the location.

Travel times on I-5 between Eugene and Portland fluctuate between approximately 1 hour 46 minutes (1:46) when there is no congestion to well over two hours during peak commute and holiday travel periods. In 2011, the I-5 location with the most congestion (as measured by highest annual average daily traffic) was one-half mile south of the I-5/ Highway 217 (OR 217) interchange in Tigard, with 154,500 vehicles per day in both directions. Traffic was lowest 2 miles south of the I-5/ Highway 228 (OR 228) interchange near Halsey and one-quarter mile south of the Diamond Hill interchange, with 36,200 vehicles per day in both directions.

[9] Summer 2015.

Commercial Bus Services

Two commercial intercity bus services are available in the travel market:

- **Greyhound.** As of 2014, Greyhound intercity buses operated four daily round trips between Eugene and Portland, with stops in Corvallis, Salem and Woodburn. The scheduled travel time between Eugene and Portland is between two hours, 25 minutes (2:25) and three hours, 15 minutes (3:15), depending on the time of day and the number of stops.
- **BoltBus.** As of 2014, BoltBus, a Greyhound subsidiary, operated two to three round trips per day between Eugene and Portland, four days a week (travel days between Thursday and Monday), with one intermediate stop in Albany. The scheduled travel time is two hours and 20 minutes (2:20).

Greyhound and BoltBus do not release ridership or on-time performance data.

Air Travel

Currently, Alaska Airlines operates four daily round trips between Eugene and Portland. In addition, two daily flights operate between Eugene and Seattle, WA, and 26 daily round trips operate between Portland and Seattle, WA. Many passengers flying between Eugene and Portland or Seattle connect to other flights to their final destinations. The passenger volume between the Eugene and Portland airports was 160,000 between May 2013 and April 2014—a daily average of approximately 440 passengers. The other cities served by the Amtrak Cascades are too close together for commercial air travel to be practical.

The scheduled flight time between Eugene and Portland is 35 to 40 minutes. In addition to flight time, air travel requires that passengers arrive at the airport prior to the flight time for check-in, security, and boarding.

4.2.4.3 Rail Crossings – Delay and Safety Conditions

There are 175 existing at-grade public crossings (seven of which are bicycle/pedestrian-only crossings) and 85 grade-separated crossings along the existing mainline rail alignments within the study area (between Eugene and Portland). As part of an ongoing safety improvement program independent of the OPR Project, ODOT and Union Pacific Railroad (UPRR) will be closing two at-grade crossings, and installing crossing arms and flashing lights at three at-grade crossings. **Table 4.2-2** shows existing at-grade and grade-separated rail crossings (both vehicular and non-motorized) and the total number of at-grade and grade-separated crossings for the Alternative 1 and Alternative 2 (including the Alternative 2 with Central Albany Option) alignments.

Table 4.2-2. Summary of At-grade Rail Crossings by Alternative

Rail Crossings	Existing Crossings	No Action Alternative	Alternative 1	Alternative 2	Alternative 2 with Central Albany Option
Total At-grade Crossings	175	173	140	46	59
Total Grade-Separated Crossings	85	85	85	109	105

Source: ODOT, 2016a.

Delay

Trains block at-grade crossings when they travel over or stop on the track. The length of the resulting delay for motorists, cyclists, and pedestrians varies based on several factors, including the length and speed of the train and the time the gates are down. For example, a short passenger train traveling at a fairly high speed may block a crossing for only a short time. Conversely, many freight trains are over 1 mile long and, while traveling at 20 mph, can take 3 minutes or more to clear a crossing (FRA, 2006).

Delays resulting from blocked crossings are most acute on streets with relatively high traffic volumes.[10] Within the study area, 18 crossings have high traffic volumes (i.e., greater than 10,000 vehicles per day). Of those, the following seven crossings have a history of trains blocking crossings by stopping or conducting switching activities while the train is in the crossing:

- Albany – 34th Avenue (UPRR crossing);
- Albany – Queen Avenue E;
- Keizer – Chemawa Road;
- Salem – McGilchrist Street;
- Clackamas – Lawnfield Road;
- Portland – NW Front Avenue E; and
- Portland – SE 11th Avenue E.

Safety

The potential for collisions between rail traffic and vehicles and/or pedestrians or bicycles is a safety risk associated with at-grade rail crossings. This risk increases where only passive warning devices, rather than active warning systems, are used. Active warning systems use a combination of lights, bells,[11] and gates to warn travelers when a train is approaching and to stop vehicles from entering the crossing. Passive systems consist only of a stop or yield sign and a railroad crossbuck. Passive warning systems are typical at locations with very low traffic volumes. Along the existing rail alignments in the study area, 30 crossings have passive warning systems, and 6 of those are bicycle/pedestrian-only crossings.

Since 2003, 31 collisions at at-grade rail crossings have occurred along the existing rail alignments, resulting in 17 fatalities and 15 personal injuries. Eight crossing locations have been the sites of two or more collisions with trains, resulting in a cumulative total of 17 crashes at these locations (see **Table 4.2-3**). All but one of the multiple-incident crossings have active warning devices. The exception is the crossing at Perkins Street just north of Keizer, which has only passive signage. Although safety risks generally decrease at crossings where active warning systems are used, such crossings are also located in areas with higher traffic volumes than crossings with passive warning systems. Therefore, the higher number of collisions at crossings with active warning systems may be a function of traffic volume and/or roadway configuration as opposed to the safety of the warning system itself.

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[10] For the purposes of this EIS, average daily traffic (ADT) volumes at at-grade crossing locations were reviewed. The top 10 percent of crossing locations, based on the highest ADT volumes, roughly corresponded to roadways with greater than 10,000 vehicles per day. A threshold of 10,000 vehicles per day was considered to represent relatively high volumes based on the ADT information.

[11] Bells do not sound in "Quiet Zones".

Table 4.2-3. Summary of Multiple-Incident Rail Crossing Locations (Existing Alignment – Eugene to Portland)

Crossing Location	Railroad	Number of Crashes
Albany – Queen Avenue	UPRR	3
Irving – Irving Road	UPRR	2
Junction City – 6th Street (Main)	UPRR	2
Salem – Court Street	UPRR	2
Woodburn – Hardcastle Street	UPRR	2
Broadacres – Butteville-Gervais Road	PNWR	2
Quinaby – Perkins Street (passive)	PNWR	2
Oregon City – 10th Street	UPRR	2

Source: ODOT, 2016a.

4.2.4.4 Connectivity and Accessibility

There are five existing Amtrak stations within the study area. **Table 4.2-4** summarizes station characteristics including physical location, parking supply, rail and bus connections, and station activity.

Table 4.2-4. Summary of Existing Amtrak Stations in the Study Area

Station	Located in Downtown?	Parking Supply (# of parking spaces[12])	Rail/Transit/ Bus Connections	Station Activity (Annual # of Riders On and Off)
Eugene	No; Periphery of Downtown Eugene	25 long-term; 8 short-term	**Rail:** Amtrak Coast Starlight, Cascades **Transit:** Lane Transit District **Bus:** Cascades POINT Thruway; Eugene-Bend-Ontario-Coos Bay Greyhound	67,000
Albany	Yes	50 long-term; 20 short-term	**Rail:** Amtrak Coast Starlight, Cascades **Transit:** Albany Transit System; Linn-Benton Loop **Bus:** Cascades POINT Thruway; Portland-Albany-Corvallis-Newport (Valley Retriever); Greyhound	24,500
Salem	No	30 long-term; 30 short-term	**Rail:** Amtrak Coast Starlight, Cascades **Transit:** Salem-Keizer Transit **Bus:** Greyhound (future); Cascades POINT Thruway	49,000

[12] Most parking at Eugene and Portland Union Station is paid. Parking at Albany, Salem and Oregon City is mostly free.

Station	Located in Downtown?	Parking Supply (# of parking spaces[12])	Rail/Transit/ Bus Connections	Station Activity (Annual # of Riders On and Off)
Oregon City	No; 1 mile east of central business district	50 long-term	**Rail:** Amtrak Cascades **Bus:** Cascades POINT Thruway	10,000
Portland Union	Yes	200 long-term; 25 short-term	**Rail:** Amtrak Empire Builder, Coast Starlight, Cascades **Transit:** MAX Green Line, MAX Yellow Line **Bus:** Greyhound; Cascades POINT Thruway; Portland-Albany-Corvallis-Newport (Valley Retriever); Northwest POINT/Thruway	450,000

Source: ODOT, 2014b; ODOT, 2016a.

Table 4.2-5 identifies how people get to and from each of the existing stations based on survey responses to the *Oregon Passenger Rail Revealed Preference Survey* (NuStats, 2014). This information is important because the extent to which transit is accessed at each of the stations appears to correspond with the availability of transit service. The greater the availability and access the station has to transit service, the higher the reported mode share to transit for access and egress. For example, station access by transit is much higher in Portland than in other cities within the study area, and Portland has the highest level of transit access of any Oregon jurisdiction along the Amtrak Cascades alignment. Likewise, the station areas with better pedestrian/bike facilities have higher shares of access and egress by walking and biking.

Table 4.2-5. Amtrak Cascades (Rail and Bus) Station Access/Egress – Percentage of Passengers by Mode

Station	Access and Egress Mode at Station						
	Walk	Bike	Drive Own Private Vehicle	Drop Off/ Pick Up – Private Vehicle	Drop Off/ Pick Up – Taxi	Public Transit	Other
Eugene	5%	3%	9%	64%	9%	8%	2%
Albany	5%	4%	15%	62%	7%	7%	0%
Salem	18%	4%	12%	51%	4%	11%	0%
Oregon City	0%	0%	5%	85%	5%	5%	0%
Portland	0%	3%	2%	42%	7%	44%	1%
All Stations	**4%**	**3%**	**7%**	**54%**	**8%**	**24%**	**1%**

Source: ODOT, 2016a.

4.2.4.5 Freight Rail

In Oregon, trucks are the primary means for transporting freight. In 2011, trucks carried approximately 75 percent of all freight tonnage statewide, while rail carried approximately 12 percent of freight tonnage statewide. Existing freight rail service in Oregon operates on 20 active railroads, transporting general merchandise, bulk commodities, and other goods in containers or trailers. Freight rail in Oregon operates on both Class I railroads (e.g., BNSF Railway (BNSF) and UPRR) and non-Class I railroads (Portland & Western Railroad (PNWR), Albany & Eastern Railroad Company (AERC), and Oregon Pacific Railroad Company). As discussed in Chapters 1 and 3, a mix of freight and passenger trains share the existing Amtrak route within the study area on the existing UPRR line. This track consists of Class I railroads capable of carrying the standard 286,000-pound (286K) freight rail cars (ODOT, 2014a). In addition, Class I railroads have Centralized Traffic Control (CTC), where traffic is controlled and managed remotely by dispatchers in centralized locations. CTCs increase safety and capacity by allowing monitoring of multiple rail routes simultaneously. Railyards allow collection, distribution, and transfer of various commodities among rail lines. Major railyards within the study area are located in Eugene, Albany, Salem, and Portland.

4.2.5 Environmental Consequences

This subsection compares the potential transportation-related impacts of the No Action Alternative and the build alternatives.

4.2.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured.

Travel Market

Under the No Action Alternative, ODOT and FRA project that population and employment, and thus Amtrak Cascades passenger rail ridership, would increase during the OPR Project planning horizon (2035). However, the increase in ridership would be relative to the increase in population. Based on population growth rates used for the Oregon Statewide Model (Bettinardi, 2013), the potential Amtrak Cascades intercity passenger rail travel market would be expected to increase to 174,000 daily person trips in 2035. ODOT forecasts 540 daily Amtrak Cascades passenger rail trips in 2035, which represents 0.3 percent of the potential Amtrak Cascades intercity passenger rail travel market.

Changes to the share of potential Amtrak Cascades intercity passenger rail market would be unlikely to occur, because passenger rail service in 2035 would be similar to existing conditions, including the same passenger train frequency and the same number and location of station stops. ODOT plans to increase Thruway bus service from six round trips to seven round trips per day between Eugene and Portland by extending service of a Thruway bus that currently operates between Salem and Portland to Eugene and Albany. Without changes to service, it is probable that passengers would continue to utilize passenger rail and Thruway bus primarily for longer trips to visit friends or relatives or for vacation/recreation. Therefore, despite population and employment increases and a corresponding increase in ridership, a shift in travel-mode is not expected under the No Action Alternative. Trips made by passenger rail would continue to be a relatively small share of the potential Amtrak Cascades intercity passenger rail market, as well as the overall travel market.

Transportation System Conditions

Due to projected increases in population and employment, Amtrak Cascades passenger rail and Thruway bus ridership is expected to more than double during the OPR Project planning horizon under the No Action Alternative—increasing to approximately 390,000 annual passengers by 2035 (see **Table 4.2-6**). Projections show Thruway bus ridership increasing at a faster rate than passenger rail ridership; therefore, ridership in 2035 is expected to be more evenly divided, with 51 percent of passengers riding passenger rail and 49 percent riding Thruway bus.

Table 4.2-6. Amtrak Cascades Ridership – Eugene to Portland – No Action Alternative*

Eugene to Portland	2015	2035	Percentage Increase
Passenger Rail	105,000	197,000	88%
Thruway Bus	89,000	193,000	117%
Total	**194,000**	**390,000**	**101%**

*Forecasting for the No Action Alternative assumes continuation of the current bus and train schedules.

Source: Williams, 2015; Holmes, 2016.

Under the No Action Alternative, passenger train travel times between Eugene and Portland would be similar to, or slightly longer than, existing conditions. Although the No Action Alternative assumes no major infrastructure or other modifications to the current track configuration would occur, freight rail demand is forecasted to increase, which could result in bottlenecks, queues, and/or delays (see subsection 4.2.4.5, Freight Rail).

Trips using other means of travel, particularly automobile and private bus, would increase under the No Action Alternative because of increased population and employment. However, the congestion on I-5 is increasing, and no significant capacity improvements are included in the *2015-2018 Statewide Transportation Improvement Program* (ODOT, 2014a). Without capacity and service improvements, travel times and/or service could worsen for these travel modes.

Transportation System Resiliency

The resiliency of the overall transportation system refers to the ability of the system to respond to events such as natural disasters. The No Action Alternative would not provide a new or alternate travel option, nor would it change or improve rail conditions and/or operations such that they would be more resilient to natural disasters or other events than the existing rail system. Therefore, the resiliency of the transportation system would not change under the No Action Alternative.

Rail Crossings – Delay and Safety Conditions

Under the No Action Alternative, 173 existing at-grade public crossings and 85 grade-separated crossings would remain after closing of 2 at-grade crossings as part of an ongoing safety improvement program independent of the OPR Project. The frequency and length of delays resulting from blocked crossings would likely increase at crossings with high traffic volumes (see subsection 4.2.4.3, Rail Crossings – Delay and Safety Conditions) as a result of increased freight rail traffic and increased traffic on local streets.

Connectivity and Accessibility

The No Action Alternative would result in no changes or improvements to multimodal access and connectivity conditions at the five existing Amtrak Cascades stations beyond the funded projects already included in each jurisdiction's Transportation System Plan (TSP). However, projected increases in population, employment, and Amtrak Cascades ridership would increase station activity, as shown in **Table 4.2-7**.

The type of effects resulting from increased station activity would likely correspond to how passengers access the stations. The *Oregon Passenger Rail Revealed Preference Survey* (NuStats, 2014) indicates that 64 percent of Amtrak Cascades rail and bus passengers traveling between Eugene and Portland access Eugene Station by being dropped off or picked up by private vehicle (ODOT, 2016a). Therefore, increased activity at this station could result in access issues associated with congestion on surrounding street networks. The Revealed Preference Survey shows that the majority of passengers accessed Portland's Union Station via public transit (44 percent) and by being dropped off or picked up by private vehicle (42 percent) (ODOT, 2016a). Therefore, increased activity at Portland Union Station could result in greater numbers of people utilizing the transit system, as well as access issues associated with congestion on surrounding street networks.

Table 4.2-7. Annual Amtrak Cascades Train and Thruway Bus Station Activity – Existing (2015) and 2035 Conditions for No Action Alternative

Station	Existing Conditions (# of riders, both on and off)	2035 Conditions for No Action Alternative (# of riders, both on and off)	Percent Growth
Eugene	85,800	172,500	101%
Albany	31,800	54,800	72%
Salem	65,300	97,100	49%
Oregon City	15,100	17,000	13%
Portland Union	458,800	961,100[a]	109%
Total	**656,800**	**1,302,500**	**98%**

[a] Increased station activity under 2035 conditions reflect riders projected on 2 additional round trip trains between Portland and Seattle scheduled to begin service in 2017.

Source: ODOT, 2016a.

Freight Rail

Under the No Action Alternative, freight demand is anticipated to increase by 40 to 50 percent between 2010 and 2035 (ODOT, 2014b). The No Action Alternative does not include modifications or improvements to the existing rail infrastructure that would increase the capacity and/or improve operations for freight trains.

In addition, increased freight traffic could increase passenger rail delays resulting from interactions with freight trains. Between April 2014 and March 2016, freight train interference was the second most frequent reason for host-related railroad delay[13] on both the UPRR- and BNSF-hosted portions of the Amtrak Cascades route, behind passenger train interference and slow order delays, respectively (FRA, 2016). With the expected increase in freight demand, delays would continue and could increase, resulting in increased travel times and decreased reliability for passenger trains.

Alternative 1

Travel Market

Under Alternative 1, four round trips per day would be added to Amtrak Cascades passenger rail service, while Thruway bus trips would be reduced. This added passenger train capacity and reduction in Thruway bus service, along with improved travel times and reliability as discussed below, could result in a shift in travel mode choice towards increased travel by passenger rail. Specifically, increased track capacity as envisioned by Alternative 1 would enhance reliability through a reduction of conflicts with freight, increased frequency and reduced travel times of passenger trains. With more frequent and reliable passenger rail service, rail could become a more attractive mode of travel that is integrated with the overall transportation system, thus increasing overall travel market share.

Under Alternative 1, ODOT projects approximately 1,770 daily Amtrak Cascades passenger rail trips in 2035. As discussed under the No Action Alternative, based on average growth rates from the Oregon Statewide Model, the potential Amtrak Cascades intercity passenger rail market would be expected to increase to 174,000 daily trips in 2035. Therefore, Amtrak Cascades passenger rail trips under Alternative 1 would comprise approximately one percent of the potential Amtrak Cascades intercity passenger rail market.

13 Host-related delays are operating delays not attributable to Amtrak when operating on tracks of a host railroad, such as track- and signal-related delays, power failures, freight and commuter train interference, routing delays, etc.

Although this is still a relatively small share of the potential Amtrak Cascades intercity passenger rail market, it is more than triple the market share under the No Action Alternative (0.3 percent).

Transportation System Conditions

Under Alternative 1, ODOT project total annual Amtrak Cascade ridership to increase approximately 89 percent to 739,000 passengers by 2035, compared to 390,000 under the No Action Alternative. However, under the No Action Alternative, ODOT and FRA forecast ridership in 2035 to be almost evenly divided between passengers riding passenger rail and passengers riding Thruway bus. The opposite is true under Alternative 1, where 646,000 of the 739,000 passengers, or 87 percent, are projected to ride on Amtrak Cascades passenger rail, compared to only 93,000 passengers, or 13 percent, riding Thruway bus (see **Table 4.2-8**). This difference in mode share is likely the case because, under Alternative 1, Thruway bus trips would be "replaced" incrementally with four additional Amtrak Cascades passenger train round trips. In other words, under Alternative 1, as the number of Amtrak Cascades trains trips per day increases, the number of Thruway bus trips per day would decrease.

Table 4.2-8. Amtrak Cascades Ridership – Eugene to Portland – Alternative 1

Eugene to Portland	2015	No Action Alternative (2035)	Percentage Increase (2015/No Action)	Alternative 1 (2035)	Percentage Increase (No Action/Alt. 1)
Passenger Rail	105,000	197,000	88%	646,000	228%
Thruway Bus	89,000	193,000	117%	93,000	-52%
Total	**194,000**	**390,000**	**101%**	**739,000**	**89%**

Source: Williams, 2015; Holmes, 2016.

Passenger train travel times on the Amtrak Cascades between Eugene and Portland would be expected to decrease to two hours and 20 minutes (2:20) under Alternative 1—a reduction of 10 percent in comparison to the current travel time of two hours and 35 minutes (2:35). The addition of mainline track in certain areas, with improved crossovers and additional sidings, would increase capacity and help bypass and reduce congestion that occurs from conflicts between passenger trains and when freight trains are switching between mainline and industry tracks. Because passenger trains travel faster than freight trains, the ability to use new crossovers would provide opportunities for passenger trains to maintain higher speeds.

Given the increase in Amtrak Cascades passenger rail ridership under Alternative 1 in comparison to the No Action Alternative, Alternative 1 could include a reduction in the number of vehicles on I-5 between Eugene and Portland. In terms of overall quantity, this shift would not be significant enough to affect or improve congestion on I-5. Similarly, some trips by private bus or air travel could shift to passenger rail under Alternative 1, but any change would probably not be significant.

Transportation System Resiliency

Under Alternative 1, additional mainline track capacity in certain locations, along with modifications and improvements to crossovers, sidings, and at-grade crossings, would improve transportation system resiliency by supporting long-term system preservation and by improving the ability of the transportation system to mitigate and recover from natural disasters and/or human-caused disruptions.

Rail Crossings – Delay and Safety Conditions

Alternative 1 includes new segments of mainline track parallel to the existing track but would not create new at-grade crossings, nor would it grade-separate existing at-grade crossings. Where a current crossing is grade-separated and new parallel track would be constructed, the crossing would be improved to accommodate new passenger tracks.

Alternative 1 would increase the number of passenger trains traveling through existing rail crossings (by adding four round trips per day to the Amtrak Cascades service) and would therefore result in more frequent delays at rail crossings. While the delays would be shorter than those caused by freight trains (because passenger trains are much shorter and generally travel faster), the addition of eight passenger trains per day at each crossing would increase the number of times that vehicles, pedestrians, and cyclists would be delayed at crossings in comparison to the No Action Alternative.

The addition of eight passenger train trips per day (four round trips) at each crossing along the Alternative 1 alignment could also increase potential safety hazards for vehicles, pedestrians, and cyclists at crossings in comparison to the No Action Alternative.

Connectivity and Accessibility

Alternative 1 includes service at the five existing Amtrak Cascades stations, as well as the potential for service at one new station in Woodburn.[14] As under the No Action Alternative, no changes or improvements to multimodal access and connectivity conditions at the five existing stations are assumed under Alternative 1 beyond the funded projects already included in each jurisdiction's TSP. **Table 4.2-9** shows the increase in station activity modeled under Alternative 1.

Under Alternative 1, the Eugene, Albany, Salem, and Oregon City stations would see considerably more activity than under the No Action Alternative (see Table 4.2-9). At each of these stations, the majority (over 50 percent) of passengers traveling between Eugene and Portland access the station by being dropped off/picked up by private vehicle or taxi. For this reason, the increase in trips to and from these stations could affect traffic patterns on surrounding surface streets, and adversely affect access by increasing congestion. These potential impacts would be evaluated in future Tier 2 analyses.

Table 4.2-9. Annual Amtrak Cascades Train and Thruway Bus Station Activity – Existing and 2035 Conditions for No Action Alternative and Alternative 1

Station	Station Activity (# of riders, both on and off)[a]			Percent Growth	
	Existing Conditions (2015)	No Action Alternative (2035)	Alternative 1 (2035)	Existing Conditions to No Action	Existing Conditions to Alternative 1
Eugene	85,800	172,500	362,300	101%	322%
Albany	31,800	54,800	119,300	72%	275%
Salem	65,300	97,100	03,700	49%	212%
Oregon City	15,100	17,000	40,500	13%	168%
Portland[b]	458,800	961,100[c]	1,136,900	109%	148%
Total	**656,800**	**1,302,500**	**1,862,700**	**98%**	**184%**

[14] As noted in Chapter 3, when ODOT began identifying potential project impacts, Alternatives 1 and 2 included a possible Woodburn Station. In 2016, ODOT and WSDOT adopted a Station Stop Policy for Amtrak Cascades service that would require any new station to meet defined criteria. Though Woodburn does not currently meet these criteria and is not included in the service and operations analysis of the Build Alternatives, future project development could include a station in Woodburn. To preserve information developed for potential new Woodburn Station locations, those locations continue to be shown on project maps and potential environmental impacts are broadly described in Chapter 4. Additional analysis of ridership, travel time, environmental impacts and costs would need to occur during the environmental analysis for the future project development prior to implementing a new station in Woodburn.

[a] Station activity (riders on and off) includes the addition of 4 round trips per day to Amtrak Cascades passenger rail service and thus reflects an additional 8 trains per day at each station.

[b] Portland Union Station activity encompasses all Amtrak Cascades passengers in Portland, including those from north of the Portland market.

[c] Increased station activity under 2035 conditions reflect riders projected on 2 additional round trip trains between Portland and Seattle scheduled to begin service in 2017.

Source: ODOT, 2016a.

Freight Rail

Under Alternative 1, as under the No Action Alternative, ODOT anticipates freight demand to increase by 40 to 50 percent between 2010 and 2035 (ODOT, 2014b). However, freight operations could improve as compared to the No Action Alternative, because improvements made under Alternative 1 to support increased passenger service would add capacity and reduce passenger/freight conflicts, thus improving freight operations. The track modifications or additions included in Alternative 1, such as mainline track, sidings, crossovers, and industry connections, would increase the efficiency of freight and passenger rail operations and allow for more flexibility for both freight trains and passenger trains. In addition, Alternative 1 envisions the upgrading and constructing of new local-industry track connections that would improve freight operations compared to the No Action Alternative. Specifically, multiple existing industry track connections would be realigned or improved to allow freight to access local industries without blocking or impeding other trains. These improved industry connections would also provide more area to separate and assemble railcars off the mainline. Therefore, Alternative 1 would be expected to result in fewer freight-related delays for passenger rail trains, as well as improved capacity and operations for freight trains.

Alternative 2

Travel Market

Under Alternative 2, four round trips per day would be added to the Amtrak Cascades service, and Thruway bus trips would be reduced. As under Alternative 1, added capacity and reduction in Thruway bus service, along with improved travel times and reliability resulting from Alternative 2 improvements, could result in a shift in travel mode choice towards increased travel by passenger rail.

Under Alternative 2, ODOT projects approximately 1,729 daily Amtrak Cascades passenger rail trips in 2035. As discussed under the No Action Alternative, based on average growth rates from the Oregon Statewide Model, the potential Amtrak Cascades intercity passenger rail market would be expected to increase to 174,000 daily trips in 2035. Therefore, Amtrak Cascades passenger rail trips under Alternative 2 would comprise approximately 1 percent of the potential Amtrak Cascades intercity passenger rail market. This is the same share of the potential Amtrak Cascades intercity passenger rail market as under Alternative 1, and more than triple the market share under the No Action Alternative (0.3 percent).

Transportation System Conditions

Under Alternative 2, total Amtrak Cascade ridership would increase approximately 85 percent to 723,000 passengers by 2035, compared to 390,000 under the No Action Alternative (see **Table 4.2-10**). Both Alternative 1 and Alternative 2 would incrementally replace Thruway bus trips with four additional Amtrak Cascades round trips. As a result, ridership on the Amtrak Cascades passenger rail is projected to increase by 220 percent in comparison to the No Action Alternative, and Thruway bus ridership is projected to decrease by 52 percent. Alternative 2 would have slightly less ridership than Alternative 1, even though travel times would be shorter under Alternative 2. The difference in ridership is likely due to lower population and employment densities around the potential new Springfield station location compared to the existing Eugene Station under Alternative 1.

Table 4.2-10. Amtrak Cascades Ridership – Eugene to Portland – Alternative 2

Eugene to Portland	2015	No Action Alternative (2035)	Percentage Increase (2015/No Action)	Alternative 2 (2035)	Percentage Increase (No Action/Alt. 2)
Passenger Rail	105,000	197,000	88%	631,000	220%
Thruway Bus	89,000	193,000	117%	92,000	-52%
Total	**194,000**	**390,000**	**101%**	**723,000**	**85%**

The passenger rail travel time between Eugene and Portland is expected to decrease to two hours and two minutes (2:02)—a 21 percent decrease compared to the No Action Alternative and a 13 percent decrease from the travel time under Alternative 1. Alternative 2 would add new mainline railroad track throughout the full route between Springfield and Portland, with the new rail line between Springfield and Keizer, and between Wilsonville and Oregon City, as well as a tunnel in southeast (SE) Portland for the exclusive use of passenger rail service. These and other improvements would help reduce congestion with freight traffic and decrease Amtrak Cascades passenger rail travel time between Eugene and Portland by up to 33 minutes compared to the No Action Alternative.

Given the increase in Amtrak Cascades passenger rail ridership under Alternative 2 in comparison to the No Action Alternative, Alternative 2 could include a reduction in the number of vehicles on I-5 between Eugene and Portland. In terms of overall quantity, this shift would not be significant enough to affect or improve congestion on I-5. Similarly, some trips by private bus or air travel could shift to passenger rail under Alternative 2, but any change would probably not be significant.

Alternative 2 would not be expected to significantly reduce congestion on freeways, but it could result in impacts to travel on I-5 and Interstate 205 (I-205). Portions of the Alternative 2 alignment would be adjacent to, or in the median of, I-5 and I-205, and the alignment crosses over the freeways in several places. The potential Tualatin station could be situated in the median of the I-5/I-205 interchange. These improvements could preclude or limit future expansion of I-5 or I-205 and, depending on design, could result in adverse effects to existing interchanges and access.

In addition, Alternative 2 could result in transportation impacts on local roadways. Construction of multiple elevated structures along I-5 and I-205 could require realignment of existing local roadways in the following two locations, although access to existing properties is anticipated to be maintained:

- Near I-5 milepost (MP) 245 (just north of the Jefferson Highway/Oregon Highway 99E interchange with I-5): The topography and existing roadway geometry would necessitate relocating Enchanted Way SE farther away from the freeway mainline to situate the rail line within or as close to the freeway right-of-way (ROW) as possible.
- At Marietta Street SE in Salem, where it intersects Fairview Industrial Drive SE just east of I-5 near MP 252 (just north of the Kuebler Boulevard interchange): In this section, the alignment profile must maintain 23.5-foot clearance above the UPRR mainline to accommodate freight traffic, while adhering to Federal Aviation Administration (FAA) regulations preventing the structure from intruding on the airspace of the Salem Municipal Airport. Where the airspace crosses the alignment, the total height of the train structure cannot be higher than 20 feet off the ground. Because of these constraints and the prevailing topography, Marietta Street would need to be shifted southeast away from I-5 at its western end to accommodate the new track alignment, based on a maximum allowable track grade of 3 to 4 percent.

Alternative 2 would also impact the existing surface street intersection of SW 95th Avenue and Boeckman Road in Wilsonville, because the passenger rail alignment is expected to cross the intersection diagonally at-grade. While the intersection would not need to be relocated, the introduced delay of passenger rail operations could affect existing intersection operations.

Finally, the construction of the new tunnel under SE 2nd Avenue in Portland could necessitate the relocation or closure of some streets for the north portal in the vicinity of SE Oak Street and would likely require changes in traffic patterns. These potential impacts would be evaluated in future Tier 2 analyses.

Transportation System Resiliency

In terms of resiliency, Alternative 2 would improve the state's railroad network and provide a mostly new travel route for passenger trains between Eugene and Portland and, in doing so, would increase the number of north/south rail track options that could be used during emergencies or threats (in addition to the existing alignment). This improvement and increase in options would support the ability of the overall transportation system to mitigate and recover from natural disasters or human-caused disruptions.

Rail Crossings – Delay and Safety Conditions

For Alternative 2, where dedicated passenger rail track is proposed adjacent to I-5 and I-205, new grade-separated passenger train crossings would be built to bridge intersecting bridges and interchanges. The grade-separated passenger train crossings would be located next to intersections and bridges in order to cross where the existing roadway is at-grade.

Alternative 2 would introduce one new at-grade crossing at Boeckman Road and SW 95th Avenue in Wilsonville (250 feet east of the existing PNWR mainline at-grade crossing). There are 46 existing at-grade crossings on the Alternative 2 alignment; 33 of these would not be upgraded, including 27 along the PNWR line between Keizer and Wilsonville. However, Alternative 2 would upgrade or close 15 at-grade passive crossings along the PNWR mainline. In addition, the number of trains passing through the at-grade crossings in the Central Eastside Industrial District in Portland would be reduced, because passenger trains would use the proposed SE 2nd Avenue tunnel. Because Alternative 2 would result in fewer at-grade crossings and would upgrade or close some existing passive crossings, safety conditions at rail crossings would be improved in comparison to the No Action Alternative and Alternative 1.

Alternative 2 would shift passenger rail traffic from the UPRR mainline to a dedicated passenger rail track for much of the alignment; therefore, the frequency of delays resulting from blocked crossings would likely decrease at crossings on the UPRR mainline in comparison to the No Action Alternative and Alternative 1. However, the frequency of delays at the remaining crossings with high traffic volumes (see subsection 4.2.4.3, Rail Crossings – Delay and Safety Conditions) would still increase as a result of increased freight rail traffic and increased traffic on local streets.

Connectivity and Accessibility

Alternative 2 includes service at the existing Portland Union Station, as well as the potential for service at five other stations—the existing Oregon City Station or new stations in Tualatin or Wilsonville, and/or new stations in Springfield, Albany, Salem or Keizer, and/or Woodburn. Like the No Action Alternative, no changes or improvements to multimodal access and connectivity conditions at the Oregon City or Portland Union stations are assumed beyond the funded projects already included in each jurisdiction's TSP. **Table 4.2-11** shows the increase in modeled station activity expected under Alternative 2.

Alternative 2 could result in impacts associated with multimodal access and connectivity conditions at the proposed/potential station locations as well as impacts to surrounding street networks. Trips to and from new stations could impact traffic patterns on surface streets surrounding the new station locations. Rail passengers driving to, or getting dropped off at, the potential new stations would increase traffic levels and turning movements into and out of the stations, which could cause delays on adjacent streets. These potential impacts would be evaluated in future Tier 2 analyses.

Several of the potential station locations lack access and/or multimodal connections. For instance, due to the proximity of the freeway to both the Albany and Tualatin station locations, multimodal access to surrounding neighborhoods and/or transit service could be limited. At the potential new Salem station location, multimodal connections are available in all directions, but access to the station would affect existing traffic circulation patterns, because it would require removal of parking areas at the mall. The potential new Keizer station location would require access through a residential area, so a new station would have an impact on traffic flow in this area. The potential new Woodburn station site is located outside of the city's urban growth boundary and, as such, multimodal connections are limited, and the PNWR mainline and I-5 alignments constrain east–west travel. These potential impacts would be evaluated in future Tier 2 analyses.

In addition, the potential new Wilsonville station would be in the same location as the last stop for TriMet's Westside Express Service (WES) commuter rail, which operates during peak periods in the morning and afternoon every weekday. The passenger rail vehicles and the commuter rail vehicles have different boarding configurations and, as a result, new platforms would need to be constructed at this station. Therefore, passenger rail service would need to be coordinated with TriMet in Wilsonville.

Table 4.2-11. Amtrak Cascades Station Activity –
Existing and 2035 Conditions for No Action Alternative and Alternative 2

Station	Station Activity (Number of riders both on and off)[a]			Percent Growth	
	Existing Conditions (2015)	No Action Alternative (2035)	Alternative 2 (2035)	Existing Conditions to No Action	Existing Conditions to Alternative 2
Springfield[b]	85,800	172,500	350,400	101%	308%
Albany[c]	31,800	54,800	122,500[b]	72%	285%
Salem[d]	65,300	97,100	203,500	49%	285%
Wilsonville[e]	15,100	17,000	39,800	13%	212%
Portland[f]	458,800	961,100[g]	1,125,500	109%	164%
Total[h]	**656,800**	**1,302,500**	**1,841,700**	**98%**	**145%**

[a] Station activity (riders on and off) includes the addition of 4 round trips per day to Amtrak Cascades passenger rail service and thus reflects an additional 8 trains per day at each station.

[b] Existing conditions and No Action Alternative values represent ridership at the existing Eugene Station. The analysis for Alternative 2 station assumes a new station would be located near the Springfield Station (an existing transit center).

[c] All alternative values represent ridership at the existing Albany Station.

[d] Existing conditions and No Action Alternative values represent ridership at the existing Salem Station. The analysis for Alternative 2 assumes a new station would be located along I-5.

[e] Existing conditions and No Action Alternative values represent ridership at the existing Oregon City Station. The analysis for Alternative 2 assumes a new station would be located at the Wilsonville South Metro Area Regional Transit (SMART) Transit Center.

[f] Activity at Portland's Union Station includes all Amtrak Cascades passengers in Portland, including those from north of the Portland market.

[g] Increased station activity under 2035 conditions reflect riders projected on 2 additional round trip trains between Portland and Seattle scheduled to begin service in 2017.

[h] Numbers may not sum due to rounding.

Source: ODOT, 2016a.

Freight Rail

Freight demand is expected to increase by 40 to 50 percent between 2010 and 2035, which could result in increased freight train traffic on the existing rail alignment (ODOT, 2014b). Alternative 2 would result in more opportunities to separate passenger rail trains from potential delays and interruptions associated with freight rail activities than under the No Action Alternative. In areas where Alternative 2 would remove

Amtrak Cascades passenger trains from the current route and allow them to run on a separate, dedicated track (on the UPPR mainline between Springfield and Salem/Keizer and between Wilsonville/Tualatin and Oregon City), train congestion would be reduced and freight capacity could be increased.

However, where the dedicated passenger rail track would reconnect with shared freight track, new points of conflict with freight would be introduced, and dispatch coordination would be required. Therefore, while Alternative 2 would result in greater flexibility in reducing congestion and increasing freight train capacity as a result of increased mainline track, benefits could be offset by increased interface with freight trains along the alignment at other locations.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option has the same alignment and operational characteristics, and thus similar impacts, as those described for Alternative 2. Rather than considering a new station along I-5 in Albany, however, the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station to the east of the Alternative 2 alignment.

The Central Albany Option would not result in a substantial shift in market share or ridership different from that under Alternative 2. Station activity at the Albany Station would be projected to increase approximately 233 percent from the No Action Alternative in 2035 (from 36,000 riders on and off to 120,000). Similar to the No Action Alternative, this increased activity at the Albany Station under the Central Albany Option would likely increase traffic on the surface streets surrounding the station and could adversely affect access by increasing congestion.

The travel time between Eugene and Portland under the Central Albany Option would be expected to be longer than under Alternative 2.

System resiliency under the Alternative 2 with Central Albany Option is expected to be similar to Alternative 2.

The Central Albany Option would increase the number of at-grade crossings by 13, for a total of 59. Increasing the number of at-grade crossings would increase the number and frequency of delays for vehicles, pedestrian and cyclists resulting from blocked crossings.

Under the Alternative 2 with Central Albany Option, congestion on the UPRR mainline would be reduced, and freight capacity could be increased in a similar manner as described under Alternative 2 above. However, the Central Albany Option would require passenger trains to move off the Alternative 2 alignment to a downtown Albany section, where AERC and UPRR would take control of passenger train movement along with freight movement. This would likely result in more freight-related delays for passenger rail trains and operational impacts to freight than under Alternative 2.

4.2.5.2 Construction Impacts

Alternative 1

During construction of Alternative 1, transportation facilities in proximity to existing at-grade crossings would likely experience congestion in some areas due to intermittent stoppages, slower speeds, reduction of useable lanes, and/or temporary closures as a result of construction activities (work zones, detours, etc.).

Trucks and passenger vehicles bringing personnel, materials, and equipment necessary to upgrade the crossings or install new track would arrive throughout the day. Potential impacts are not anticipated to be significant, but they could include reducing roadway capacity and causing longer delay times at the crossings for a short amount of time. Roadway closures or detours for upgrades to at-grade crossing locations could occur. Construction schedules would be coordinated with the local governments to minimize delays.

Delays to trains on the existing track could occur during the construction of Alternative 1. Construction schedules would be coordinated with the host railroad to minimize delays.

Alternative 2

During construction of Alternative 2, congestion on the existing roadways surrounding crossing locations (both elevated and at-grade) would likely increase as a result of intermittent stoppages, slower speeds, reduction of useable lanes, and/or temporary closures due to construction activities (work zones, detours, etc.). Access at locations away from crossings is a possibility and would minimize some of those impacts. Trucks and passenger vehicles bringing personnel, materials, and equipment necessary to upgrade or construct the crossings or install new track would arrive throughout the day.

Potential impacts could include reduced roadway capacity and longer delay times at the at-grade crossings, as well as delays and operational impacts at or around locations where elevated structures are being constructed for a short amount of time. Construction of Alternative 2 would also likely require changes in traffic patterns because of roadway relocations (such as along Enchanted Way SE or at Marietta Street SE/Fairview Industrial Drive SE in south Salem). Existing structures would likely need to be relocated and streets would be closed to construct the north portal (near Oak Street) of the new passenger rail tunnel under SE 2nd Avenue in Portland. Oak Street would close permanently as a result of construction of the north portal. Construction schedules would be coordinated with the local governments to minimize delays.

Where Alternative 2 proposes new track adjacent to existing track, delays to trains on the existing mainline track could occur as new connections, crossovers, and sidings are installed. Construction of these new features would require the existing track to be accessed directly. While construction could occur during off-peak times, freight could be affected, because such trains travel at all times of the day. Construction schedules would be coordinated with the host railroad to minimize delays.

Alternative 2 includes the potential for service at four new stations. Construction at any of the potential station locations could result in increased traffic on surrounding roadways, as well as roadway closures or detours.

Alternative 2 with Central Albany Option

The Central Albany Option would construct additional mainline track connecting to the existing Albany Station to the west of the Alternative 2 alignment. During construction of the Central Albany Option, congestion on the existing roadways surrounding crossing locations would likely increase as a result of intermittent stoppages, slower speeds, reduction of useable lanes, and/or temporary closures as a result of construction activities (work zones, detours, etc.). Trucks and passenger vehicles bringing personnel, materials, and equipment necessary to upgrade or construct the crossings or install new track would arrive throughout the day. Potential construction impacts could include reduced roadway capacity and higher delay times at the at-grade crossings. During construction of new track, delays to trains on the existing mainline track could occur as new connections, crossovers, and sidings are installed.

4.2.6 Potential Mitigation Strategies

Project-specific mitigation strategies for transportation impacts would be considered and implemented as necessary during subsequent Tier 2 environmental studies. If FRA and ODOT determine them to be warranted, future project-level mitigation measures could include, but would not be limited to, the following:

- Additional signal upgrades and infrastructure improvements to decrease passenger and freight conflicts on shared track beyond the improvements incorporated into the Build Alternatives;
- Additional crossing upgrades or closure to improve safety beyond those incorporated into the Build Alternatives; and/or
- Implementation of a traffic management plan during construction activities to route roadway traffic away from construction zones, minimize traffic pattern disruptions, and reduce construction-related delays (all build alternatives).

4.3 Land Use/Farmland

This section discusses land use legal requirements, methods of analysis, the land use study area, affected environment, potential environmental consequences and potential mitigation strategies of the alternatives for the OPR Project.

4.3.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal, state, and local laws, regulations and orders related to land use and applicable to this Tier 1 analysis include the following:

Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14.(n)(15) of FRA's environmental procedures require an EIS to include consideration of potential environmental impacts on existing and future land uses. Specifically, an EIS should assess the impacts of each alternative on local land use controls and comprehensive regional planning, as well as on development within the affected environment, including, where applicable, other proposed Federal actions in the area.
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 United States Code [U.S.C.] 61). The act provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and Federally assisted programs and establishes uniform and equitable land acquisition policies for Federal and Federally assisted programs.
- **Farmland Protection Policy Act of 1981 (7 Code of Federal Regulations (CFR) Part 658).** The Farmland Protection Policy Act (FPPA) is intended to minimize the impact of Federal programs in regards to the unnecessary and irreversible conversion of farmland to nonagricultural uses. The FPPA seeks to ensure that, to the extent possible, Federal programs are administered compatible with state, local, and private programs and policies intended to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a Federal agency. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land (NRCS, 2016).

State

- Oregon Statewide Planning Goals. The Oregon Statewide Planning Goals express the state's policies on land use and related topics such as transportation planning. The 19 Statewide Planning Goals are achieved through local comprehensive plans, which must be consistent with the goals. For the purposes of this Tier 1 analysis, the following Statewide Planning Goals are the most relevant:
  - *Goal 3, Agricultural Lands***.** Statewide Planning Goal 3 (Agriculture) requires all agricultural lands to be inventoried and protected by adopting exclusive farm use (EFU) zones, thereby supporting the farmland protection goals of the FPPA. According to Goal 3, land inside of an Urban Growth Boundary (UGB) is not considered agricultural land. Counties are responsible for planning and zoning of land outside UGBs, and allowable nonfarm uses are included in county zoning regulations. Oregon Administrative Rule 660-012-0065, which implements Goal 12 (Transportation), states that railroad mainlines and branchlines are allowed on rural lands consistent with Goal 3 (Agricultural Lands) without a goal exception. However, accessory uses and structures (such as stations and infrastructure development to implement railroad mainlines and branchlines) may not be consistent with these goals.
  - *Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces*. Goal 5 is intended to protect natural resources. Local governments are responsible for inventorying Goal 5 resources, including

mineral and aggregate resources, and identifying conflicts with inventoried resource sites. This identification is done primarily by examining the uses allowed in broad zoning districts established by the jurisdiction and identifying conflicting uses (ones that, if allowed, could negatively affect Goal 5 resource sites). These potential impacts must be evaluated through an analysis of the economic, social, environmental, and energy consequences of allowing, limiting, or prohibiting conflicting uses.

– Goal 15, Willamette River Greenway. Goal 15 aims to protect, conserve, enhance, and maintain the quality of land along the Willamette River. Consistent with Goal 15, each local jurisdiction with land use authority in areas adjacent to the Willamette River has adopted regulations to limit and review development within the Greenway Overlay. This goal is applicable to land use permitting in jurisdictions where improvements to existing bridges or new bridge crossings of the Willamette River would be necessary.

- **Oregon Revised Statute (ORS) 215.243, Agricultural Land Use Policy.** ORS 215.243 establishes the state's agricultural land use policy affirming the preservation of the maximum amount of limited agricultural land, the restriction of urban development on rural land, the use of EFU zones to limit alternatives to the use of rural land, and the creation of incentives and privileges for owners of land in EFU zones.

Local

- **Local Comprehensive Plans and Zoning Ordinances.** Oregon Statewide Planning Goals are reflected in local comprehensive plans. Local zoning ordinances implement local comprehensive plans and, by extension, the Oregon Statewide Planning Goals. The OPR Project *Land Use Technical Memorandum* (ODOT, 2015b) includes a description of local plans and ordinances that apply to the study area and OPR Project alternatives.

4.3.2 Methods

To characterize existing and planned land uses and evaluate potential impacts along the 130-mile study area, geographic information system (GIS) mapping, including relevant land use plans and public zoning data, were obtained from the Oregon Department of Land Conservation and Development (DLCD) as well as relevant Metropolitan Planning Organizations (MPOs), counties, and cities. Aerial photography from Google Earth™ assisted in identifying and mapping existing land uses. Land uses in the vicinity of potential stations were summarized from the *Oregon Passenger Rail Station Area Assessments* (ODOT, 2014e). Field surveys of existing land uses were not conducted as part of this Tier 1 EIS.

For this analysis, broad land use categories are generally used to describe the study area, so that comparisons can be made across jurisdictions and between alternatives. For example, under Oregon law, every urban area and most cities have created an Urban Growth Boundary, or UGB, which is a line that demarcates where rural and urban uses are expected. Subsection 4.3.4, Affected Environment, characterizes the study area by the amount of land inside and outside of UGBs to indicate the general type and intensity of land uses present. However, specific land uses are identified and discussed where conversion and/or compatibility impacts related to alternative improvements would be more likely because of the existing built environment. Because the OPR Project planning horizon is 2035, the analysis includes land use designations to assess potential impacts at the time of buildout.

As discussed above, Oregon Statewide Planning Goal 3 supports the farmland protection goals of the FPPA. This analysis uses the framework of the Oregon Statewide Planning Goals, rather than the FPPA, to evaluate potential impacts on farmland. Therefore, the EFU designation is used in the impact analysis to identify potential impacts to farmland rather than using the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) farmland classifications (prime farmland, unique farmland, and land of statewide or local importance).

Tier 2 Analysis

Future Tier 2 environmental studies for individual projects proposed subsequent to the OPR Project would consider a parcel-by-parcel analysis of land use, including specific effects on land use, property acquisition impacts, and consistency with local land use controls and comprehensive regional planning. For agricultural lands, this would include the quantification of types of farmland potentially impacted by the proposed action or actions. In addition, Tier 2 environmental studies would include qualitative analyses of potential indirect land use impacts, including agricultural lands impacts, that could result from development or redevelopment around new and existing stations.

4.3.3 Study Area

The study area for land use follows two build alternative routes between the Eugene/Springfield area and Portland, OR, and includes land surrounding both existing and potential new station locations. The analysis of impacts on existing and planned land uses focuses on the consequences of changes within 100 feet from the centerline of the track alignment and a 20-acre area surrounding potential new station locations. For existing stations, the assumption is that land use impacts would be limited to the property footprint of each station. Where no additional track is proposed along the rail alignment, the only impacts anticipated would be attributable to increased passenger rail trips.

4.3.4 Affected Environment

The land use study area follows two alternative passenger rail routes between the Eugene/Springfield area and Portland, OR, and land surrounding both existing and potential new station locations. Both build alternatives pass through several counties and cities (see **Table 4.3-1**), as well as within and outside of the UGBs of those jurisdictions. Appendix D, Figure D-1 shows general land uses in the study area. Generally, land outside of UGBs tends to be agricultural, forested, or mineral resource-related, while land inside of UGBs tends to be developed with urban uses. As such, the intensity of existing and planned land uses within the study area vary from agricultural and rural to highly developed urban areas (see **Table 4.3-2**).

For No Action Alternative and Alternative 1, the study area brackets the existing UPRR rail line beginning in Eugene in the south and ending in north Portland, passing through 5 counties and 19 cities (see **Table 4.3-1**). The study area for Alternative 1 also includes existing rail stations in the cities of Eugene, Albany, Salem, Oregon City, and Portland, and a 20-acre area surrounding a potential new station in Woodburn. Approximately 41 percent of this study area contains agricultural/forest/rural land, and 59 percent contains urban/other land. The majority of urban land within the study area for the No Action Alternative and Alternative 1 is designated for industrial uses.

For Alternative 2, the study area starts in southwest Springfield and ends in Portland, passing through 6 counties and 12 cities (see **Table 4.3-1**). The study area for Alternative 2 also includes a 20-acre area surrounding six potential new station locations in the cities of Springfield, Albany, Salem, Keizer, Wilsonville, and Tualatin.[15] Approximately 50 percent of this study area contains agricultural/forest/rural land, and 50 percent contains urban/other land (see **Table 4.3-2**). Where the Central Albany Option alignment departs from I-5, 49 percent of the study area contains agricultural/rural land, and 51 percent contains urban land. Similar to Alternative 1, urban land use within the study area for Alternative 2 and Alternative 2 with Central Albany Option is primarily industrial.

[15] Alternative 2 assumes the need for three or four new passenger rail stations south of Portland. The exact location of each new station has not been determined; the EIS considers six potential Alternative 2 station locations for the three to four new stations.

Table 4.3-1. Summary of Jurisdictions in the Land Use Study Area

No Action Alternative and Alternative 1	Alternative 2 (including Central Albany Option)
Clackamas County	**Clackamas County**
Barlow Canby Gladstone Milwaukie Oregon City	Gladstone Milwaukie Oregon City West Linn Wilsonville
Lane County	**Lane County**
Eugene Junction City	Coburg Springfield
Linn County	**Linn County**
Albany Halsey Harrisburg Jefferson Millersburg Tangent	Albany
Marion County	**Marion County**
Aurora Gervais Hubbard Salem Woodburn	Donald Keizer Salem
Multnomah County	**Multnomah County**
Portland	Portland
–	**Washington County**
–	Tualatin

Source: ODOT, 2015a.

Table 4.3-2. Summary of Designated Land Uses within the Study Area (by acreage)

Land Use Designation	No Action Alternative (in acres)	Alternative 1 (in acres)	Alternative 2 (in acres)	Alternative 2 (Central Albany Option) (in acres)
Agricultural	1,339	1,339	1,583	1,574
Industrial	804	817	512	575
Commercial	159	159	120	96
Unzoned/ROW[a]	408	408	496	493
Public	117	124	70	70
Residential	317	317	277	303
Mixed Use	114	114	103	104
Retail	12	12	10	17
Other	1	1	0	0
Forest	0	0	5	5
Total[b]	**3,271**	**3,291**	**3,176**	**3,237**

Source: ODOT, 2015a.

[a] Jurisdictions vary in their categorization of ROW. In this analysis, any area lacking zoning data was designated "Unzoned/ROW."

[b] Numbers may not add up to totals due to rounding.

4.3.5 Environmental Consequences

This subsection compares the potential direct, indirect, and construction-related impacts on land use, including agricultural lands, for the No Action Alternative and the build alternatives.

4.3.5.1 Direct and Indirect Impacts

Potential OPR Project impacts to land use include acquisition of ROW, land use conversion to a transportation use, and/or displacement of existing buildings and other structures, because they would either be within or too close to the study area for proposed improvements and would need to be removed or relocated.

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. The No Action Alternative would continue to serve existing stations in Eugene, Albany, Salem, Oregon City, and Portland, and would not include changes to current track configurations or operations.[16] Therefore, no direct land use impacts are anticipated under the No Action Alternative.

Alternative 1

Rail Alignment Impacts

Alternative 1 would involve the continued use of existing track, as well as the modification and addition of track in selected areas. While there is typically some buffer distance from the existing UPRR mainline to structures on either side of the ROW, there are areas along the Alternative 1 alignment where nearby buildings or structures are in close vicinity (within 50 feet) of the existing rail line. These land uses, which are primarily industrial, could be affected in locations where new or modified track is proposed, because the acquisition of additional ROW could be required, and the proposed improvements could displace existing buildings and other structures.

Specifically, proposed new/improved track in Eugene (in the vicinity of Oregon Highway 126), in Brooks (north of Salem) and in Millersburg (north of Albany) could affect existing industrial uses adjacent to the rail alignment. Near the I-5/Murder Creek interchange in south Millersburg, large industrial structures line both sides of the railroad track, and current roadways limit options for accommodating changes to the rail line. Some of these structures are likely associated with freight movement and, if displaced, could require relocation to have a similar relationship to the rail alignment. Where the use of potentially affected structures is not dependent on being close to the rail line, relocation could be complicated by the lack of vacant industrial land in the area south of the I-5/Murder Creek interchange and west of I-5.

There are structures near to the track in the City of Turner (where industrial structures in the vicinity of Mill Creek are located within 50 feet of the track), the City of Salem (12th Street), and the City of Jefferson (where industrial uses and a residential subdivision are within 100 feet of the track). However, the Alternative 1 alignment would use existing track in these areas, meaning that no changes to current track configurations would occur. Therefore, the potential for direct impacts in these areas is low.

In the City of Milwaukie and the unincorporated community of Clackamas, there are areas where new track has the potential to affect adjacent industrial and commercial uses. In Portland's Central Eastside Industrial District, between Hawthorne Boulevard and SE Washington Street, industrial buildings are located within 50 feet of the track on both sides. While some area is available east of the existing track to potentially accommodate improvements or relocate impacted uses, there is no vacant industrial land and little underutilized land (such as parking lots) in the area. Therefore, industrial displacement could necessitate

[16] As noted in Chapter 3, ODOT and UPRR will be closing two existing at-grade crossings and upgrading the warning systems at three at-grade crossings as part of an ongoing safety improvement program that is independent of the OPR Project.

relocating businesses outside of this area, and potentially result in adverse impacts to the industrial use of these properties.

The proposed Alternative 1 rail alignment would include new or modified track in EFU zones. Agricultural uses on EFU lands that lie in the immediate vicinity of the rail line include field crops, as well as specialized structures and equipment associated with nursery, forest product, and dairy operations. Impacts related to disrupting or moving these businesses are potentially greater than those associated with agricultural uses that do not include structures. However, no direct impacts on agricultural uses have been identified, because it appears that adequate space exists to accommodate potential improvements, and to avoid the structures and facilities associated with agricultural production. Furthermore, because Alternative 1 would parallel the existing rail alignment, fragmentation of agricultural land and remnant parcels would be unlikely to occur.

Station Area Impacts

No impacts to existing station areas are anticipated, and no new stations are proposed under Alternative 1.

While not included under Alternative 1, the potential site for a Woodburn station is vacant and zoned Light Industrial (IL), which is intended for industrial and land-intensive activities, including transit and ground transportation facilities (City of Woodburn, 2015). The surrounding 20-acre study area includes compatibly zoned land, including other land zoned IL and land zoned Public/Semi-Public (P/SP), which is meant for public uses, parks, schools, and cemeteries.

Depending on the exact location and/or site design of the station, infrastructure modifications necessary to provide access to the new station could result in impacts to the OR 214/N. Front Street interchange.

Alternative 2

Rail Alignment Impacts

Alternative 2 would include the addition of new single track throughout the full alignment, with additional siding tracks placed every 10 to 12 miles to facilitate passing operations. Therefore, ODOT and FRA anticipate that Alternative 2 would result in a greater degree of direct impacts than Alternative 1 in relation to the acquisition of ROW as well as the associated land use conversion to a transportation use and/or displacement of existing buildings and other structures.

Areas along the Alternative 2 alignment where buildings or structures are close to the proposed new and existing rail lines and thus could be impacted by proposed new track include the following:

- **Salem.** The Oregon Department of Corrections Central Distribution Center on State Street is large and would be difficult to relocate within the area due to a lack of large, vacant industrial sites.
- **Salem.** Residential land adjacent to I-5 is largely developed. However, there is vacant land near the proposed alignment that could be suitable for residential relocation if Alternative 2 were to affect existing residences.
- **Town of Donald.** A few industrial structures and improvements are within 50 feet of the track; however, an area to the east would potentially be sufficient to accommodate upgrades and additional mainline track and sidings.
- **North of SW Boeckman Road (near Wilsonville).** Alternative 2 would affect existing structures north of SW Boeckman Road as the alignment rejoins the I-5 median, including a car dealership and office building. There is vacant land west of I-5 that could potentially accommodate relocation of affected businesses.
- **Portland's Central Eastside Industrial District.** Alternative 2 primarily follows the same alignment as Alternative 1 north of the Willamette River crossing near Oregon City. The notable difference in impacts on Portland's Central Eastside Industrial District is that the Alternative 2 alignment would include a cut-

and-cover tunnel between SE Market Street and SE Stark Street. This would result in the removal of more industrial structures and greater impacts associated with industrial displacement than Alternative 1.

The Alternative 2 rail line alignment would also involve new or modified track in EFU zones, including areas where the proposed alignment would likely affect existing farm structures (e.g., at the Diamond Hill Drive/ I-5 interchange near Harrisburg). To preserve the functionality of existing I-5 interchanges and road overcrossings, the Alternative 2 alignment would swing farther to the east in these locations, shifting away from the existing I-5 ROW. As a result, it is possible that Alternative 2 would impact productivity by converting agricultural lands and by bisecting productive farmland into smaller units that could be divided by new track. For this reason, ODOT and FRA anticipate that direct impacts to EFU zones/agricultural lands would be greater under Alternative 2 than under Alternative 1. These exact impacts (e.g., acreage and number of parcels) would be evaluated in future Tier 2 analyses.

In addition to direct impacts associated with land use conversion and displacement, Alternative 2 would require local planning actions to be consistent with Oregon Statewide Planning Goals. The land use analysis identified two significant aggregate resource sites along the Alternative 2 alignment—one in Lane County north of the McKenzie River and one in Marion County north of the I-5 and OR Highway 164 interchange. The proposed new alignment could affect mining operations at one or both of these sites. If it is determined that proposed Alternative 2 related improvements would be likely to affect these resource sites, amendments to local Goal 5 inventories could be required, and the impacts would need to be evaluated (see Goal 5 under subsection 4.3.1, Legal Requirements). If a railroad line is determined to be a conflicting use within the Goal 5-protected aggregate site, a local comprehensive plan amendment could be needed to revise the analysis of the economic, social, environmental, and energy consequences of allowing the use or to determine a balance between protection of the significant resource (aggregate) with a new potential conflicting use (rail).

Alternative 2 would result in new crossings of the Willamette River – two in Springfield and one between West Linn and Oregon City. An exception to Goal 15 (Willamette River Greenway) would be required where new crossings of the Willamette River occur. A new bridge crossing is not considered a “river-dependent use” under Goal 15 and an exception to Goal 15 would be required to accommodate new bridges and other rail-supportive improvements within the adopted greenway boundary. The potential crossings along the Alternative 2 alignment would likely require an exception through a local plan amendment process. (Because Alternative 1 relies on existing bridges to cross the Willamette River, it would likely not need an exception to Goal 15.)

Station Area Impacts

Alternative 2 would involve the construction of three or four new stations; the study area includes six potential locations for the new stations.[17] The potential direct land use impacts related to siting new stations consist of conversion of existing uses to a transportation-related use, displacement of existing uses, and impacts to agricultural lands. These potential impacts would be minimized where potential new stations would be located on vacant or underdeveloped land in urban areas.

- **Springfield Station Location.** The *Downtown District Urban Design Plan and Implementation Strategy* (City of Springfield, 2010) identifies this site for a station. The surrounding land is mainly zoned for Mixed Use Commercial, Industrial, and Public uses, and a fair amount of underdeveloped or vacant land exists within the study area. Therefore, direct impacts are anticipated to be minimal.
- **Albany Station Location.** The potential Albany station would be on the east side of I-5, near industrial land uses. Because the potential station would be located adjacent to and east of the interstate, no direct impacts to residential uses west of I-5 are anticipated.

[17] See Chapter 3 for details. Proposed new stations include: (1) Springfield; (2) Albany; (3) Salem or Keizer; (4) Wilsonville or Tualatin.

- **Salem Station Location.** There is a high likelihood for direct impacts on land use related to a new Salem station because the land within the study area is developed with high-intensity uses such as the regional shopping center (Lancaster Mall). Even so, some of the land is surface parking lots, which provides opportunities for redevelopment and the placement of a new station without direct impacts on existing structures. Impacts on NE Center Street and NE D Street would also be a consideration, because these streets would connect the potential new Salem station with popular destinations in the downtown Salem area.
- **Keizer Station Location.** The potential Keizer station location is adjacent to a regional shopping center (Keizer Station), which is home to corporate stores such as Lowes and REI. An established residential neighborhood lies to the west. Although there is vacant land in the study area, the minimum distance between buildings is approximately 140 feet. If the station were to be located to the east of the track, large parking lots within the shopping center could be affected by an influx of passenger rail users.
- **Woodburn Station Location**. While not included under Alternative 2, anticipated direct land use impacts associated with a potential new station in Woodburn (a different location than the potential Woodburn station considered under Alternative 1) consist of conversion of land designated EFU to a transportation-related use. Development of a new station would require a formal Goal Exception for Oregon Statewide Planning Goal 3 (Agriculture) pursuant to ORS 197.732.
- **Wilsonville Station Location**. Locating a new Wilsonville station for Alternative 2 could affect developed industrial and commercial properties. However, most of the land use within the study area is currently dedicated to public transportation and commuter options accommodating TriMet's WES and Wilsonville's South Metro Area Regional Transit. A large portion of the study area is surface parking, which provides redevelopment opportunities and a potential location for a new station without affecting existing buildings.
- **Tualatin Station Location.** The potential Tualatin station would be sited in the I-5/I-205 interchange median, but parking areas would likely need to be located southeast of the interchange on EFU land with existing agricultural uses. If parking for the station were to be sited on EFU land, an exception to Oregon Statewide Planning Goal 3 (Agriculture) or an expansion of the Metro UGB would be required to allow the use. This land was designated Urban Reserve by Metro in 2014, indicating that it is suitable for eventual urban development. Urban Reserves are the first priority areas for inclusion in the UGB in the future. However, inclusion of an Urban Reserve area into the UGB must be supported by a regional land needs analysis prepared by Metro and decided on by the elected Metro Council through a public adoption process.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option has the same alignment and operational characteristics, and thus similar land use impacts, as those described for Alternative 2. Rather than considering a new station along I-5 in Albany, however, the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station to the east of the Alternative 2 alignment.

Where the Central Albany Option alignment diverges from I-5, land uses are predominantly industrial along the potential alignment west of Marion Street and south of OR 99, although the alignment does traverse developed, single-family residential land in south Albany. In addition, there are some parcels being farmed directly to the south of the existing track. Therefore, the Central Albany Option could result in impacts to residential and agricultural uses in Albany. If residential displacements were to occur, vacant areas to the south of the proposed centerline are zoned for residential uses and could potentially accommodate residential relocation. North of the existing Albany Station, the Central Albany Option alignment follows the alignment of Alternative 1 along existing UPRR track through industrial and residential areas north and west of OR 99E. Within the City of Millersburg, the Central Albany Option is located to the east of nearby commercial and industrial uses. There could be potential direct impacts on industrial and residential structures adjacent to the rail ROW in this area if additional ROW needed to be acquired east of the existing alignment.

4.3.5.2 Construction Impacts

Alternative 1

Construction of Alternative 1 would result in short-term effects on adjacent land uses and areas used for agriculture with temporary increases in noise, vibration, dust and traffic, and parking and access changes associated with construction equipment and staging areas. Areas that would be more likely to experience impacts from construction coincide with identified places within the study area where existing structures lie to either side of the existing railroad line where new track is proposed. These include specific areas where buildings are situated very close (within 50 feet) to the railroad line in Brooks, Eugene, Millersburg, Jefferson, Turner, Salem, unincorporated Clackamas, Milwaukie, and Portland.

Alternative 2

Alternative 2 construction activities would be more intensive than those of Alternative 1 because of the amount of new track needed where none currently exists. Negative impacts on existing adjacent land uses and areas used for agriculture from the construction of Alternative 2 could include temporary increases in noise, vibration, dust and traffic, and parking and access changes associated with construction equipment and staging. Negative impacts along much of the alignment would be well buffered from other existing uses, because much of the construction would be within, or would abut, the I-5 and I-205 ROWs, and would not be adjacent to residences and businesses. Areas that would be more likely to experience impacts from construction coincide with identified places within the study area where existing structures lie to either side of the proposed new and existing railroad lines. These include specific areas where buildings are situated very close (within 50 feet) to the railroad line in Salem, Donald, north of SW Boeckman Road, and Portland's Central Eastside Industrial District.

Four of the potential new station locations (Springfield, Albany, Salem, and Keizer) under Alternative 2 would be constructed near existing homes or businesses. The likelihood of short-term construction impacts is greater in urban areas where the surrounding built environment precludes providing adequate space for equipment or where there would not be an adequate buffer between existing uses and the construction area. Such locations include Albany, Keizer, Salem, and, possibly, Wilsonville. In addition, the potential Tualatin station would be within the median of the I-5/I-205 interchange, so intermittent traffic impacts would be likely during construction.

Alternative 2 with Central Albany Option

Negative impacts on existing land uses from the construction of Alternative 2 with Central Albany Option could include noise, dust, increased traffic, and parking and access issues associated with construction equipment and staging. Areas that would be more likely to experience impacts from construction would include residential areas south of the existing Albany station and residential areas north and west of OR 99E.

4.3.6 Potential Mitigation

Generally speaking, the types of potential mitigation strategies are similar for both build alternatives. However, the number of areas of impact, and thus the level of effort to seek out appropriate measures to mitigate specific impacts on specific land uses, are much different. One consideration ODOT used when designing improvements for Alternative 1 was to minimize impacts to urban areas by adding new track outside cities wherever possible. Therefore, Alternative 1 would have relatively fewer direct and indirect land use impacts, and thus require less mitigation, than Alternative 2.

Project-specific mitigation strategies for land use impacts would be considered and implemented as necessary during subsequent Tier 2 environmental studies. Future project-level mitigation measures could include, but would not be limited to, the following:

- Ensuring that needed modifications that could extend beyond the existing ROW (such as new sidings) are not proposed to be located in areas where buildings are located very close to the existing roadway or railroad line (which would be more difficult to achieve with Alternative 2, for which greater amounts of ROW acquisition would be required);
- Designing and siting modifications to avoid structures where possible and using the less constrained side of the ROW;
- Generally complying with the Uniform Act requirements; and
- Creating new crossings and alternative routes for farm uses.

Additional mitigation strategies could be facilitated through the Statewide Planning Program and require land use coordination with local jurisdictions along the proposed alignment. Only Alternative 2 would require additional local land use actions.

4.4 Environmental Justice

This section discusses environmental justice legal requirements, methods of analysis, the study area, affected environment, potential environmental consequences, and potential mitigation strategies of OPR Project alternatives.

4.4.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws, regulations, and orders related to environmental justice and applicable to this Tier 1 analysis include the following:

Federal

- Executive Order (EO) 12898*, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* This EO requires that Federal agencies evaluate the impacts of their actions, programs, or policies on low-income and minority populations to determine if such populations bear an undue burden of the high and adverse human health or environmental impacts.
- U.S. Department of Transportation (USDOT) Order 5610.2(a), *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This order requires agencies to consider human health and environmental effects related to transportation projects that may have a disproportionately high and adverse effect on minority or low-income populations. The order also requires agencies to implement procedures to provide "meaningful opportunities for public involvement" by members of those populations during project planning and development (Section 5[b][1]).
- **Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency*.** This EO requires that Federal agencies improve access to their programs and activities by eligible persons with limited English proficiency (LEP). This order has particular relevance to the NEPA mandate to foster public involvement in the environmental review process. It stipulates that Federal agencies must make accommodations for persons with LEP who wish to participate in public environmental reviews.
- **Title VI of the Civil Rights Act.** Title VI prohibits discrimination based on race, color, national origin, age, sex, or disability in programs and activities receiving Federal financial assistance.
- **FRA's Procedures for Considering Environmental Impacts.** Section 14.(n)(20) of FRA's environmental procedures require an EIS to include consideration of environmental justice impacts.

4.4.2 Methods

The assessment of potential environmental justice impacts was reliant on Geographic Information Systems (GIS) mapping and U.S. Census Bureau (U.S. Census) data for multiple levels (state, county, tract, and block group[18]) to determine whether minority or low-income populations are present within the study areas. The following categories of data are compiled and assessed for the environmental justice study area (which includes rail stations and rail alignments):

- Total population;
- Average median household income;
- Low-income population (percentage of individuals living below the poverty threshold in the last 12 months);
- Low-income population under 18 years (percentage of children that lived in poverty in the last 12 months);
- Minority population (percentage of the total population that identifies as African American, American, Indian/Native Alaskan, Hispanic, Asian American, and Native Hawaiian/Pacific Islander); and
- LEP (percentage of the people who are not fluent English speakers/do not speak English at home).

This analysis uses the term "Environmental Justice (EJ) populations" to refer collectively to minority and low-income populations. In addition, the analysis examines LEP populations in this context as a way to provide richer data for the individuals who may be associated with EJ populations.

The CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* (1997), states that a minority population should be identified where: (1) the minority population of the affected area exceeds 50 percent; or (2) if the minority population percentage of the affected area is "meaningfully greater" than the minority population percentage in the general population or other "appropriate unit of geographic analysis" (CEQ, 1997). For this analysis, the tract and block group demographic data for minority populations adjacent to rail stations and rail alignments are compared to the state- and county-level data.

The analysis categorizes high, medium, and low threshold concentrations of EJ populations as follows:

- High concentration, if more than 50 percent of the tract/block group population is higher than that of the county (where it is located);
- Medium concentration, if more than 25 percent of the tract/block group population is higher than that of the county (where it is located); and
- Low concentration, if more than 10 percent of the tract/block group population is higher than that of the county (where it is located).

The methods used are somewhat limited because distribution of populations is not uniform within U.S. Census tracts or block groups (or even counties and cities). In addition, this Tier 1 level of analysis does not identify the precise locations of rail alignments and/or specific locations of potential new stations, and the analyses for other disciplines/resources do not discuss project-specific effects (adverse or beneficial). Therefore, this evaluation does not provide conclusions on whether the build alternatives would result in disproportionately high and adverse impacts on EJ populations. Instead, concentrations of low-income and minority populations in the EJ study area are identified and, based on the analysis contained in this EIS, potential effects are discussed in broad terms. As discussed below, subsequent Tier 2 environmental

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[18] Census **tracts** are small, relatively permanent statistical subdivisions of a county or equivalent entity that generally cover a contiguous area, follow visible and identifiable features, and have a population size between 1,200 and 8,000 people. **Block groups** are statistical divisions of census tracts that generally cover a contiguous area, contain between 600 and 3,000 people, and are used to present data and control block numbering (U.S. Census Bureau, 2016).

studies would provide detailed analyses comparing specific adverse and beneficial effects of individual projects within the selected alternative.

Tier 2 Analysis

Future Tier 2 EJ analyses for individual projects proposed subsequent to the OPR Project would include the use of location- and project-specific GIS mapping, U.S. Census and other demographic data, and targeted public outreach. Future projects would use this information to identify the presence of EJ populations near the proposed action(s), as well as populations dependent upon potentially affected resources. Future Tier 2 environmental analyses would also determine the degree to which individual project effects would be adverse and/or beneficial for EJ populations in comparison to other populations.

4.4.3 Study Area

The EJ study area consists of the following:

- **Rail stations**. The EJ study area includes the area within a 1-mile-radius around existing and potential rail stations.
- **Rail alignments**. The EJ study area extends continuously from the Eugene/Springfield area to Portland and consists of the area within 100 feet of either side of the proposed alignment that consists of the rail centerline of the existing track where no improvements are proposed, and new track where it is proposed to be added. However, where the discussion of impacts on minority and low-income communities relates to air quality, vibration, and noise, the analysis assumes a study area of 500 feet on either side of the rail centerline consistent with the study areas for those disciplines/resources.

4.4.4 Affected Environment

Table 4.4-1 summarizes key demographic data for the State of Oregon and for counties in which the build alternative alignments and rail stations would be located. As discussed in subsection 4.4.2, Methods, state and county data is a reference used for comparison purposes.

Table 4.4-1. Summary of EJ and LEP Demographic Data for Study Area Counties

Location (State, County)	Total Population	Individuals Below Poverty Threshold (Low-income)	Median Household Income	Children in Poverty	Minority	LEP
State of Oregon	3,868,721	16%	$50,229	5%	22%	6%
Lane	346,021	**18%**	***$42,931***	5%	16%	3%
Linn	116,910	16%	***$46,939***	**8%**	13%	3%
Marion	308,783	16%	***$46,885***	**7%**	**32%**	**11%**
Clackamas	377,962	9%	$64,352	3%	16%	5%
Multnomah	732,970	**17%**	$52,511	5%	**28%**	**9%**
Washington	533,789	8%	$64,180	3%	**31%**	**10%**

Note: Items in **red bold** are higher than the relevant state percentage and indicate higher concentrations of low-income individuals, children, minorities, or LEP populations. Items in ***bold italic*** indicate lower median household income than the state median household income.

Source: ODOT, 2016b.

Table 4.4-2 contains key demographic data that conveys EJ population characteristics adjacent to the rail alignments for each alternative. Compared to the relevant state data, the build alternatives have higher concentrations of minority populations. Alternative 1 has a higher concentration of LEP populations adjacent to the proposed alignment than the state, and the median household income is lower than the state median household income.

Alternative 2 has higher concentrations of minority populations adjacent to the proposed alignment than the state. However, where the Central Albany Option alignment diverges from the Alternative 2 alignment (referred to as "Option Only" in the **Table 4.4-2** and herein), higher concentrations of minority populations are not present. The Option Only portion of the Central Albany Option also has a median household income that is lower than the state median household income, while the overall study area for the Alternative 2 alignment does not.

Table 4.4-2. Summary of Key EJ and LEP Demographic Data for Proposed Rail Alignments (Within 100 Feet)

	Block Group				Tract					
Alternative	**Total Population**	**Low-income House-holds[1]**	**Median House-hold Income**	**Minority**	**Total Population**	**Low-Income House-holds[1]**	**Median House-hold Income**	**Children in Poverty**	**Minority**	**LEP**
Alternative 1	194,654	6% (4,800)	***$43,914***	**20% (38,975)**	342,295	3% (9,230)	***$43,576***	5% (16,897)	20% (67,636)	**9% (29,482)**
Alternative 2	181,078	6% (4,288)	$51,912	**19% (33,525)**	339,005	3% (8,590)	$50,426	4% (14,706)	**18% (61,276)**	6% (19,049)
Alternative 2 with Central Albany Option – Option Only	34,559	9% (1,254)	***$39,977***	11% (3,822)	77,314	8% (2,502)	***$42,031***	5% (4,015)	15% (11,514)	3% (2,400)
Alternative 2 with Central Albany Option - TOTAL	183,977	6% (4,586)	$51,120	**19% (34,263)**	360,790	1% (4,768)	***$42,031***	2% (7,813)	6% (22,484)	6% (20,020)

Note: Items in **red bold** are higher than the relevant state percentage and indicate higher concentrations of low-income individuals, children, minorities, or LEP populations. Items in ***bold italic*** indicate lower median household income than the state median household income.

[1] Individuals below poverty threshold.

Source: ODOT, 2016b.

Table 4.4-3 contains key demographic data that conveys EJ and LEP population characteristics adjacent to existing and potential stations.

Table 4.4-3. Summary of Key EJ and LEP Demographic Data for Rail Stations (Within 1-Mile Radius)

	Block Group				Tract					
Station Location	**Total Population**	**Low-Income House-holds[1]**	**Median Household Income**	**Minority**	**Total Population**	**Low-Income House-holds[1]**	**Median House-hold Income**	**Children in Poverty (under 18 years)**	**Minority**	**LEP**
Eugene (existing)	36,134	4% (696)	***$25,129***	**20% (7,305)**	41,083	5% (844)	***$26,644***	3% (1,029)	**20% (8,346)**	4% (1,588)
Springfield (potential)	20,145	10% (875)	***$31,979***	**18% (3,545)**	30,658	9%	***$35,398***	4% (1,349)	**17% (5,078)**	3% (883)
Albany (potential)	24,951	7% (547)	***$38,354***	14% (2,757)	28,421	7% (742)	***$34,577***	5% (1,504)	14% (3,943)	5% (1,222)
Albany (existing)	36,573	8% (1,013)	***$38,191***	**16% (4,892)**	49,073	7% (1,345)	***$38,853***	5% (2,440)	14% (6,853)	4% (1,857)

	Block Group				Tract					
Station Location	Total Population	Low-Income Households[1]	Median Household Income	Minority	Total Population	Low-Income Households[1]	Median Household Income	Children in Poverty (under 18 years)	Minority	LEP
Keizer (potential)	24,595	6% (557)	$53,664	**19% (4,765)**	40,260	9% (1,332)	$52,010	**7% (2,886)**	**21% (8,277)**	**8% (2,972)**
Salem (existing)	31,023	7% (708)	***$33,674***	**18% (4,532)**	34,357	8% (1,076)	***$31,682***	**6% (2,010)**	**18% (6,069)**	**9% (2,839)**
Salem (potential)	48,819	11% (1,595)	***$36,600***	**27% (11,796)**	56,254	10% (2,060)	***$37,096***	**8% (4,306)**	**26% (14,735)**	**17% (8,656)**
Woodburn 1 (potential)	20,552	10% (630)	***$38,961***	**40% (8,286)**	31,782	9% (924)	***$43,844***	**7% (2,149)**	**38% (12,177)**	**33% (9,445)**
Woodburn 2 (potential)	8,600	7% (234)	***$44,051***	**29% (2,467)**	18,192	7% (453)	***$43,844***	**6% (1,105)**	**33% (6,021)**	**28% (4,671)**
Wilsonville (potential)	14,112	6% (318)	$50,114	**21% (2,922)**	16,536	5% (344)	$58,243	3% (576)	**19% (3,192)**	**9% (1,317)**
Tualatin (potential)	25,660	5% (565)	$68,646	15% (4,124)	28,842	5% (486)	$81,630	3% (981)	14% (4,151)	**7% (1,996)**
Oregon City (existing)	27,338	6% (620)	***$45,489***	13% (3,554)	44,268	6% (1,001)	$56,695	4% (1,752)	12% (5,309)	3% (1,139)
Portland (existing)	37,326	2% (512)	***$32,609***	**25% (9,338)**	51,476	2% (714)	***$33,159***	1% (551)	**24% (12,469)**	4% (2,053)

Note: Items in **red bold** are higher than the relevant state percentage and indicate higher concentrations of low-income individuals, children, minorities, or LEP populations. Items in ***bold italic*** indicate lower median household income than the relevant county median.

[1] Individuals below poverty threshold.

Source: ODOT, 2016b.

Appendix D, Figure D-3 shows the areas at the census tract level for high concentrations of minority, and low-income populations within the study area.

4.4.5 Environmental Consequences

This subsection discusses the potential for adverse and/or beneficial effects for EJ populations, and identifies where EJ populations are most likely to experience those potential effects.

4.4.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. Under the No Action Alternative, Amtrak Cascades passenger rail service would continue serving existing stations in Eugene, Albany, Salem, Oregon City, and Portland, and changes to current track configurations or operations would not occur. The No Action Alternative would not meet the OPR Project Purpose and Need, and would result in associated impacts in communities including EJ populations near existing stations. The No Action Alternative would not result in beneficial effects on EJ populations associated with improvements to enhance intercity passenger rail service. In addition, under the No Action Alternative, the ridership would continue to grow based on population growth and but the associated impacts at the station locations could occur without any physical improvements to mitigate.

Alternative 1

EJ and LEP populations are present within or adjacent to the proposed Alternative 1 rail alignment and around the existing/potential station locations. The most notable potential for adverse and/or beneficial effects that could affect EJ populations includes the following:

- **Transportation.** Increased intercity travel frequency and capacity, and reduced Amtrak Cascades passenger rail travel time under Alternative 1 in comparison to the No Action Alternative could provide transportation-related benefits for people in EJ communities, including increased travel options to access education, employment, and social and health services.
- **Railroad Crossings**. The addition of eight train trips per day (four round trips) at each crossing along the Alternative 1 alignment would increase the number of delays and potential safety hazards for automobiles, pedestrians, and cyclists at crossings in comparison to the No Action Alternative.
- **Noise and Vibration**. The increased number of train trips under Alternative 1 would increase noise and vibration, and the majority of potentially impacted residential lands are located within urban areas and include EJ communities. Therefore, increased noise and vibration could affect EJ communities.
- **Air Quality**. Long-term benefits related to air quality could occur for EJ communities, because enhanced passenger rail service would likely replace some passenger vehicle, bus, or plane travel. For example, Alternative 1 would incrementally replace four Thruway bus trips with four additional passenger rail round trips. However, the increased number of delays at at-grade rail crossings due to increased passenger trains could adversely affect localized air quality because of increased vehicle emissions from idling at intersections. Increased traffic congestion and localized impacts of carbon monoxide (CO) and particulate matter may also occur near rail stations along with passengers’ increased use of surface routes to access the stations. Localized emissions from Alternative 1 could have the potential to expose the nearby population to air toxics such as diesel particulate matter; the highest potential exposure would be around existing stations in urban areas.
- **Displacements/Community Cohesion and Character**. It is anticipated that Alternative 1 would result in few impacts on community characteristics/cohesion, because the alignment is primarily within or adjacent to an existing transportation ROW. Where existing rail lines are currently a barrier in communities, Alternative 1 would not improve conditions. The additional track in certain locations could potentially make segments of rail alignment and/or crossings moderately wider than what currently exists. While the addition of track would require additional distance for people to traverse these crossings, improvements to the travel surface and crossing equipment would enhance safety and accessibility at these locations.
- **Native American Populations/Stream Impacts.** Alternative 1 could require new or modified stream crossings in some locations, which could directly impact cultural resources, including fish and aquatic habitat of concern to Tribal communities.

As discussed in subsection 4.4.2, Methods, this Tier 1 EIS analysis does not include any quantitative analysis to determine whether the effects discussed above would be potentially disproportionately high and adverse to EJ populations. Urban areas with a high concentration of EJ populations are most likely to experience adverse impacts and/or benefits. The following urban areas in the EJ study area for Alternative 1 show high concentrations of EJ populations:

- Around the Eugene Station
- Around Delta Highway/Beltline Highway in Eugene
- In Millersburg at the intersection of Old Salem Road NE
- South of the Albany Station

- Around 34th Avenue and Queen Avenue SW in Albany
- Around the Salem Station
- Around the potential Woodburn station
- In Canby
- In Clackamas at the junction of SE 82nd and I-205
- In Milwaukie
- In Portland, from the Multnomah County line to SE Holgate
- In Portland, between SE Holgate and SE Division
- In Portland, at the inner SE industrial area south of SE Stark
- Around Portland's Union Station

Tier 2 environmental analyses could reveal EJ populations and/or further potential impacts not identified above.

Alternative 2

EJ and LEP populations are present within or adjacent to the proposed Alternative 2 rail alignment and around the existing/potential new station locations. The most notable potential for adverse and/or beneficial effects that could affect EJ populations includes the following:

- **Transportation.** Increased intercity travel frequency and capacity under Alternative 2 in comparison to the No Action Alternative, and reduced travel time under Alternative 2 in comparison to both the No Action Alternative and Alternative 1 could provide transportation-related benefits for EJ communities. In addition, the addition of new stations in areas not currently served by passenger rail could provide increased transportation options for EJ populations to access education, employment, and social and health services.
- **Railroad Crossings**. Alternative 2 would result in fewer at-grade crossings for passenger trains compared to the No Action Alternative and Alternative 1. Alternative 2 would shift passenger rail traffic from the UPRR mainline through the majority of the route to a dedicated passenger rail track for much of the alignment, and the frequency of delays resulting from blocked crossings would likely decrease at crossings on the UPRR mainline south of Oregon City. Compared to the No Action Alternative and Alternative 1, Alternative 2 would shift passenger rail traffic from the UPRR mainline to a new track adjacent to the PNWR line between Keizer and Wilsonville, and would increase the frequency of trains and associated delays at crossings along the PNWR alignment.
- **Noise and Vibration**. Alternative 2 would build about 81 miles of track on a new alignment, and thus would introduce a potential new source of noise and vibration to areas that currently do not experience train-generated impacts. Increased noise and vibration resulting from passenger rail trains under Alternative 2 would potentially affect more residential land uses in urban areas than Alternative 1. Therefore, Alternative 2 could result in more noise and vibration impacts to EJ populations.
- **Air Quality**. Similar to Alternative 1, long-term benefits related to air quality could occur because more frequent and efficient intercity train service would replace some passenger vehicle, bus, or plane travel, as well as decrease Thruway bus trips. While Alternative 2 would result in a lower number of at-grade crossings than the No Action Alternative and Alternative 1, increased delays at crossings with more frequent trains could adversely affect localized air quality. Increased traffic congestion and localized impacts of CO and particulate matter may also occur near Alternative 2 existing and potential new rail stations along with passengers' increased use of routes to access the stations. Localized emissions from

Alternative 2 could have the potential to expose the nearby population to air toxics such as diesel particulate matter; the highest potential exposure would be around existing stations in urban areas.

- **Visual Impacts**. Elevated structures associated with Alternative 2 could have potential adverse visual effects for residents and for viewers from community resources, such as parks or trails that have views toward the structures.
- **Displacements/Community Cohesion and Character**. Alternative 2 would include the addition of new track throughout the full alignment and the potential for more new stations. Therefore, it is anticipated that Alternative 2 would result in a greater degree of direct impacts than Alternative 1 in relation to the acquisition of ROW, displacement, and community cohesion.
- **Native American Populations/Stream Impacts.** Alternative 2 has the highest potential to directly impact cultural resources of importance to local Tribes, including fish and aquatic habitat of concern to Tribal communities. The proposed Alternative 2 alignment would require new railroad bridges over the McKenzie, Santiam, and Tualatin rivers, and three new bridges over the Willamette River. Impacts to cultural resources from Alternative 2 construction could potentially result in adverse EJ impacts to Native American populations.

The following urban areas in the Alternative 2 study areas show high concentrations of EJ populations and would therefore be most likely to experience adverse impacts and/or benefits:

- Around the potential Springfield station
- In Springfield, east of I-5 and north of OR 126 to Gateway Road
- Around the potential Albany station
- West of I-5, north of the potential Albany station
- Around the Albany Station
- South of Albany
- Around 34th Avenue and Queen Avenue SW in Albany
- Within Salem, and north and south of Salem
- Near the potential Salem station
- Near the potential Keizer station
- At the intersection of I-5 and Indian School Road in north Salem
- Around the potential Wilsonville station
- Around the potential Woodburn station
- In Salem, east of I-5 between Sunnyview and Silverton Roads
- In Salem, between State Street and Sunnyview Road
- In Salem, between Mission and State Streets
- Around the potential Tualatin station
- Through Clackamas between Oregon City and I-205
- In Clackamas County, at junction of SE Linwood and Harmony
- In Milwaukie, at the junction of SE 82nd and I-205
- In Milwaukie

- In Portland, from Multnomah County line to SE Holgate
- In Portland, between SE Holgate and SE Division
- In Portland, at the inner SE industrial area south of SE Stark
- Around Portland's Union Station

The EJ analysis for Alternative 2 indicated high concentrations of EJ populations near potential new stations, with relatively lower concentrations adjacent to the rail alignment. Therefore, the effect and type of EJ impacts would likely be dependent on the specific station locations selected. For example, there are demographic differences between the potential stations at Wilsonville and Tualatin. Development of the Wilsonville station could have more EJ impacts related to displacement, because the area around the potential station location has higher concentrations of minority and low-income groups. However, local and regional transit could better serve the potential Wilsonville station, which would be a benefit to EJ populations. The potential Tualatin station area has fewer adjacent concentrations of EJ populations, but there are higher concentrations outside of the EJ study area. Therefore, there could be fewer displacement effects on EJ populations associated with the potential Tualatin station.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option would have similar impacts associated with EJ populations as those described for Alternative 2. Where the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station to the west of the Alternative 2 alignment, other impacts than discussed for Alternative 2 could occur. The EJ populations most likely to experience adverse impacts and/or benefits associated with the Central Albany Option would be the areas of high concentration around the existing Albany Station and north of the station. The Central Albany Option would increase the number of at-grade crossings and travel time compared to Alternative 2, which could adversely affect safety and transportation options for EJ communities. The increased number of at-grade crossings could also adversely affect air quality because of increased vehicle idling.

4.4.5.2 Construction Impacts

Alternative 1

Construction of Alternative 1 could temporarily affect EJ populations by increasing traffic congestion, delays at at-grade public roadway crossings, and noise and vibration. Construction would also increase dust and particulates that could affect air quality, particularly for those EJ populations living and working close to the proposed rail alignment and the potential Woodburn station.

Alternative 2

Construction impacts to EJ populations under Alternative 2 would be similar to those described for Alternative 1, but would be more intensive because of the amount of new track needed where none currently exists, the increased amount of construction required for elevated structures, and the number of proposed new stations.

Alternative 2 with Central Albany Option

Construction of the Alternative 2 with Central Albany Option would create impacts similar to Alternative 2, with additional potential EJ population impacts through north Albany adjacent to the UPRR mainline track.

4.4.6 Potential Mitigation

The alignments for the build alternatives generally follow either the existing UPRR alignment (Alternative 1) or the existing I-5 and I-205 freeway and PNWR alignment (Alternative 2), thus avoiding and/or minimizing impacts on surrounding land uses and developed communities, and natural resources, as discussed throughout this chapter. BMPs will be used to minimize construction effects as practicable. If effects cannot be avoided or minimized, mitigation strategies will be implemented.

Specific mitigation measures are not identified as part of this Tier 1 analysis but will be identified during the project-level analysis when details on the proposed facilities are determined. These project-level analyses would pursue further outreach to, and engagement with potentially affected EJ and LEP communities in order to communicate project information and potential impacts, and to discuss potential mitigation strategies, as appropriate.

Tier 2 project-specific evaluations of disproportionately high and adverse impacts on EJ populations would include consultation with local governments and planning agencies, and would consider minimizing barrier effects to maintain neighborhood integrity including protected rail crossings, and improved visual quality of project facilities. In coordination with local jurisdictions, ODOT would develop and implement a traffic control plan to minimize traffic delays and periodic lane and/or access revisions during and after construction.

4.5 Socioeconomics

This section discusses socioeconomic resources and associated legal requirements, methods of analysis, the study areas for socioeconomic resources, affected environment, potential environmental consequences, and potential mitigation strategies of project alternatives for the OPR Project. Socioeconomics includes information on demographic characteristics such as population, housing, employment, community characteristics, and community resources (such as schools [public and private], places of worship, community centers, cemeteries, hospitals, emergency facilities, parks, open spaces, libraries, government offices, and museums).

4.5.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, **FRA's Procedures for Considering Environmental Impacts** are applicable to this Tier 1 analysis of socioeconomics. Section 14(n)(16) of FRA's environmental procedures require an EIS to include consideration of potential environmental impacts on the socioeconomic environment, including potential for community disruption or cohesion and the possibility of demographic shifts, as well as the number and kinds of available jobs likely to be affected by the alternatives. It also considers the positive and negative consequences of each alternative on existing business districts and the immediate project area.

4.5.2 Methods

A literature review of documented empirical evidence on potential impacts of intercity passenger rail service was conducted. This examination focused on the relationship between passenger rail service and factors known to influence a region's economic competitiveness. An economic base analysis determined the industry mix and employment trends and assessed land use characteristics, and provided an understanding of the general socioeconomic composition of the affected areas.

4.5.2.1 Categories of Socioeconomic Impacts

Socioeconomic direct impacts were assessed using the following categories:

- **Community characteristics.** The potential for changes in community characteristics was qualitatively evaluated for potential changes in neighborhood context/land uses, community population characteristics, and community resource accessibility. Some examples of potential impacts are: separating and isolating land uses, redistributing population, and cutting off or otherwise restricting access. The analysis included reviews of maps of the build alternative alignments and potential new stations, as well as aerial photography to assess potential impacts.

- **Community resources.** The analysis qualitatively assessed potential ROW acquisition, displacement of resources, circulation and access to the resources, changes in emergency services, and environmental quality (such as traffic, noise, visual impacts, and air quality). The analysis relied on an evaluation of mapped data to determine whether, and how, community resources could be affected by the build alternatives.
- **Community benefits.** The potential for positive changes in the community, such as urban revitalization, station area development, and increased connectivity or mobility, was qualitatively evaluated. This component of the social resources analysis relied on findings from the *Oregon Passenger Rail Transportation Technical Memorandum* (ODOT, 2016f) and the *Oregon Passenger Rail Economics Technical Memorandum* (ODOT, 2016a) to interpret effects of each proposed rail alignment as a whole and on communities within the project study area.
- **Economic development impacts.** The characteristics of the areas affected by the OPR Project were compared to those revealed in the literature review to determine those characteristics that would most likely give rise to economic development impacts.
- **Construction jobs.** A qualitative overview revealed the potential construction-related jobs that could result from the build alternatives.

The analysis assessed indirect impacts qualitatively using the following categories:

- **Changes in community cohesion and accessibility** (such as access to shopping, recreational areas, health services, and emergency response). This analysis assessed impacts to community cohesion due to changes in access that may occur as part of the OPR Project.
- **Changes to the jobs/housing balance by community.** The analysis used potential areas of displacement or land use isolation impacts to assess potential changes to jobs and housing by community that could occur over time or farther in distance.
- **Value of increased accessibility, connectivity, and amenity value (the value associated with the existence of passenger rail).** These indirect impacts include changes to business districts, housing markets, and tourism attractions.
- **Potential temporary impacts from construction.** This analysis reviewed potential temporary impacts, such as temporary changes in driveway access, that could occur as part of the OPR Project.

4.5.2.2 Tier 2 Analysis

This socioeconomic analysis is based on a preliminary conceptual level of engineering and passenger rail service planning for the two build alternatives and a No Action Alternative. No site-specific field investigation was conducted for this analysis.

The context for the socioeconomic affected environment includes identification of demographic data (community population/residents), community characteristics, and community resources adjacent to the two build alternative rail alignments, existing stations, and potential new stations.

Future Tier 2 environmental studies for individual projects proposed subsequent to this Tier 1 analysis for the OPR Project would consider:

- More detailed project-level economic analysis;
- Detailed assessment of specific temporary impacts, the extent of temporary impacts, and appropriate mitigation measures; and
- Project-level analyses regarding residential and business displacements, noise and vibration impacts, visual impacts, transportation impacts, and air quality impacts related to social resources.

4.5.3 Study Area

Potential impacts to social resources were evaluated within the following OPR Project study area boundaries:

- **Direct Impacts Study Area:** Within 200 feet of proposed rail centerlines where rail improvements are proposed, the existing station areas, and within a 20-acre area around the potential new passenger rail station areas. Impacts from increased passenger train frequency were considered for the entire alignment, regardless of where new track would be constructed.
- **Indirect Impacts Study Area:** Within a ¼-mile buffer around the existing/proposed rail alignments, and existing and potential new station areas.

The primary study area for the economic impacts assessment included all counties where there are existing or proposed new passenger rail stations. In addition to county-level information, the assessment also considered national and station area socioeconomic data in order to facilitate relative comparisons of various economic indicators and attributes.

4.5.4 Affected Environment

4.5.4.1 Community Characteristics

Table 4.5-1 summarizes demographic data for the State of Oregon and ***counties*** within the OPR Project Alternative 1 and Alternative 2 study areas. **Table 4.5-2** summarizes demographic data for the State of Oregon and ***cities*** within the OPR Project study areas. Overall, population is increasing for Oregon and for all of the counties present in the OPR Project study areas. In cities that the study areas transect, the concentrations of populations under 18 years old range from 18 percent (Eugene) to 30 percent (Woodburn), and the concentrations of populations over 65 years old range from 8 percent (Tualatin) to 15 percent (Woodburn). In cities that the study areas transect, the concentrations of minority populations range from 14 percent (Oregon City) to 62 percent (Woodburn), and concentrations of LEP populations range from 3 percent (Oregon City) to 34 percent (Woodburn). The subsections that follow Table 4.5-2 describe community characteristics and community resources in the study areas. **Tables 4.5-3** and **4.5-4** summarize the community resources identified within the study area for each of the build alternatives and as shown on maps in Appendix D, Figure D-3.

Table 4.5-1. Summary of Demographic Data for State of Oregon and Counties in the Study Area

Location (State, County)	2000 Total Population	2010 Total Population	Total Population Change (2000–2010)	Forecasted Population in 2040	2010 Under 18 Years Old	2010 Over 65 Years Old	2010 Minority	2010 LEP
State of Oregon	3,421,399	3,838,957	12%	5,203,000	22%	14%	22%	6%
Clackamas	338,391	376,891	11%	537,753	23%	14%	16%	5%
Lane	322,959	351,983	9%	437,345	20%	16%	16%	3%
Linn	103,069	116,910	13%	156,505	24%	16%	13%	3%
Marion	284,834	316,096	11%	453,557	26%	13%	32%	11%
Multnomah	660,486	737,902	12%	936,729	20%	11%	28%	9%
Washington	445,342	531,744	19%	830,100	25%	11%	31%	10%

Sources: Information collected from U.S. Census Population Data 2000 and 2010, and Oregon Office of Economic Analysis, 2013.

Table 4.5-2. Summary of Demographic Data for State of Oregon and Cities in the Study Area

Location (State, City)	Total Population	Under 18 Years Old	Over 65 Years Old	Minority	LEP
State of Oregon	3,868,721	22%	14%	22%	6%
Albany	50,828	26%	13%	19%	4%
Eugene	157,318	18%	13%	19%	4%
Keizer	36,681	27%	14%	26%	7%
Oregon City	33,115	25%	10%	14%	3%
Portland	594,687	19%	11%	28%	9%
Salem	156,937	25%	13%	30%	9%
Springfield	59,692	23%	11%	19%	4%
Tualatin	26,383	26%	8%	29%	8%
Wilsonville	19,636	22%	14%	23%	7%
Woodburn	24,101	30%	15%	62%	34%

Sources: Information collected from U.S. Census American Community Survey (ACS) (2006–2010 and 2009–2013). The table presents ACS 5-year average data, which is the most reliable option for presenting demographic data for the study area.

No Action Alternative and Alternative 1

The No Action Alternative/Alternative 1 alignment follows a historic freight and passenger railroad line that currently hosts Amtrak passenger rail service to a number of the cities in the study area. This alignment passes through Lane, Linn, Marion, Clackamas, and Multnomah counties. The alignment passes through the cities of Eugene, Junction City, Harrisburg, Halsey, Tangent, Albany, Millersburg, Jefferson, Salem, Keizer, Brooks, Woodburn, Hubbard, Aurora, Barlow, Canby, Oregon City, Gladstone, Milwaukie, and Portland. There are existing passenger rail stations in Eugene, Albany, Salem, Oregon City, and Portland. These stations would continue to be used by the No Action Alternative and Alternative 1.

Outside of the cities, the study area is largely agricultural, sparsely populated, and has few community characteristics of note. Within the cities, a majority of the adjacent uses are related to industrial and commercial activities. Where there is residential development, the majority is composed of single-family units and is a mixture of older residential with areas of new development that abut the railroad property. While the existing UPRR infrastructure is an impediment to local access and mobility throughout portions of the study area, there are numerous crossings of the railroad tracks.

Alternative 2

Alternative 2 would generally parallel the I-5, PNWR, I-205, and UPRR rights-of-way and would pass through Lane, Linn, Marion, Clackamas, Washington, and Multnomah counties. It would pass through the cities of Springfield, Eugene, Coburg, Albany, Millersburg, Keizer, Woodburn, Donald, Wilsonville, Tualatin, West Linn, Oregon City, Gladstone, Milwaukie, and Portland. Alternative 2 would use the existing Portland Union Station and possibly the existing Albany station (Central Albany Option). Proposed new passenger rail stations for this alternative would be located in Springfield, Albany (except with the Central Albany Option), Salem or Keizer, and Wilsonville or Tualatin. The Eugene, Albany (except with the Central Albany Option), Salem, and Oregon City stations would no longer be served by passenger rail and would be converted to other uses.

The construction of I-5 bisected many of the communities and is a barrier to local access and mobility through major portions of the study area. However, I-5 also provided new opportunities as a major north-south transportation corridor for the entire West Coast. The I-5 ROW is generally the boundary for industrial uses and residential developments, and commercial uses are present in proximity to I-5 interchanges. Residential development in the study area consists primarily of single-family residential areas that do not center on or face toward the proposed rail alignment. Outside of the cities, Alternative 2 would be adjacent to primarily agricultural-related uses, with limited residential development.

Where the Alternative 2 with Central Albany Option diverts from the I-5 alignment, the proposed route would be built parallel to an existing railroad alignment through Albany and would then rejoin the alignment adjacent to I-5 north of Albany.

4.5.4.2 Community Resources

Table 4.5-3 identifies the 62 community resources within the Alternative 1 study area.

Table 4.5-3. Community Resources within the Alternative 1 Study Area[a]

Community Resource	Location	Community Resource Type	Approximate Distance from Existing/Proposed Rail Infrastructure[b]
New Life Apostolic Tabernacle	Eugene	Place of Worship	200 feet
U.S. Marshals Service Office	Eugene	Law Enforcement	200 feet
Lane County Corrections Division	Eugene	Law Enforcement	200 feet
Washington/Jefferson Park	Eugene	Park/Open Space	Less than 25 feet
Walnut Grove Park	Eugene	Park/Open Space	100 feet
Day Memorial Park	Junction City	Park/Open Space	200 feet
Harrisburg Fire and Rescue Station	Harrisburg	Fire Station	100 feet
Harrisburg Area Museum	Harrisburg	Museum	175 feet
Harrisburg City Park/Skatepark	Harrisburg	Park/Open Space	75 feet
Alford Cemetery	Linn County	Cemetery	125 feet
Tangent Rural Fire Department	Tangent	Fire Station	25 feet
Swanson Park	Albany	Park/Open Space	125 feet
Maple Lawn Park	Albany	Park/Open Space	125 feet
Simpson Park	Albany	Park/Open Space	125 feet
5th Street Park	Turner	Park/Open Space	Less than 25 feet
Turner Fire Department	Turner	Fire Station	25 feet
State of Oregon Law Library	Salem	Library	150 feet
Willamette Heritage Center	Salem	Museum	50 feet
North Salem High School	Salem	School	50 feet
Barrick Field Park	Salem	Park/Open Space	175 feet
Claggett Creek Natural Area	Salem	Park/Open Space	50 feet
Chemawa Cemetery	Salem	Cemetery	100 feet
Gervais Police Department	Gervais	Law Enforcement	125 feet

Community Resource	Location	Community Resource Type	Approximate Distance from Existing/Proposed Rail Infrastructure[b]
Gervais City Hall	Gervais	Government Building	125 feet
House of Zion Lutheran Church	Woodburn	Place of Worship	75 feet
St. Luke's Cemetery	Woodburn	Cemetery	100 feet
Woodburn Historical Museum	Woodburn	Museum	75 feet
Chemeketa Community College	Woodburn	School	Less than 25 feet
North Front Street Park	Woodburn	Park/Open Space	75 feet
Settlemier Park	Woodburn	Park/Open Space	100 feet
Woodburn Police Station	Woodburn Station (Potential)	Law Enforcement	375 feet
Christ Baptist Church	Hubbard	Place of Worship	150 feet
Hubbard Rural Fire Department	Hubbard	Fire Station	Less than 25 feet
Canby Regional Park	Canby	Park/Open Space	Less than 25 feet
Church of the Nazarene	Canby	Place of Worship	200 feet
Canby Depot Museum	Canby	Museum	100 feet
Coalca Landing Willamette River Greenway	Clackamas County	Park/Open Space	25 feet
Canemah Bluff Natural Area	Oregon City	Park/Open Space	100 feet
Canemah Cemetery	Oregon City	Cemetery	150 feet
Old Canemah Park	Oregon City	Park/Open Space	150 feet
Museum of the Oregon Territory	Oregon City	Museum	175 feet
McLoughlin Promenade	Oregon City	Park/Open Space	Less than 25 feet
Victorious Faith Family Church	Oregon City	Place of Worship	200 feet
Providence Willamette Falls Community Center	Oregon City	Community Center	75 feet
North Clackamas District Park Three Creeks Natural Area	Clackamas County	Park/Open Space	Less than 25 feet
Minthorn North Natural Area	Milwaukie	Park/Open Space	50 feet
Milwaukie Museum	Milwaukie	Museum	75 feet
Milwaukie Police Department	Milwaukie	Law Enforcement	125 feet
Springwater Corridor	Portland	Park/Open Space	Less than 25 feet
Roswell Pond Open Space	Portland	Park/Open Space	Less than 25 feet
Eastmoreland Golf Course	Portland	Park/Open Space	Less than 25 feet
Buddhist Daihonzan Henjyoji Temple	Portland	Place of Worship	75 feet

Community Resource	Location	Community Resource Type	Approximate Distance from Existing/Proposed Rail Infrastructure[b]
Portland Community College	Portland	School	Less than 25 feet
Vera Katz Eastbank Esplanade	Portland	Park/Open Space	Less than 25 feet
Steel Bridge Riverwalk	Portland	Park/Open Space	Less than 25 feet
Gov. Tom McCall Waterfront Park	Portland	Park/Open Space	Less than 25 feet
The Fields Neighborhood Park	Portland	Park/Open Space	Less than 25 feet
Harbor View Property	Portland	Park/Open Space	Less than 25 feet
Peninsula Crossing Trail	Portland	Park/Open Space	Less than 25 feet
Jehovah's Witnesses	Portland	Place of Worship	Less than 25 feet
Smith and Bybee Wetlands Natural Area	Portland	Park/Open Space	150 feet
Heron Lakes Golf Course	Portland	Park/Open Space	Less than 25 feet

[a] The affected environment study area includes the full Alternative 1 alignment, regardless of where new track would be constructed.

[b] Distance rounded to the nearest 25 feet.

Table 4.5-4 identifies the 47 community resources within the Alternative 2 study area.

Table 4.5-4. Community Resources within the Alternative 2 Study Area[a]

Community Resource	Location	Community Resource Type	Approximate Distance from Proposed Infrastructure[b]
Springfield IOOF Cemetery	Springfield	Cemetery	125 feet
Laurel Hill Cemetery	Springfield	Cemetery	150 feet
James Park	Springfield	Park/Open Space	200 feet
Eastgate Woodlands Natural Areas	Springfield	Park/Open Space	Less than 25 feet
Gateways High School	Springfield Station (Potential)	School	475 feet
Armitage County Park	Lane County	Park/Open Space	Less than 25 feet
Freeway Lakes County Park	Linn County	Park/Open Space	Less than 25 feet
Albany Mennonite Church	Albany	Place of Worship	150 feet
Oregon State Police Office	Albany	Law Enforcement	25 feet
The Difference Church	Albany	Place of Worship	175 feet
St Matthews Church of Christ[c]	Albany	Place of Worship	200 feet
Simpson Park[c]	Albany	Park/Open Space	125 feet
Swanson Park[c]	Albany	Park/Open Space	125 feet
Maple Lawn Park[c]	Albany	Park/Open Space	125 feet
Waverly Memorial Cemetery[c]	Albany	Cemetery	175 feet

Community Resource	Location	Community Resource Type	Approximate Distance from Proposed Infrastructure[b]
Roberts High School	Salem	School	100 feet
Pauline Memorial Zion Church	Salem	Place of Worship	175 feet
Cascade Gateway Park	Salem	Park/Open Space	200 feet
Keizer Church of Christ	Keizer	Place of Worship	75 feet
Keizer Little League Park	Keizer	Park/Open Space	125 feet
St. Louis Ponds Park	Marion County	Park/Open Space	50 feet
Grace Chapel	Wilsonville	Place of Worship	Less than 25 feet
U.S. Fish and Wildlife Service – Office of Law Enforcement	Wilsonville	Law Enforcement	50 feet
Atfalati City Park	Tualatin	Park/Open Space	175 feet
Stafford Country Montessori	Tualatin	School	200 feet
Three Rivers Charter School	West Linn	School	175 feet
West Bridge Park	West Linn	Park/Open Space	Less than 25 feet
Sportcraft Landing	Oregon City	Park/Open Space	Less than 25 feet
Jon Storm Park	Oregon City	Park/Open Space	175 feet
North Clackamas District Park Three Creeks Natural Area	Clackamas County	Park/Open Space	Less than 25 feet
Minthorn North Natural Area	Milwaukie	Park/Open Space	50 feet
Milwaukie Museum	Milwaukie	Museum	75 feet
Milwaukie Police Department	Milwaukie	Law Enforcement	125 feet
Springwater Corridor	Portland	Park/Open Space	Less than 25 feet
Roswell Pond Open Space	Portland	Park/Open Space	Less than 25 feet
Eastmoreland Golf Course	Portland	Park/Open Space	Less than 25 feet
Buddhist Daihonzan Henjyoji Temple	Portland	Place of Worship	75 feet
Portland Community College	Portland	School	Less than 25 feet
Vera Katz Eastbank Esplanade	Portland	Park/Open Space	Less than 25 feet
Steel Bridge Riverwalk	Portland	Park/Open Space	Less than 25 feet
Gov. Tom McCall Waterfront Park	Portland	Park/Open Space	Less than 25 feet
The Fields Neighborhood Park	Portland	Park/Open Space	Less than 25 feet
Harbor View Property	Portland	Park/Open Space	Less than 25 feet
Peninsula Crossing Trail	Portland	Park/Open Space	Less than 25 feet
Jehovah's Witnesses	Portland	Place of Worship	Less than 25 feet

Community Resource	Location	Community Resource Type	Approximate Distance from Proposed Infrastructure[b]
Smith and Bybee Wetlands Natural Area	Portland	Park/Open Space	150 feet
Heron Lakes Golf Course	Portland	Park/Open Space	Less than 25 feet

[a] The affected environment study area includes potential new station areas and the full Alternative 2 alignment, regardless of where new track would be constructed.

[b] Distance rounded to the nearest 25 feet.

[c] For Central Albany Option only.

4.5.4.3 Economic Base Analysis

The economic base analysis is used to study the current economic conditions for each county hosting existing or proposed new passenger rail stations. Specifically, the analysis identified those industries that are growing or declining in terms of employment and productivity.

The analysis involved performing location quotient (LQ) and shift-share analyses, which are standard analyses used to understand an area's local economy and measure the concentration of all industries within the study area compared to the nation. These analyses identify which industries within the study area are strong and/or growing. If these identified industries are those that are more likely to benefit from passenger rail service (for example, the Knowledge-Based and Educational Services industries), the expansion of service to an existing or new passenger rail station could further strengthen these industries. The following key industries have the greatest potential influences on the economic development potential of new or expanded passenger rail service in the study area:

- **Knowledge-Based** – includes Information, Professional, and Technical Services; Finance and Insurance; Management of Companies and Enterprises; and Real Estate.
- **Tourism** – includes Accommodation and Food Services; Retail Trade; Leisure and Hospitality; and Arts, Entertainment, and Recreation.
- **Educational Services** – include schools, colleges, universities, and training centers.
- **Public Administration** – includes Federal, state, and local government agencies that administer, oversee, and manage public programs. These agencies also set policy, create laws, adjudicate civil and criminal legal cases, and provide for public safety and national defense. In general, government establishments in the Public Administration sector oversee governmental programs and activities that are not performed by private establishments.

The analysis was conducted on a county level because of the availability and accuracy of the county data. Performing an economic base analysis at a level smaller than a county (such as a U.S. Census tract) has a high possibility for producing exaggerated and inaccurate results. Other industry-related analyses were conducted at the station community level to account for this limitation.

Location Quotient (LQ)

An LQ is used to quantify which industries in a region are unique or concentrated when compared to the nation; this comparison is made by dividing a region's employment share within a particular industry by the nation's employment share within the same industry. The LQ analysis was based on a county's concentration and specialization of Knowledge-Based, Tourism, and Educational Services industries, with LQ expressed as a ratio. An LQ greater than 1 indicates an industry with a greater share of the county employment than its share of employment in the nation. Multnomah and Lane counties, which include the locations of the Eugene, Springfield, and Portland stations, have the highest performance, with a handful of these industries categorized as specialized or emerging. Continued growth in these specialized industries is key to a strong economic base.

Linn, Marion, and Washington counties have the lowest LQ performance, because few, if any, of the key industries have an LQ greater than 1 and/or the key industries are not growing.

Shift-Share Analysis

The shift-share analysis is similar to the LQ analysis; however, instead of investigating total jobs in the industry, this analysis concentrates on job growth. Specifically, it highlights industries that have a local economic competitive advantage compared to the nation. The criteria for evaluating the shift-share results are similar to those for the LQ analysis—that is, looking at the growth and competitiveness of the key industries. These key industries are those most able to support passenger rail service and generate the most ridership.

Washington County, which could be home to one station (the potential new Tualatin station associated with Alternative 2), has the highest shift-share performance, with all of the key industries growing, based on the local (not national) conditions. Most of the other counties have average shift-share performance, with approximately half of the growth/decline in employment because of national performance. In Lane and Linn counties, most of the growth is attributed to the overall employment change in the nation.

The description of the affected environment uses factors documented as having an impact on the economic development potential of new or expanded passenger rail service. The description of the current economic conditions (the affected environment) is categorized into the following three sections:

- Socioeconomic attributes
- Employment and industry by station
- Land use

Socioeconomic Attributes

The population distribution and socioeconomic characteristics of the areas surrounding passenger rail stations can be used to estimate the receptiveness of the population to service expansion at existing stations or potential new stations. The analysis considered population density, average household size and educational attainment of residents within ¼ mile of each existing and potential new station, and the distribution of employees within ½ mile of each existing and potential new station (based on U.S. Census tract data). The results of this analysis are summarized as follows:

- **Population** – Development supportive of passenger rail would primarily be dense, with high concentrations of residents and commercial development. The existing station in Albany, potential new station in Salem (Alternative 2), and the potential new station in Woodburn along Alternative 1 have the highest population densities.
- **Average household size** – Household size has been shown to be an influencing factor related to the effect of passenger rail stations on economic expansion. Singles and couples without children are more likely to live near and use public transportation. Only two stations had an average household size equal to or less than two persons: the Eugene Depot and Portland's Union Station.
- **Educational attainment** – The educational attainment of residents in an area can suggest the attractiveness of that area to employees with specialized skills. Those with associate's or higher degrees are more likely to be employed in Knowledge-Based industries. A larger than average portion of Woodburn (Alternative 2) has residents with less than an associate's degree (80 percent of residents), while Portland's Union Station has the highest portion of residents with a higher education degree (54 percent of residents). In addition, 48 percent of residents around the potential Wilsonville Station and 44 percent of residents around the potential Tualatin Station have higher education degrees

(although the data for the potential new Tualatin Station is limited due to the large U.S. Census tract area that extends beyond the potential new station area).

- **Distribution of Employees** – The distribution of the number of employees in certain industries helps analysts understand the availability of Knowledge-Based, Tourism, Educational Services, and Public Administration industries in the area. These industries were identified as benefiting most from passenger rail service, and have located or could locate close to existing or proposed stations to take advantage of the benefits. Portland's Union Station and the potential Wilsonville Station have the largest percentage of employees in the Knowledge-Based industries (34 percent and 35 percent, respectively). Surrounding the Eugene Depot, the Educational Services industry (34 percent of residents) and Tourism industries (29 percent of residents in the Retail Trade or Arts, Entertainment, and Recreation) are the most popular. Public Administration does not make up a particularly large share of employment in any county, although in Marion County it has an LQ of greater than 1.

Employment and Industry by Station

This subsection is focused on station area attributes related to commuting and business travel. While commuting and business travel does not make up a large portion of the total trips on passenger rail, it is still a portion and is directly related to economic development through agglomeration, or impacts resulting from businesses and/or people clustering in an area.

This analysis gathered data on the number and types of business establishments within a ¼-mile radius of each existing and potential new station. The number of businesses and number of employees provide information on the employment opportunities and the supply of labor for industries surrounding these stations.

This information supplements the socioeconomic attributes and economic base analyses by further exploring the possibilities for increasing economic competitiveness based on the types of employees and firms in the area. Because the ¼-mile-radius catchment area encompassed multiple counties near some stations, the analysis used the county with the largest share of employees.

The existing Albany and Portland station areas include all or most key industries, as well as Knowledge-Based-industry employees. New passenger rail service in Wilsonville and Tualatin would likely have the smallest economic development impact potential of any of the existing or potential new station areas, because these areas do not contain many of the key industries. The Tualatin Station area has few industries overall, which severely limits the potential for economic development benefits.

Land Use

Section 4.3, Land Use/Farmland, describes the areas surrounding the existing and potential new stations. Factors such as a location close to a Central Business District (CBD), the existing planned development and zoning (high density, residential/commercial zoning), and the presence of a major draw to the area (including a university) contribute to the success and economic competitiveness of a passenger rail station. Having residential, commercial, and/or mixed-use zoning with sites ready for development that support passenger rail transportation could also enhance the economic competitiveness in the area.

Locating a station within a CBD not only increases connections among modes but also allows for supportive development around the station. Generally, Alternative 1 has more stations close to CBDs than Alternative 2, and thus Alternative 1 is more likely to benefit from existing land uses, transit and other modal connections, and supportive development.

The major cities (Portland, Eugene, Springfield, Salem, and Oregon City) have favorable zoning in the areas surrounding the existing and potential new stations. This zoning includes the availability of a mixture of different uses compatible with passenger rail service including residential, commercial, and educational uses and community services. Conversely, agricultural and industrial land uses do not support passenger rail service.

Having a destination or draw to the area would entice more visitors to travel to a certain station and could also serve as a catalyst for attracting visitors to other nearby areas. For example, a visitor who attends a convention in Eugene might visit other areas in the region as a vacation or day trip. Having a passenger rail connection would increase the transportation options, consequently increasing the likelihood that the individual would make the trip. Many universities in the study area are accessible from the existing and proposed stations. In addition, hospitals, governmental offices, and local attractions can be major draws. These situations exist for stations within the Portland, Salem, and Eugene areas. In addition, because the destination might not be adjacent to the station, having a robust and convenient local public transportation system serves as a “last mile” connection.

4.5.5 Environmental Consequences

This subsection identifies the potential direct, indirect, and construction-related impacts on social resources for the No Action Alternative and the build alternatives. Social impacts are described by alternative, while economic impacts are described for both build alternatives, because impacts are assessed at the city and county level and most stations do not show a difference at this scale. Stations unique to an alternative are described separately.

4.5.5.1 Social Resources Direct and Indirect Impacts

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. Under the No Action Alternative, Amtrak Cascades passenger rail service would continue at existing stations in Eugene, Albany, Salem, Oregon City, and Portland, and changes to current track configurations or operations would not occur. The No Action Alternative would not result in the separation or isolation of land uses, redistribution of population, or the bisecting of communities, nor would it require ROW acquisition or the displacement of community resources.

Increases in population and employment are expected to increase Amtrak Cascades passenger rail and Thruway bus ridership during the OPR Project planning horizon under the No Action Alternative. As shown in **Table 4.2-7** in subsection 4.2.5.1 above, ODOT and FRA expect station activity to increase considerably at the Eugene Depot and Portland’s Union Station. In response to the increased ridership, demand for station area services and amenities could beneficially influence local commercial activity and associated development. The increased activity at stations could also contribute to higher levels of congestion on surrounding transportation networks, resulting in potential adverse impacts to local mobility and access.

In addition, increased freight train traffic under the No Action Alternative would likely result in more frequent vehicle delays at rail crossings, and potentially additional delays to passenger rail travel time. Emergency response and access could be adversely affected by increased delays.

The No Action Alternative would have few and negligible direct or indirect economic impacts, because the proposed action would not be constructed, and the service levels and stations served by trains and buses would remain the same as in the existing condition.

Alternative 1

Community Characteristics, Resources, and Cohesion

Alternative 1 would involve the continued use of existing UPPR mainline track, as well as the modification and addition of track in selected areas. Because Alternative 1 would either share or parallel the existing UPRR ROW, impacts related to community cohesion as a result of the bisection of communities or barriers to interaction would be minimal. The greatest potential for direct impacts to community resources, such as displacement and/or disruption of access, could occur where the community resources are near track that is being modified or proposed new track. **Table 4.5-3** includes a list of community resources adjacent to the proposed Alternative 1 alignment. However, ODOT located proposed track modifications and new track outside of urban areas as much as possible in order to minimize community impacts. In urban areas where modified or new track would be located, land uses are predominately industrial and commercial. Therefore, ODOT and FRA do not expect Alternative 1 to have direct impacts to community resources due to the conversion of land use or displacement of existing buildings. Furthermore, Alternative 1 is not expected to directly affect community resources as a result of land use separation, isolation, or displacement, redistribution of populations, and/or restriction of access.

The addition of eight passenger train trips per day (four round trips) could increase noise, vibration, or air quality impacts to community resources (such as parks and places of worship) adjacent to both existing and proposed track, as well as residential areas including low-income, elderly, and youth populations. Outside of the cities that the proposed rail alignment passes through, potential community impacts would be limited. Within the cities, the land uses within the study area are primarily related to industrial development, as discussed above and in subsection 4.3.5.1. Community resources and populations within the Alternative 1 study area already experience impacts related to noise, vibration, and air quality; the increase in service frequency could change the duration and intensity of these impacts. In addition, users of the community resources could experience potential delays in access to and from these resources, because additional passenger trains would result in more at-grade crossing delays each day. Emergency response and access could also be adversely affected by increased at-grade crossing delays. However, passenger trains travel much faster and are much shorter than freight trains; therefore, crossings by passenger trains are typically closed for a minute or less . The delays resulting from the increased passenger train trips per day would likely be minimal, because the eight additional closures would be spread throughout the day and have a short closure time.

The Alternative 1 study area includes 12 parks or open spaces adjacent to proposed new infrastructure and 31 total parks or open spaces adjacent to the entire Alternative 1 route (including existing infrastructure). Generally, the access to, and recreational amenities of, these parks and open spaces would be unaffected by Alternative 1. Refer to Section 4.7, Section 4(f) and Section 6(f) Resources, for information on parks and recreational areas that could be affected.

Community Benefits

Alternative 1 would benefit communities within the study area by providing faster and more frequent passenger rail service. Under Alternative 1, the Eugene, Albany, Salem, and Oregon City stations would see considerably more activity than under the No Action Alternative (see **Table 4.2-9** in subsection 4.2.5.1). For the communities around these stations, employment growth and greater patronage of the businesses in the surrounding area would be possible. These potential increases would depend on the kinds of development zoning would allow and the nature of the businesses in the surrounding area. For example, restaurants, coffee shops, and retail businesses would have the greatest potential for increased patronage. A potential new station in Woodburn could also offer a new access point for that community, providing benefits associated with improved access and mobility, including to Environmental Justice populations, as described in Section 4.4.

In addition, populations in the study area could receive air quality benefits, because the increased rail service would likely replace some passenger vehicle and bus trips. However, the increased number of delays at at-grade rail crossings due to increased passenger trains could adversely affect localized air quality because of increased vehicle emissions from idling at intersections. Increased traffic congestion and localized impacts of carbon monoxide (CO) and particulate matter may also occur near rail stations along with passengers’ increased use of surface routes to access the stations. Localized emissions from Alternative 1 could have the potential to expose the nearby population to air toxics such as diesel particulate matter; the highest potential exposure would be around existing stations in urban areas.

Changes to Jobs/Housing Balance

The level of analysis for this Tier 1 EIS did not reveal potential for changes to the housing mix in communities where new development could occur around station areas. However, with more frequent and reliable intercity passenger rail service, rail could become a more attractive mode of travel that is integrated with the overall transportation system, thus increasing the overall travel market share for passenger rail under Alternative 1 compared to the No Action Alternative (see subsection 4.2.5.1). This shift in mode choice towards passenger rail could result in increased commercial activity, employment, potential new development, and a commensurate increase in jobs in the vicinity of the existing station areas in Eugene, Albany, Salem, and Oregon City. Additionally, the service could facilitate access to the Portland jobs market from areas of the Willamette Valley with more affordable housing. The potential new station in Woodburn could also result in increased development activity and new jobs for that area.

Alternative 2

Community Characteristics, Resources, and Cohesion

Alternative 2 would include the addition of a new track for most of the full alignment, with siding tracks placed every 10 to 12 miles to facilitate passing operations. Alternative 2 would be constructed within or adjacent to the existing I-5, I-205, PNWR, and UPRR ROW, which already bisect communities; therefore, potential impacts related to the bisection of communities would be minor.

Alternative 2 would result in more ROW acquisition and a greater potential for displacement of buildings and structures than Alternative 1. **Table 4.5-3** includes a summary of community resources adjacent to the proposed Alternative 2 alignment and potential new station areas. The U.S. Fish and Wildlife Service (USFWS) Office of Law Enforcement north of Wilsonville is within 50 feet of the alignment and is the only resource that could be adversely affected by Alternative 2.

Alternative 2 would also involve the construction of four new stations; the study area includes six potential locations for the new stations. Depending on existing land uses and zoning (see subsection 4.3.5.1), new stations could result in the displacement of existing uses (including community resources) and changes to access, and could represent a new type of development in the surrounding area. In addition, elevated structures associated with Alternative 2 could have potential adverse visual effects for residents and for viewers from community resources, such as parks or trails that have views toward the structures. For these reasons, Alternative 2 could result in a greater degree of impacts than Alternative 1 in relation to community characteristics and cohesion.

The addition of eight train trips per day (four round trips) could result in additional noise, vibration, or air quality impacts to community resources (such as parks and places of worship) adjacent to the Alternative 2 alignment, as well as residential areas including low-income, elderly, and youth populations. Community resources and populations within the Alternative 2 study area already experience some noise, vibration, and air quality impacts; the increase in service frequency would increase the frequency of those impacts.

Along I-5 and I-205, Alternative 2 would construct grade-separated crossings over existing highways and roads. Users of the community resources under Alternative 2 would experience fewer delays in access to and from these locations than under the No Action Alternative and Alternative 1, because Alternative 2 would result in fewer at-grade crossings for passenger trains.

The Alternative 2 study area includes 17 parks or open spaces adjacent to proposed new infrastructure and 24 total parks or open spaces adjacent to the entire Alternative 1 route (including existing infrastructure). Generally, the access to, and recreational amenities of, these parks and open spaces would be unaffected by Alternative 2. Refer to Section 4.7, Section 4(f) and Section 6(f) Resources, for information on parks and recreational areas that could be affected.

Community Benefits

Alternative 2 would benefit communities within the study area by providing faster and more frequent passenger rail service. In cities with potential new stations, as well as in Portland around Union Station, increases in residential infill, employment growth, and greater patronage of the businesses in the surrounding area would be possible. The extent and type of community benefits would likely be dependent on the station locations selected (i.e., they would depend on the demographic character of the surrounding area, how riders access the station, the kinds of development zoning would allow, and the nature of the businesses in the surrounding area). The potential new station locations are predominantly in less developed locations than the existing passenger rail stations. Therefore the potential for, and extent of, community benefits would be greater around potential new station areas. Alternative 2 would likely present more opportunities for community benefits than Alternative 1.

Changes to Jobs/Housing Balance

As under Alternative 1, added passenger train capacity and reduction in Thruway bus service, along with improved travel times and reliability resulting from Alternative 2 improvements, could result in a shift in travel mode choice towards increased travel by passenger rail (see subsection 4.2.5.1). The shift in mode choice towards passenger rail combined with new commercial and residential development and associated jobs near potential new stations in Springfield, Albany, Salem or Keizer, and Wilsonville or Tualatin under Alternative 2 could indirectly benefit the jobs/housing balance to a greater extent than Alternative 1. While not part of Alternative 2, a potential new station in Woodburn could also result in increased development activity and new jobs, as it would in Alternative 1.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option would have similar impacts to social resources as those described for Alternative 2. Where the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station to the west of the Alternative 2 alignment, other impacts than those discussed for Alternative 2 could occur. Specifically, in addition to the Alternative 2 impacts discussed above, the Central Albany Option could adversely affect one place of worship, three parks, and one cemetery.

4.5.5.2 Economics

Location Quotient (LQ)

The LQ analysis was based on an area’s concentration and specialization of Knowledge-Based, Tourism, and Educational Services industries. With respect to this measure, Multnomah and Lane counties have the best performance, with a handful of these industries as “specialized” or “emerging” (see **Table 4.5-5**). Continued growth in these specialized industries is key to a strong economic base, and there could be an opportunity to expand the economic competitiveness of the local economy with the emerging industries through improvements to intercity passenger rail.

Linn, Marion, and Washington counties do not perform as well, because few, if any, of the key industries have an LQ greater than 1 and/or the key industries are not growing. However, these underperforming counties also present an opportunity for intercity passenger rail service to enhance and induce new development.

Shift-Share Analysis

The criteria for evaluating the shift-share results are similar to those for the LQ analysis—that is, they focus on the growth and competitiveness of the key industries. These industries are the ones that are the most able to take advantage of passenger rail service and generate the most ridership. Shift share and location quotient are both forward-looking analyses that consider how those industries are growing. These analyses rely on county-level data, because the county is the smallest geography that is available for these purposes.

Washington County has the highest shift-share performance: All of the key industries are growing because of local conditions. Most of the other counties have average shift-share performance, with approximately half of the growth/decline in employment because of national performance. The counties with most of their growth attributed to the overall employment change in the nation are Lane and Linn counties.

Socioeconomic Attributes

The presence of certain socioeconomic characteristics (including dense population, high educational attainment, and small households) also contributes to the likelihood of increasing economic competitiveness because of improved passenger rail service. This analysis investigated whether the counties already have a population base that has characteristics similar to those of people who are attracted to use passenger rail. The existing Oregon City and Portland station areas have such a population base with similar characteristics: many employees in Knowledge-Based industries (those that rely upon intellectual capabilities and not physical inputs/outputs), higher educational achievements, and smaller households.

Employment Attributes

An employment and industry analysis was conducted within the areas surrounding the existing and potential new passenger rail stations. The existing Albany and Portland stations possessed the most desired characteristics in this category, including the presence of all or most of the key industries, as well as Knowledge-Based-industries employees. New passenger rail service in Wilsonville and Tualatin is predicted to have the smallest economic development impact potential, because these potential new stations do not have many of the key industries. The potential Tualatin Station area has few industries overall, which severely affected the results. However, some redevelopment opportunities could be possible in these areas.

Land Use Attributes

Land uses surrounding the existing and potential new stations were assessed for their ability to support passenger rail service. Characteristics such as having certain types of existing development and zoning (such as mixed-use), and proximity to the CBD, and having a major draw to the area were the key attributes for this analysis. The existing Eugene, Salem, and Portland stations had the characteristics most in line with the successful land use attributes identified in the literature review for areas surrounding passenger rail stations. It is predicted that current and planned future development around these stations would further support passenger rail service.

Areas that would need additional development or land use policies to increase potential ridership include the stations in Clackamas County (the existing Oregon City Station (Alternative 1) and the proposed new Wilsonville Station (Alternative 2) in Clackamas County. To make these areas more supportive of passenger rail service, it would be necessary to provide connections to major destinations in the area and to grow successful key industries to attract more employees and employers.

Table 4.5-5 summarizes the findings of the qualitative economic assessment described above. In Table 4.5-5, circle symbols are used as follows:

○ Very low impact potential ◔ Low impact potential ◑ Average impact potential ◕ High impact potential

● Very high impact potential

Table 4.5-5. Summary of Qualitative Assessment of Economic Development Impact Potential of the Oregon Passenger Rail Project

Findings	Counties and Train Station Areas										
	Clackamas		Lane		Linn		Marion			Multnomah	Washington
	Oregon City	Wilsonville	Eugene	Springfield	Albany	Albany Amtrak	Salem Amtrak	N. Salem	Keizer	Portland	Tualatin
Location Quotient											
Knowledge-Based	◑		◑		◑		◑			◕	◑
Tourism	◑		◑		◑		◔			◕	◑
Education	○		○		◑		○			●	○
Shift-Share											
Knowledge-Based	◑		◔		○		◑			◔	●
Tourism	◑		◔		◑		◔			◕	●
Education	●		●		○		●			◕	●
Public Administration	○		○		◔		○			○	●
Socioeconomic Attributes											
Knowledge-Based Employees	◑	●	◑	◑	◑	◑	◑	◑	◑	●	●
Tourism-Based Employees	◑	◑	●	◑	◑	◑	◑	◑	◑	○	○
Education-Base Employees	◑	◔	●	◑	◑	◕	◕	◑	◑	◑	◑
Residents with Higher Education	◕	●	◑	◑	◑	◑	◑	○	◑	●	●
Lower-Income Households	●	◔	○	◑	◑	◑	◕	◕	◔	●	○

Findings	Counties and Train Station Areas										
	Clackamas		Lane		Linn		Marion			Multnomah	Washington
	Oregon City	Wilsonville	Eugene	Springfield	Albany	Albany Amtrak	Salem Amtrak	N. Salem	Keizer	Portland	Tualatin
Smaller Household Size	●	◑	◑	◑	◑	◑	◕	◑	◑	●	◑
High Population	◑	○	◔	◔	●	●	◑	●	◑	○	○
Employment											
Knowledge-Based Companies	◔	◔	●	◑	◔	◑	○	◑	◔	●	◑
Tourism-Based Companies	◔	○	◑	◑	○	◔	◔	●	●	◑	○
Education-Based Companies	○	○	○	◔	○	◑	●	◑	○	◑	○
Knowledge-Based Employees	◑	○	◕	◑	◑	◕	◑	◔	○	◕	●
Tourism-Based Employees	●	○	◔	◔	●	◔	○	●	●	○	○
Education-Based Employees	○	○	○	◔	○	◑	●	◔	○	◑	○
Mixture of Large and Small Companies	○	◑	●	◑	◔	◔	◕	◔	◔	●	○
Land Use											
Close to CBD	◔	◔	●	◑	◕	◕	●	◑	◔	●	◕
Existing Desired Development & Zoning	◑	◔	●	◕	◑	◑	◕	◑	◑	●	◑
Major Draw to Area/University	○	○	◕	◑	○	○	●	◔	◑	●	○

4.5.5.3 Construction Impacts

Alternative 1

Construction impacts would be temporary and could include increased noise, increased vibration, visual impacts, and dust. In addition, community resources could experience temporary impediments to facility access and/or temporary closures to driveways or roads. It is possible that existing roads near railroad construction areas could need to be temporarily closed, relocated or provided with detours. However, construction impacts associated with Alternative 1 would be less intensive and of shorter duration than Alternative 2 construction impacts, because Alternative 1 would include less new infrastructure and could be constructed incrementally.

Alternative 1 would likely result in a short-term stimulus to the local economy. The stimulus generated by construction expenditures would not be limited only to those jobs involved directly with the construction itself (direct economic impacts). Construction companies often purchase raw materials, rent equipment, and consume other goods and services from local businesses in order to complete the construction projects. These local businesses therefore also benefit from the investment, producing additional wages and employment (generally referred to as indirect economic impacts). A further stimulus to the economy would be derived from the additional consumption from those direct and indirect wages and jobs. Employees of the construction companies and supporting businesses would likely spend a portion of their wages in the local community (at grocery stores, restaurants, and movie theaters, for example). This further spending is referred to as induced economic impacts.

Alternative 2 and Alternative 2 with Central Albany Option

While construction impacts would also be temporary under Alternative 2 and Alternative 2 with Central Albany Option, these impacts would be greater than Alternative 1 due to a much larger construction area and negligible opportunities to construct the project incrementally. Increased noise, increased vibration, visual impacts, and dust could affect communities in proximity to construction activities. In addition, community resources could experience temporary impediments to facility access and/or temporary closures to driveways or roads. It could be necessary to temporarily close, relocate or provide detours for roads that intersect or abut construction areas.

Alternative 2 and Alternative 2 with Central Albany Option would include the construction of a mostly new passenger railway alignment, including grade-separated portions over roadways, which would have a greater impact on any communities close to this alignment than Alternative 1. The construction of grade-separated structures over existing roadways would require temporary road closures and detours, and would have a greater intensity of impacts related to noise from any required pile driving, as well as visual impacts from equipment and any required construction staging area.

Alternative 2 would likely result in a short-term economic stimulus to the local economy, although it would require more new rail infrastructure, including stations, and would take a longer period of time to construct than Alternative 1. Therefore, Alternative 2 would create a larger short-term economic stimulus through its construction than Alternative 1.

4.5.6 Potential Mitigation

Mitigation strategies identified in the other sections would contribute to minimization and avoidance of impacts on social resources, including those strategies identified in Section 4.8.6, Noise and Vibration, and Section 4.16.6, Air Quality. During construction, temporary traffic control plans (including plans for transit stops, cyclists, and pedestrians) would be required to maintain needed access to destinations and provide necessary circulation within and between communities. Subsequent Tier 2 environmental reviews and documentation would provide additional details related to mitigation measures for minimizing or avoiding impacts.

No mitigation is expected to be required for potential economic effects. Tier 2 environmental studies would consider and implement project-specific mitigation strategies for economic resources if impacts are identified that require mitigation.

4.6 Section 4(f) and Section 6(f) Resources

This section identifies study area properties protected by Section 4(f) of the USDOT Act of 1966 (Section 4[f]) and Section 6(f) of the Land and Water Conservation Fund Act (LWCFA) of 1965 (Section 6[f]), and discusses legal requirements, methods of analysis, study area, affected environment, potential environmental impacts, and potential mitigation strategies.

This Tier 1 EIS does not provide the level of detail available that FRA would need to make final approvals on uses of protected Section 4(f) or Section 6(f) resources. Therefore, this section focuses on the potential use of these properties. Final decisions on specific location and design will be made at the project level, when more detailed information is available and specific properties can be evaluated.

4.6.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws, regulations, and orders related to Section 4(f) and Section 6(f) and applicable to this Tier 1 analysis include the following:

4.6.1.1 Federal

- **Section 4(f) of the USDOT Act of 1966 (49 USC 303[c]), 23 USC 138.** Section 4(f) refers to the original section in the USDOT Act of 1966 that sets the requirement for consideration of publicly owned parks and recreation lands, wildlife and waterfowl refuges, and historic sites (whether publicly or privately owned) in transportation project development. It prohibits an operating administration within the U.S. Department of Transportation from approving a project that would use land from a Section 4(f) resource unless there is no prudent and feasible alternative to using that land and the project includes all possible planning to minimize harm or the operating administration finds the use would be *de minimis*.
- **Section 6(f) of the LWCFA of 1965, 16 USC 460.** Section 6(f) of the LWCFA of 1965 concerns projects that propose conversion of outdoor recreation property acquired or developed with LWCFA grant assistance. Section 6(f) prohibits the conversion of recreation property acquired or developed with these grants to a non-recreation purpose without the approval of the National Park Service. Section 6(f) directs the National Park Service to ensure that land conversions provide replacement lands of equal value, location, and usefulness as conditions of approval.
- **Section 106 of the National Historic Preservation Act (NHPA), as amended, 54 USC 300101 et seq.** Section 106 of the NHPA requires Federal agencies to consider the effects of their undertakings on historic properties, defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). This includes artifacts, records, and material remains related to such a property or resource. A historic site typically is considered a Section 4(f) resource if it is eligible for the NRHP under Criterion A, B, or C. Section 106 is described in more detail in section 4.11, Cultural Resources.

Section 11502 of the Fixing America's Surface Transportation Act (FAST Act) (Pub. L. 114-94, December 4, 2015) amended the Section 4(f) legislation at 23 U.S.C. § 138(f) and 49 U.S.C. § 303(h) to exempt from Section 4(f) review the use of railroad and rail transit lines, or elements thereof, that are in use or that were historically used for the transportation of goods and passengers. The exemption applies regardless of whether the railroad or rail transit line, or element thereof, is listed on or eligible for listing on the NRHP. The exemption has two exceptions:

- The exemption does not apply to rail stations or transit stations; and

- The exemption does not apply to bridges or tunnels located on a rail line that has been abandoned under the process described in 49 U.S.C. § 10903, or a transit line that is not in use.

4.6.2 Methods

4.6.2.1 Affected Environment Methods

ODOT consulted GIS data and other digital mapping sources to assist in the preliminary identification of parks, recreation lands, and wildlife/waterfowl refuges within or adjacent to the OPR Project study area. No wildlife or waterfowl refuges were identified. The nearest such refuge is Ankeny National Wildlife Refuge, which is approximately 0.75 mile west of the proposed rail alignment centerline for Alternative 2. Therefore, no further discussion of potential Section 4(f) impacts to wildlife and waterfowl refuges is warranted.

ODOT conducted additional review of the identified parks and recreation lands using Google Earth™, applicable state and local park maps, and property descriptions to determine if they are publicly owned, open to the public, and used for recreation. To determine if any of the recreation lands in the study area have received LWCF assistance and, and are therefore protected under Section 6(f), ODOT reviewed the National Park Service LWCF website, which contains a listing of grants, by county.

Architectural and archaeological historians consulted GIS layers maintained by the State Historic Preservation Officer (SHPO) to identify NRHP-listed and NRHP-eligible properties (see section 4.11, Cultural Resources), because these properties are subject to the requirements of Section 4(f).

4.6.2.2 Impact Assessment Methods

There are three types of Section 4(f) uses. First, a permanent incorporation occurs when a proposed action permanently incorporates a Section 4(f) property into the transportation facility (i.e., a "permanent use"). Second, a constructive use occurs when a proposed action could result in proximity impacts or indirect impacts so severe that the protected activities, features, or attributes that qualify a property for protection under Section 4(f) are substantially impaired. Third, a temporary use occurs when a proposed action would not result in a permanent incorporation of Section 4(f) property but would result in a temporary occupancy of that property ("temporary use") that is adverse in terms of the statute's preservationist purpose.

Under Section 4(f), in some cases even where there is a permanent incorporation the operating administration may determine that the impacts to the property are negligible, or *de minimis*. Use of a Section 4(f) property may be determined to be *de minimis* if it does not adversely affect the activities, features and attributes that qualify the resource for protection under Section 4(f). For properties protected under Section 106, an operating administration may only make a *de minimis* impact finding if it finds the project would result in "no adverse effect" to the property, and it has received concurrence from the official with jurisdiction (i.e., the State Historic Preservation Officer or Tribal Historic Preservation Officer).[19] For parks, recreation areas or wildlife refuges, an operating administration must receive the concurrence from the official with jurisdiction (agency who owns or manages the property) on its *de minimis* impact determination after seeking public comments.

Given the early level of conceptual engineering and the program-level environmental analysis conducted for this Tier 1 EIS, a final determination of potential permanent, constructive, or temporary Section 4(f) "use" is not possible. Therefore, this analysis discusses relative potential impacts to Section 4(f) resources. Formal Section 4(f) analyses and/or approvals, as appropriate, will be completed during subsequent Tier 2 environmental studies, as discussed below.

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[19] Section 4(f) does not apply to NRHP-listed or NRHP-eligible archaeological sites when the resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

The calculation of parkland in the study area is the result of a two-dimensional GIS analysis that calculated the total amount of Section 4(f) park property intersected by the proposed ROW footprint of the respective build alternatives. Therefore, calculations may overstate the amount of potentially affected parkland, especially where improvements would be elevated.

For Section 6(f)-protected parks and recreational properties that could be directly impacted by the OPR Project, the discussion below includes an assessment of the activities, features, and attributes of each Section 6(f) resource.

For Section 4(f) cultural resources that could be directly impacted by the OPR Project, the discussion below addresses whether NRHP-listed or NRHP-eligible historic properties could be adversely affected under Section 106 of the NHPA (see section 4.11, Cultural Resources). Within this Tier 1 analysis, potential Section 106 adverse effects are considered to be potential impacts to Section 4(f) cultural resources.

4.6.2.3 Tier 2 Analysis

The supporting analyses for this Tier 1 Draft EIS were based on a conceptual level of engineering, and therefore, any specific Section 4(f) “use” and/or Section 6(f) “conversion” cannot be determined at this time. Additional confirmation and/or data gathering would be necessary during the subsequent tier of environmental analysis, after coordinating with the official or officials with jurisdiction over Section 4(f) resources. Future Tier 2 environmental analyses would include specific location and design parameters, along with the use of location- and project-specific GIS mapping that could be used to document and further address potential Section 4(f) use and minimization of harm.

If a build alternative has the potential to result in the conversion of Section 6(f)-protected lands, then coordination efforts would be initiated, and reasonable and feasible options for avoiding or minimizing conversion of Section 6(f) property would be further evaluated during Tier 2 environmental analyses. If avoidance is not feasible, minimization of the conversion footprint would be a primary goal.

In addition, as the OPR Project moves forward and time passes, field verification in subsequent Tier 2 environmental analyses would be necessary to ensure the accuracy of historic sites identified in this analysis and to identify any potentially affected historic sites not addressed in this Tier 1 EIS.

4.6.3 Study Area

The study area for parks and recreation resources, both Section 4(f) and Section 6(f), is the area within 100 feet from the track centerline and potential new station locations for the entire route of both build alternatives. The impact analysis focuses on parks and recreation resources within 100 feet from the track centerline of proposed new track improvements.

The study area for Section 4(f) cultural resources is that area within 100 feet from the track centerline and within a 20-acre area of potential new station locations for the entire route of both build alternatives; the impact analysis focuses on new track improvements. Appendix D, Figure D-2 shows locations of Section 4(f) parks and historic resources.

4.6.4 Affected Environment

4.6.4.1 Parks and Recreation Resources

Table 4.6-1 lists Section 4(f) and Section 6(f) parks/recreation resources located within the study area.

Table 4.6-1. Section 4(f) and 6(f) Parks/Recreation Resources in the Study Area

Resource Name	Amenities	Alternative	Location/ Jurisdictional Owner	Section 4(f) Property?	Section 6(f) Property?
Washington/ Jefferson Park	Basketball court, horseshoe pits, performance stage/space, a 23,000-square-foot skatepark, open grass areas, walking paths, and restrooms	Alternative 1	150 Jefferson Street, Eugene/ ODOT (City of Eugene leases)	No[a]	Yes
Eastgate Woodlands/ Alton Baker Park/ Whilamut Natural Area	Urban greenway connecting Eugene and Springfield. Paved bike/running paths, boat landing, picnic tables, playground, natural area, and parking.	Alternative 2	512 Aspen Street, Springfield/ Willamalane Park and Recreation District	Yes	Yes
Armitage County Park	Boat ramp on the McKenzie River, picnic sites, trails, volleyball courts, an off-leash dog area, and horseshoe pits	Alternative 2	90064 Coburg Road, unincorporated Lane County/ Lane County Parks	Yes	No
Freeway Lakes County Park	Three lakes within the park (approximately 7 acres, 9 acres and 21 acres). Public recreation boat landing, dock access, and restroom facilities	Alternative 2; Alternative 2 with Central Albany Option	6000 Three Lakes Road SE, unincorporated Linn County/ Linn County	Yes	No
Maple Lawn Park	Open grass fields and two playground areas	Alternative 2 with Central Albany Option	1950 SE 4th Avenue, Albany/ City of Albany	Yes	No
Santiam River I-5 Boat Ramp	Public boat ramp	Alternative 2	Unincorporated Marion County/ Oregon Department of Transportation	Yes	No[b]
Keizer Little League Park	12 youth-sized baseball diamonds, a picnic shelter, and a parking lot	Alternative 2	5245 Ridge Drive NE, Keizer/ City of Keizer	Yes	No
St. Louis Ponds County Park	Fishing amenities and picnic sites	Alternative 2	Unincorporated Marion County/ Marion County	Yes	Yes
Settlemier Park	Three picnic shelters, playground, skatepark, baseball/softball field, and an aquatic center	Alternative 1	400 Settlemier Street, Woodburn/ City of Woodburn	Yes	Yes
North Front Street Park	Playground and open play field	Alternative 1	1080 N. Front Street, Woodburn/ City of Woodburn	Yes	No

Resource Name	Amenities	Alternative	Location/ Jurisdictional Owner	Section 4(f) Property?	Section 6(f) Property?
Boones Ferry Park	Basketball court, picnic areas, walking paths, playground, gazebo, restrooms, and parking	Alternative 2	31240 SW Boones Ferry Road, Wilsonville/ City of Wilsonville	Yes	Yes
Fish Eddy Landing	Undeveloped natural area, boat access, and open grass area	Alternative 1	Canby/ City of Canby	Yes	No
West Bridge Park	River access, trails and forested areas	Alternative 2	5300 River Street, West Linn/ City of West Linn	Yes	No
Sportcraft Landing	Public boat launch and dock, trails, and restroom facilities	Alternative 2	1701 Clackamette Drive, Oregon City/ City of Oregon City	Yes	Yes
North Clackamas District Park – Three Creeks Natural Area	Natural area with trails through wetlands and upland forest	Alternative 1; Alternative 2	Unincorporated Clackamas County/ North Clackamas Parks & Recreation District	Yes	No
Campbell Elementary School Athletic Fields	Athletic fields (baseball, softball, and soccer), open to the general public	Alternative 1; Alternative 2	11326 SE 47th Avenue, Milwaukie/ City of Milwaukie	Yes	No
Minthorn Springs Natural Area	Natural area with trails	Alternative 1; Alternative 2	Milwaukie/ Wetlands Conservancy and City of Milwaukie	Yes	No
Minthorn North Natural Area	Natural area with trails	Alternative 1; Alternative 2	Milwaukie/ City of Milwaukie	Yes	No
Roswell Pond Open Space	Natural area with trails	Alternative 1; Alternative 2	Milwaukie/ City of Milwaukie	Yes	No
Springwater Corridor Trail	21 mile multi-use trail	Alternative 1; Alternative 2	Milwaukie (affected segment)/ Metro	Yes	No
Eastmoreland Golf Course	Public golf course	Alternative 1; Alternative 2	2425 SE Bybee Boulevard, Portland/ City of Portland	Yes	No
Vera Katz Eastbank Esplanade	1.5 mile multi-use trail	Alternative 1; Alternative 2	Portland/ City of Portland	Yes	No
Steel Bridge Riverwalk	0.2-mile multi-use trail	Alternative 1; Alternative 2	Portland/ City of Portland	Yes	No

[a] Washington/Jefferson Park is located on leased property owned by ODOT. The land remains under ODOT jurisdiction, with ODOT's right of use for transportation purposes reserved as the site's primary use. Therefore, Washington/Jefferson Park does not qualify as a Section 4(f) property.

[b] Construction of the Santiam River I-5 Boat Ramp was partially funded by a Federal Sport Fish Restoration Act grant and an Oregon State Marine Board boating facility grant; each of these grants has a conversion of use provision similar to Section 6(f) of the LWCFA. Source: ODOT, 2016e.

In addition to resources identified in **Table 4.6-1**, the following parks/recreation resources are also located in the study area. However, no OPR Project actions are proposed near these resources, and the only potential effects would be increased noise and visual effects from increased passenger train frequency. These resources are already near an active mainline freight track which pre-dates the existence of all these resources. No further analysis or documentation is required.

- Harrisburg City Skateboard Park (Harrisburg)
- 5th Street Park (Turner)
- Claggett Creek Natural Area (Salem)
- Coalca Landing Willamette River Greenway (Clackamas County)
- Canemah Bluff Natural Area (Oregon City)
- McLoughlin Promenade (Oregon City)
- Governor Tom McCall Waterfront Park (Portland)
- The Fields Neighborhood Park (Portland)
- Heron Lakes Golf Course (Portland)

4.6.4.2 Section 4(f) Cultural Resources

Within the collective study area for Alternatives 1 and 2, there are 121 historic (built) properties listed in or eligible for the NRHP, including 15 buildings and three historic districts listed in the NRHP and therefore protected by Section 4(f). **Table 4.6-2** below identifies these NRHP-listed properties and their association with Alternative 1 and/or Alternative 2. Ten of these properties contribute to the three listed historic districts, while six are located within one of these historic districts but have been previously determined as ineligible/non-contributing resources. The remaining 93 properties are not currently listed in the NRHP but have been previously determined eligible for listing; these properties would require further research during Tier 2 environmental analyses to verify missing information (such as the property name, type, date of construction, and area of significance for each eligible property).

Table 4.6-2. NRHP-Listed Section 4(f) Historic (Built) Properties in the Study Area

Property Name	Year Built	Location	Alternative
Southern Pacific Passenger Depot	1908	433 Willamette Street, Eugene	Alternative 1
McCracken Brothers Motor Freight Building	c.[a] 1930	375 W 4th Avenue, Eugene	Alternative 1
Hackleman Historic District (1 contributing building in APE[b])	c. 1860–1915	Albany, Linn County	Alternative 1; Alternative 2 with Central Albany Option
Thomas Kay Woolen Mill	1886	1313 Mill Street SE, Salem	Alternative 1
Salem Southern Pacific Railroad Station	1918	500 13th Street SE, Salem	Alternative 1
Chemawa Indian School Site	1885	3700 Chemawa Road NE, Chemawa	Alternative 1
Bank of Woodburn	1890	199 N Front Street, Woodburn	Alternative 1
Aurora Colony Historic District (2 contributing buildings in APE)	c. 1856–1881	Aurora, Marion County	Alternative 1

Property Name	Year Built	Location	Alternative
Canemah Historic District (7 contributing buildings in APE)	c. 1850–1928	Oregon City, Clackamas County	Alternative 1
Erwin Charles House (Gray-Hackett House)	1893	415 17th Street, Oregon City	Alternative 1
Jones Cash Store	1921	111 SE Belmont Street, Portland	Alternative 1
Spokane, Portland & Seattle Railway Steam Locomotive	1938	2250 SE Water Avenue, Portland	Alternative 1; Alternative 2
International Harvester Warehouse	1912	79 SE Taylor Street, Portland	Alternative 1
Oregon Portland Cement Building	1929	111 SE Madison Street, Portland	Alternative 1
Pacific Hardware & Steel Company Warehouse (Vinton Company Warehouse, Fuller, WP & Company)	1910	2181 NW Nicolai Street, Portland	Alternative 1; Alternative 2
Olympic Cereal Mill	1920	107 SE Washington Street, Portland	Alternative 1; Alternative 2
Portland’s Union Station	1894	800 NW 6th Avenue, Portland	Alternative 1; Alternative 2
John Deere Plow Company Building	1911	215 SE Morrison Street, Portland	Alternative 2

[a] c. = circa.

[b] APE = Area of potential effect.

Source: ODOT, 2016e.

As listed in Table 4.11-2 (Section 4.11, Cultural Resources), eight known archaeological sites are within the No Action Alternative/Alternative 1 study area, and ten known sites are within the Alternative 2 study area. Three of these archaeological sites are common to both proposed build alternatives. Previously, five of these archaeological sites were determined eligible for listing in the NRHP. It is likely that Tier 2 archaeological surveys would identify additional archaeological sites in association with a more definitive OPR Project design and study area. At that time, sites not previously evaluated for listing in the NRHP would be evaluated.

4.6.5 Environmental Consequences

This subsection identifies the potential direct, indirect, and construction-related impacts associated with Section 4(f) and Section 6(f) resources within the OPR Project study area.

4.6.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative would not affect Section 4(f) or Section 6(f) resources.

Alternative 1

Parks/Recreation Resources

Alternative 1 could result in potential impacts to 13 Section 4(f) parks/recreation resources. Section 6(f) of the LWCFA also protects six of these resources. Based on the high-level assessment performed for this Tier 1 EIS effort, as summarized below, ODOT and FRA anticipate that more refined project-level engineering could result in avoidance of permanent incorporation of most Section 4(f) properties, and they do not expect potential impacts to adversely affect the features, attributes or activities qualifying any Section 4(f) resource for protection. Based on the Tier 1 analysis, impacts to Section 4(f) parks/recreation resources would likely be no more than *de minimis* in nature. Tier 2 environmental studies and coordination with jurisdictional authorities would further quantify OPR Project impacts to Section 4(f) resources and determine the 4(f) effects, which could in turn result in project design modifications intended to avoid and/or minimize impacts to Section 4(f) resources.

Section 4(f) and Section 6(f) parks/recreation resources in the Alternative 1 study area are described below, along with potential impacts that could result from the OPR Project.

ODOT and FRA do not expect adverse effects from noise, vibration or visual intrusions. All of the 4(f) resources listed are presently next to an active freight mainline (UPPR), which existed prior to the resource establishments. All of these resources are currently subject to noise, vibration and visual intrusion from freight and passenger rail activity. Additional analysis of potential noise, vibration and visual impacts will be conducted during Tier 2.

Washington/Jefferson Park

According to GIS analysis, 1.24 acres of the 21-acre Washington/Jefferson Park property is located within the study area. The park is located in Eugene below the elevated I-105 freeway, on land leased from ODOT. The land remains under ODOT jurisdiction, with ODOT’s right of use for transportation purposes reserved as the site’s primary use. Therefore, Washington/Jefferson Park does not qualify as a Section 4(f) property.

Because Washington/Jefferson Park received LWCF grant funds, the park is subject to the requirements of Section 6(f). As such, if subsequent Tier 2 environmental analyses for individual projects determined that the acquisition of parkland is required, replacement parkland of equal value, location, and usefulness could be required as mitigation. Although Alternative 1 could be designed during subsequent project-level analysis to avoid permanent incorporation of any of this park property, this alternative could impact a thin strip of unimproved parkland located along the edge of the park, just north of the existing rail tracks, that contains a row of evergreen trees.

Settlemier Park

Approximately 0.21 acre of the 10-acre Settlemier Park property located in Woodburn is situated within the Alternative 1 study area. Alternative 1 would avoid permanent incorporation of any of this park property, and no other adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f) are anticipated, because no recreation amenities are located in the study area.

The park is also subject to the requirements of Section 6(f) because of the use of LWCF grant funds; therefore, acquisition of replacement parkland could be required if parkland is converted to a non-recreational use.

North Front Street Park

Approximately 0.09 acre of the 1.14-acre North Front Street park property in Woodburn is located within the study area. This part of the property contains a thin strip from the eastern edge of the open play field; no recreation improvements are located in the study area. Alternative 1 would avoid any permanent incorporation of any of this park property, and would not be likely to result in adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f), because no recreation amenities are located in the study area.

Fish Eddy Landing

Approximately 0.65 acre of the 20-acre Fish Eddy Landing property is located within the study area. However, Alternative 1 would avoid any permanent incorporation of any of this park property, and ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

North Clackamas District Park – Three Creeks Natural Area

Approximately 11.5 acres along the southern edge of Three Creeks Natural Area are located within the study area. However, because Alternative 1 improvements would be located on the south side of the existing tracks, Alternative 1 could be developed to either avoid permanent incorporation of this park property, or any impact would likely not exceed a narrow strip of land along the very southern edge of the natural area. Because no recreation amenities are located in the study area, ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

Campbell Elementary School Athletic Fields

Approximately 0.2 acre of the Campbell Elementary School property is located within the study area. Alternative 1 improvements would be located on the south side of the existing rail tracks, whereas the athletic fields are located north of the existing rail tracks. Therefore, it is not anticipated that Alternative 1 improvements would impact the main baseball field, nor would they adversely affect the features, attributes or activities qualifying the property for protection under Section 4(f).

Minthorn Springs Natural Area

According to GIS analysis, 0.6 acre along the northern edge of Minthorn Springs Natural Area is located within the study area. This part of the property contains a strip of wetlands but no recreation improvements. Design improvements and coordination with the Wetlands Conservancy and the City of Milwaukie could minimize the amount of area acquired as well as the impact on wetlands. Alternative 1 would not be likely to result in adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f), because no recreation amenities are located in the study area.

Minthorn North Natural Area

Approximately 0.5 acre on the northern edge of the 1-acre Minthorn North Natural Area property is located within the study area. This part of the property contains a strip of wetlands but no recreation improvements. Design improvements and coordination with the Wetlands Conservancy and the City of Milwaukie could potentially avoid or minimize the amount of area acquired as well as the impact on wetlands. Because no recreation amenities are located in the study area, ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

Roswell Pond Open Space

Approximately 0.6 acre along the western edge of the 1.7-acre Roswell Pond property is located within the study area. There are no recreation amenities located in this area and, as such, adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f) are not anticipated.

Springwater Corridor Trail

Approximately 0.53 acre of the 21-mile, multi-use trail Springwater Corridor Trail property is located within the study area. The Springwater Corridor Trail is elevated on a bridge structure at this location. The area under the existing bridge could accommodate construction of Alternative 1 improvements with no effect on the structure or trail. Therefore, ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

Eastmoreland Golf Course

Approximately 5.6 acres of the 68-acre Eastmoreland Golf Course property are located within the study area. However, based on the widths of the existing rail ROW and the proposed additional track, ODOT and FRA anticipate that Tier 2 engineering design efforts could facilitate avoidance and/or minimization of adverse effects to the Section 4(f)-qualifying features, attributes and activities of the golf course. Tier 2 environmental studies would also need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Vera Katz Eastbank Esplanade

Approximately 1.2 acres of the City of Portland's Vera Katz Eastbank Esplanade linear park property are located within the study area. The segment of the Esplanade property in the study area is a stub pedestrian/bicycle multi-use path on a bridge structure that crosses the existing UPRR line and connects to NE Lloyd Boulevard. Because the stub pedestrian/bicycle facility is elevated on a bridge structure at this location, there is ample room for improvements under the existing trail bridge. Therefore, ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

Steel Bridge Riverwalk

Approximately 0.3 acre of the Steel Bridge Riverwalk property is located within the study area. The segment of the trail in the study area is located directly adjacent to the existing railroad track on the lower deck of the Steel Bridge. No improvements are proposed to the Steel Bridge, and there would be no permanent incorporation of the Steel Bridge Riverwalk. As such, ODOT and FRA do not anticipate adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f).

Cultural Resources

There are 102 NRHP-listed or NRHP-eligible historic (built) properties within the study area for Alternative 1. Forty-eight of those are located adjacent to the proposed rail alignment and to existing station facilities. The remaining properties are located adjacent to the existing mainline in areas where there would not be infrastructure improvements. Section 4.11, Cultural Resources, discusses the potential impacts to these properties in more detail.

Under Alternative 1, historic (built) properties adjacent to new track and other infrastructure improvements could experience direct impacts from ROW acquisition, as well as minor visual and noise and vibration proximity impacts from the increased number of passenger trains. Although most ROW acquisition from historic properties would likely consist of linear strips of unimproved property, it could still constitute a Section 4(f) use, and it is also possible that the removal of historic properties would be required. Tier 2 analyses for subsequent projects would further assess the potential for adverse effects resulting from ROW acquisition. Because the historic properties are currently located adjacent to the railroad tracks, Alternative 1 improvements and additional passenger trains would not likely result in a significant increase in visual, noise, or vibration impacts beyond those under the No Action Alternative. Similarly, historic or potentially historic properties located adjacent to the existing mainline where no improvements are proposed would not be expected to experience visual, noise, or vibration impacts beyond those under the No Action Alternative.

Alternative 1 considers a potential new Woodburn station, and the station study area includes a c. 1930 property that has not been evaluated for NRHP eligibility. The potential for adverse effects associated with the property would be dependent on the potential new station's exact location and design, as well as the NRHP eligibility of the property. If the Woodburn station is selected for development, these considerations would be assessed further in Tier 2 analyses.

All five of the existing stations under Alternative 1 are historic; the Oregon City and Albany stations are eligible for NRHP listing, and the remaining three are listed on the NRHP—those in Eugene, Salem, and Portland. Separate projects are currently developing preliminary engineering and environmental analysis for the Eugene Station and Portland Union Station. Although Alternative 1 assumes no physical changes to the stations, any potential improvements within the station properties (i.e., improvements to the railroad tracks) could result in changes to the historic settings. Railroad tracks are an integral part of the settings of existing historic railroad stations. Even so, regular maintenance and technology-related improvements throughout history have altered the settings of the existing historic railroad stations to improve their overall functionality. Such improvements, particularly those that have occurred within the period of significance for the stations, do not diminish the integrity of the historic buildings. Changes to existing stations that occur outside of the designated periods of significance could result in adverse effects.

In addition to the potential impacts discussed above, Alternative 1 could result in improvements on a historic railroad line—the former Southern Pacific line, which may be eligible for the Fast Act Section 11502 exemption. Construction of new adjacent track and/or additional sidings, cross-overs, and industry connections are typical improvements that the railroads have made over the years, and it is not likely that these improvements would significantly diminish the integrity of the overall resource or adversely affect the railroad line's character-defining qualities. Addition of a parallel mainline track and improvements to the existing track would not diminish the railroad's significant association with the early development of Oregon, its cities, and the Northwest region. For these reasons, it is unlikely that improvements under Alternative 1 would result in adverse effects to the historic rail line.

Eight known historic (archaeological) sites are located within the Alternative 1 study area. One of these sites has been determined eligible for listing in the NRHP. Additional archaeological sites could be recorded during SHPO consultation and subsequent fieldwork activities within the Tier 2 APE, and if so would require NRHP eligibility evaluation prior to construction. Direct impacts to archaeological resources could be caused by physical, ground-disturbing actions associated with infrastructure construction. Because field investigations were not conducted for this Tier 1 EIS, the potential adverse impacts of the OPR Project to archaeological sites would be determined during subsequent Tier 2 environmental studies. For archaeological sites, any direct impact is permanent and potentially adverse. An inadvertent discovery plan may also be put into effect in case previously undiscovered resources are exposed during construction.

Indirect impacts to historic properties from Alternative 1 could be prompted by increases in vehicular and pedestrian traffic near Alternative 1 station areas due to growth in passenger rail ridership. As demand rises for access to passenger rail stations, related local transportation improvements and commercial growth could potentially result in physical impacts to historic properties as well as adverse effects on the settings of small towns, historic districts, and individual historic properties. Conversely, local transportation improvements and increased commercial growth could result in rehabilitation of historic buildings and revitalization of historic districts.

Archaeological data recovery is usually considered a mitigating action for adverse impacts. However, the destruction of an archaeological site, even through data recovery, is permanent, and such resources are finite. Significant archaeological sites that warrant preservation in place are protected under Section 4(f). It should be noted that this discussion addresses only those sites within the Alternative 1 study area. Additional sites adjacent to Alternative 1 (outside the study area, where no project activities are planned) are not addressed.

Indirect impacts to archaeological sites could be caused by construction activities that result in access to sites not previously identified or previously inaccessible.

Alternative 2

Parks/Recreation Resources

Alternative 2 would result in potential impacts to 18 Section 4(f) parks/recreation resources. Based on the high-level assessment performed for this Tier 1 EIS effort as summarized below, these potential impacts would not be expected to adversely affect the features, attributes, or activities qualifying any Section 4(f) resource for protection. Therefore, any direct impacts to Section 4(f) park/recreation resources are expected to be *de minimis* in nature. Tier 2 environmental studies and coordination with jurisdictional authorities would further quantify OPR Project impacts to Section 4(f) resources, which could in turn result in project design modifications intended to avoid and/or minimize impacts to Section 4(f) resources.

Potential impacts to the following Section 4(f)-protected parks/recreation resources under Alternative 2 are the same as those described above for Alternative 1:

- North Clackamas District Park – Three Creeks Natural Area
- Campbell Elementary School Athletic Fields
- Minthorn Springs Natural Area
- Minthorn North Natural Area
- Roswell Pond Open Space
- Springwater Corridor Trail
- Eastmoreland Golf Course
- Vera Katz Eastbank Esplanade
- Steel Bridge Riverwalk

Potential impacts to Section 4(f) and Section 6(f) parks/recreation resources that would be unique to Alternative 2 are described in the remainder of this section.

Eastgate Woodlands/Alton Baker Park/Whilamut Natural Area

Eastgate Woodlands is located along the Willamette River at the eastern-most end of the Whilamut Natural Area of Alton Baker Park, an urban greenway connecting the communities of Eugene and Springfield. Approximately 4.5 acres of Eastgate Woodlands are located within the study area. This part of the property contains segments of two paved bike paths and a strip of forested land along the park's western edge. However, because the Alternative 2 alignment would be on elevated track as it crosses this resource, it is not anticipated that there would be disruption to the continuity of the existing recreational trails. The only direct impact would be from the installation of columns to support the elevated-rail guideway. During design, the support columns could be placed away from the existing trails or, if necessary, the trails could be realigned to avoid the installed columns while preserving the continuity of the trails. Therefore, adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f) are not anticipated. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Alton Baker Park has received LWCF grant funds and, therefore, is subject to the requirements of Section 6(f). As such, if subsequent, Tier 2 environmental analyses for individual projects determines that the acquisition of parkland is required, the OPR Project would need to obtain replacement parkland of equal value, location, and usefulness as that land being acquired from Eastgate Woodlands associated with the installation of support columns.

Armitage County Park

Approximately 1.46 acres of the 56.7-acre Armitage County Park property are located within the study area. This part of the park contains recreation amenities such as a portion of a park circulation road, some open grass and forested areas, a paved walking trail, and a portion of a beach area fronting the McKenzie River. However, because the Alternative 2 alignment would be on elevated track as it crosses this resource, it is not anticipated that there would be disruption to the continuity of the existing recreational trails or adverse effects to other recreation amenities. The only direct impact would be from the installation of columns to support the elevated-rail guideway. During design, the support columns could be placed away from the existing amenities. Therefore, adverse effects to the features, attributes, or activities qualifying the property for protection under Section 4(f) are not anticipated. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Freeway Lakes County Park

Approximately 1.76 acres of the 27-acre Freeway Lakes County Park property are located within the study area. There are three lakes within the park connected by Oak Creek, which flows under I-5. The part of the property within the study area contains forested strips along each side of I-5. No recreation features are located in the study area. The Alternative 2 alignment would be on elevated track as it crosses this resource. Therefore, the only direct impact would be from the installation of columns to support the elevated-rail guideway. These support columns could be designed so they would not impact the channel connection between the lakes located on either side of the highway. Therefore, adverse effects to the features, attributes, or activities qualifying the property for protection under Section 4(f) are not anticipated. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Santiam River I-5 Boat Ramp

The Santiam River I-5 Boat Ramp is located within the Alternative 2 study area. The I-5 Santiam River Rest Area provides the only vehicular access to this public boat ramp. The Alternative 2 alignment would be on elevated track as it crosses the interstate rest area, and the nearest direct impacts would be from the installation of columns to support the elevated-rail guideway located east of and parallel to I-5. Based on this Tier 1 assessment, the proposed Alternative 2 alignment would not directly impact the Santiam River I-5 Boat Ramp. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary and constructive use of the Section 4(f) property.

Keizer Little League Park

Approximately 0.33 acres of the 16.7-acre Keizer Little League Park property is located within the study area. This part of the property contains only an unimproved gravel area; no recreation improvements are located in the study area. Alternative 2 could avoid permanent incorporation of any of this park property, and no other adverse effects to the features, attributes or activities qualifying the property for protection under Section 4(f) are not anticipated.

St. Louis Ponds County Park

Approximately 2 acres of the 21.87-acre St. Louis Ponds County Park property are located within the study area. This part of the property contains unimproved land along the park's western edge; no recreation improvements are located in the study area. Therefore, adverse effects to the features, attributes, or activities qualifying the property for protection under Section 4(f) are not anticipated.

St. Louis Ponds County Park has received LWCF grant funds and, therefore, is subject to the requirements of Section 6(f). As such, if subsequent Tier 2 environmental analyses for individual projects determines that conversion of parkland would occur, replacement parkland of equal value, location, and usefulness could be required as mitigation.

Boones Ferry Park

Approximately 0.95 acre of the 3.1-acre Boones Ferry Park property is located within the study area. This part of the property contains a strip of open grass and forested area on the western edge of the park; no recreation improvements are located in the study area. The Alternative 2 alignment would be on elevated track as it crosses this resource, so the only direct impact would be from the installation of columns to support the elevated-rail guideway. Based on this Tier 1 assessment, it is not anticipated that improvements would have an adverse effect on Boones Ferry Park or its qualifying Section 4(f) elements. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Boones Ferry Park has received LWCF grant funds and, therefore, is subject to the requirements of Section 6(f). As such, if subsequent Tier 2 environmental analyses for individual projects determined that the conversion of parkland would occur, replacement parkland could be required as mitigation.

West Bridge Park

Approximately 1.17 acres of the 4.1-acre West Bridge Park property are located within the study area. This part of the property contains a forested riverbank area and a portion of a trail. However, because the Alternative 2 alignment would be on elevated track as it crosses this resource, it is not anticipated that there would be disruption to the continuity of the existing recreational trails. The only direct impact would be from the installation of columns to support the elevated-rail guideway. During design, the support columns could be placed away from the existing trails or, if necessary, the trails could be realigned to avoid the installed columns while preserving the continuity of the trails. In addition, the design of support column locations could minimize impacts on existing trees, especially mature trees and/or significant groves. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Sportcraft Landing

Approximately 0.98 acre of the 3.4-acre Sportcraft Landing property is located within the study area. This part of the property contains a public boat dock and a parking area. However, because the Alternative 2 alignment would be on elevated track as it crosses this resource, impacts on the public boat dock are not anticipated. Design of future projects could seek to avoid placing columns near the boat dock or in the parking lot. Based on this Tier 1 assessment, it is not anticipated that improvements would have an adverse effect on Sportcraft Landing or its qualifying Section 4(f) elements. Tier 2 environmental studies would need to ensure that construction activities would avoid and/or minimize any temporary use of the Section 4(f) property.

Sportcraft Landing has received LWCF grant funds and, therefore, is subject to the requirements of Section 6(f). As such, if subsequent Tier 2 environmental analyses for individual projects determines that the conversion of parkland would occur, replacement parkland of equal value, location, and usefulness could be required as mitigation.

Cultural Resources

Thirty-three NRHP-listed or NRHP-eligible historic (built) properties are within the study area of Alternative 2. Section 4.11, Cultural Resources, discusses the potential impacts to these properties in more detail.

Alternative 2 would include the addition of a new track throughout the full alignment, with siding tracks placed every 10 to 12 miles to facilitate passing operations. Therefore, ODOT and FRA anticipate that Alternative 2 would result in more impacts than Alternative 1 in relation to the acquisition of ROW and the potential impacts to historic (built) properties. Construction of the cut-and-cover tunnel that would run below Southeast 2nd Avenue in southeast Portland would require ROW acquisition, including the potential purchase of large parcels, two of which contain buildings constructed in 1946 and 1937, respectively. ODOT and FRA have not determined the NRHP eligibility of these buildings. Further evaluation would be required during subsequent Tier 2 environmental studies to determine impacts associated with ROW acquisition.

In addition to the acquisition of ROW and potential demolition, impacts associated with the new mainline track could include increased visual, noise, and vibration on surrounding historic (built) properties. For the majority of the Alternative 2 alignment, potentially impacted historic properties are immediately adjacent to an existing freeway. Therefore, identified historic properties are already subject to the noise, vibration, and visual effects resulting from heavy road traffic, and it is unlikely that those indirect impacts from Alternative 2 improvements would be a considerable change from the No Action Alternative.

Alternative 2 would include construction of new elevated viaducts and bridges. Although no known NRHP-listed or NRHP-eligible properties are adjacent to the proposed bridge or elevated structures, visual impacts and adverse effects on the settings of surrounding historic properties could occur. Further evaluation would be required during subsequent Tier 2 environmental studies to determine these impacts.

Construction of new stations along Alternative 2 could also result in adverse effects on historic properties. Alternative 2 considers five potential new station locations. The Salem and Tualatin station locations would be adjacent to, or in the vicinity of, buildings constructed in or before 1969 that have not been evaluated for NRHP eligibility and could be historic. These new stations could require demolition of existing buildings or structures, which could also result in adverse effects on potential historic properties on or adjacent to those sites. The Tualatin station location is within the freeway median, which would limit the impact on any surrounding historic properties. At this time, there are no known properties constructed in or before 1969 within the study area for the Springfield, Albany, Keizer, Woodburn, or Wilsonville station locations. There are approximately 70 properties in the study area of the aforementioned station locations for which the year of construction is still unknown. For this reason, the number of potentially impacted historic buildings associated with these new stations could be higher. For each station selected for development, further evaluation would be required during Tier 2 environmental studies to determine potential impacts.

Under Alternative 2, potential Section 4(f) impacts could occur along the segment of the historic Oregon Electric Railway line between Keizer and Wilsonville, which is potentially eligible for listing in the NRHP and may be eligible for the Fast Act Section 11502 exemption. As discussed above, improvements to the existing track and an additional mainline track and sidings are unlikely to significantly diminish the integrity of the overall resource, adversely affect the railroad line’s character-defining qualities, or diminish the railroad’s significant association with the early development of Oregon, its cities, and the Northwest region.

Ten known archaeological sites are located within the Alternative 2 study area. Five of these sites have been determined eligible for listing in the NRHP. Because field investigations were not conducted as part of this Tier 1 analysis, potential adverse impacts to archaeological sites would be determined during subsequent Tier 2 environmental studies.

Alternative 2 with Central Albany Option

Parks/Recreation Resources

Potential impacts to parks and recreational resources under the Alternative 2 Central Albany Option would be the same as those described for Alternative 2, with the addition of potential impacts on one more Section 4(f) property: Maple Lawn Park.

<u>*Maple Lawn Park*</u>

Approximately 0.46 acre of the 2-acre Maple Lawn Park property is located within the study area for the Alternative 2 Central Albany Option. This part of the park contains the front lawn of Maple Park Preschool and a portion of the school’s parking lot; no recreation amenities are located in the study area. This property is already adjacent to an active, double-tracked freight rail mainline and subject to noise, vibration and visual impacts and the OPR Project is not anticipated to substantially increase those impacts. Therefore, ODOT and FRA do not anticipate adverse effects to the features, attributes, or activities qualifying the property for protection under Section 4(f).

Cultural Resources

In addition to the NRHP-listed or NRHP-eligible properties within the study area of Alternative 2, one NRHP-listed historic district (the Hackleman Historic District, including a contributing building) and three additional NRHP-eligible historic (built) properties are located within the Alternative 2 Central Albany Option study area. Although no direct impacts on the Hackleman Historic District or the NRHP-eligible properties are anticipated, minor visual, noise, and vibration impacts could result in adverse effects. Further evaluation would be required during subsequent Tier 2 environmental studies to determine these impacts.

No additional known historic (archaeological) sites were identified for the Alternative 2 Central Albany Option segment. Because field investigations were not conducted as part of this Tier 1 analysis, potential adverse impacts to archaeological sites would be determined during subsequent Tier 2 environmental studies.

4.6.5.2 Construction Impacts

Construction impacts under Alternative 1 would be less intensive, affect a smaller area, and would be shorter in duration than under Alternative 2. Because an existing railroad line does not exist adjacent to substantial portions of Alternative 2 and new passenger rail stations would be built, an increased level of construction would be necessary, along with a greater reliance on surface roads for delivery of equipment and materials compared to Alternative 1. Potential construction impacts of the build alternatives to Section 4(f) and Section 6(f) resources could include noise, vibration, and dust impacts to adjacent properties as well as minor delays to local traffic circulation. Construction impacts could also include unanticipated discovery of previously unknown historic (archaeological) sites, which would need to be evaluated for NRHP eligibility. Construction-related activities occurring close to any of the Section 4(f) and Section 6(f) resources described above could result in temporary occupancy of those resources. Further evaluation would be required during subsequent Tier 2 environmental studies to determine whether temporary occupancy would occur.

4.6.6 Potential Mitigation

None of the build alternatives considered at this Tier 1 level of NEPA analysis, including the preliminary alternatives that were considered and dismissed, would avoid all Section 4(f) resources in the OPR Project study area. However, ODOT and FRA anticipate that: (1) the build alternatives studied in this EIS could avoid most of the identified potential Section 4(f) impacts, and (2) those Section 4(f) resources that cannot be completely avoided would likely meet the criteria for a Section 4(f) *de minimis* impact finding.

Subsequent project-level design efforts and Tier 2 environmental studies would more specifically identify OPR Project impacts to Section 4(f) and Section 6(f) resources, and could result in modifications to Tier 1 conceptual infrastructure design in order to avoid and/or minimize impacts to these resources. Any mitigation provided to compensate for Section 4(f) *de minimis* impacts would be determined in association with Tier 2 environmental studies. If a specific Tier 2 passenger rail project could not avoid LWCF lands, replacement property of at least equal fair market value and of reasonably equivalent location and usefulness could be required as mitigation.

4.7 Visual Resources

This section discusses the legal requirements, methods of analysis, affected environment, potential environmental consequences, visual resources study area, and potential mitigation strategies related to potential visual impacts caused by the OPR Project.

4.7.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state requirements related to the assessment of visual resource impacts during a Tier 1 NEPA analysis include the following:

Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14.(n)(12) of FRA's environmental procedures require an EIS to include consideration of potential environmental impacts on the aesthetic environment and scenic resources. Specifically, the environmental procedures require an EIS to identify any significant changes likely to occur in the natural landscape and in the developed environment. The procedures also require an EIS to discuss the consideration given to design quality, art, and architecture in project planning and development.

State

- **Oregon Statewide Planning Goals.** The Oregon Statewide Planning Goals implement state policy regarding planning, particularly land use and transportation planning. Local comprehensive plans carry out the 19 Statewide Planning Goals, and plans must be consistent with the goals. For the purposes of this Tier 1 analysis, the following Statewide Planning Goal related to visual resources is relevant:
  - *Goal 5, Natural Resources, Scenic and Historic Areas, and Open Spaces*. The intent of Goal 5 is to protect natural resources. This state goal directs local governments to adopt programs “To protect natural resources and conserve scenic and historic areas and open spaces.”

4.7.2 Methods

Because of the extent and variety of environments in the study area, this Tier 1-level assessment does not characterize the visual quality of all views of and from proposed OPR Project improvements. The assessment instead focuses on OPR Project elements most likely to have visual impacts, as well as key scenic resources, parks, and publicly accessible open spaces in the study area. The assessment considers potential visual impacts for multiple viewer groups, including adjacent land users (that is, views *of* the project) and rail passengers (views *from* the train). The analysis uses readily available GIS datasets and existing aerial imagery and does not include field visits, specific viewpoint evaluations, or computer-based viewshed modeling.

ODOT performed a broad review in order to identify key scenic resources in the study area, particularly those adjacent to the build alternative alignments. Key scenic resources are those designated and managed for high visual quality (such as Scenic Byways, parks, open spaces, and natural areas). Although not always officially designated as scenic resources, parks and publicly accessible open spaces, including bike and pedestrian facilities, are commonly valued within a community for offering attractive or unique scenery. Therefore, the review of scenic resources identified parks and open spaces where they are located adjacent to a build alternative alignment route and thus, where they could have views of the proposed OPR Project improvements.

4.7.2.1 Tier 2 Analysis

Future Tier 2 environmental studies could include, as appropriate, GIS line-of-sight analyses to determine the physical extent and anticipated visual character of proposed improvements, as well as the geographic extent and numbers of viewers who would have views of those elements.

For all listed Scenic Byways, parks, and open spaces, further investigation could be required in subsequent Tier 2 analyses to establish the visual context and to determine whether visual changes would cause adverse effects.

4.7.3 Study Area

The **track alignment study area** for visual resources extends 100 feet from the centerline of existing track where no improvements would occur and 100 feet from centerline of proposed new track in areas it would be added, for a total width of 200 feet, for each of the build alternatives. However, because elements of the build alternatives would be visible from locations well outside of this primary study area, specific area discussions are included in order to begin identifying and assessing potential effects on scenic resources and to describe points in the landscape from which the build alternatives could potentially be visible. Examples of these areas include where the build alternatives would intersect identified scenic resources or in areas surrounding large-scale project elements (such as elevated viaducts, retained-earth fill, or new bridges). Subsequent Tier 2 NEPA analyses could use GIS modeling to determine an individual project’s “viewshed,” which could extend beyond the study area used in this Tier 1 analysis.

For **proposed new stations, the study area** consists of the area immediately surrounding the potential station location (i.e., approximately 100 feet in any direction from the potential location, with consideration of wider viewsheds depending on topography) to analyze land uses and thus viewer types (i.e., residential, commercial, rural) that could be neighboring the stations.

4.7.4 Affected Environment

The alternative alignments would pass through both developed and rural lands, closely following existing railroad tracks (for Alternative 1) or a combination of railroad tracks and interstate freeway (for Alternative 2).

Key scenic resources that could intersect (via at-grade crossings or visually, via line-of-sight) with the alternative alignments include the following:

- **Willamette Valley Scenic Bikeway.** The Willamette Valley Scenic Bikeway (Bikeway) begins at Armitage County Park, which is located on the south bank of the McKenzie River and west of I-5 near Coburg. The Bikeway then follows rural back roads northward through the Willamette Valley for 104 miles before finishing at Champoeg State Park (south of Portland). (Alternatives 1 and 2)
- **Silver Falls Tour Route (Scenic Byway).** The Silver Falls Tour Route is a 55-mile drive that begins at Woodburn and I-5 and ends west of Turner and I-5. The route travels along OR 214, and through farmland and Silver Falls State Park. (Alternatives 1 and 2)
- **Over the Rivers and Through the Woods Scenic Byway (Oregon Scenic Byway).** The Over the Rivers and Through the Woods Scenic Byway route begins at I-5, where it intersects OR 228, about 20 miles north of Eugene. The byway then follows OR 228 east toward Brownsville before continuing along U.S. Highway 20 (US 20) toward Sweet Home. With access to rivers, reservoirs, parks, and campgrounds, many trails and snow-play areas, this byway offers a wide range of recreational activities (ODOT, 2016f). (Alternative 2)
- **Willamette Falls.** Willamette Falls is a large, horseshoe-shaped waterfall along the Willamette River between Oregon City and West Linn. The falls are visible from several viewpoints, including two improved viewpoints on I-205, as well as from several parks and open spaces in the surrounding area. (Alternatives 1 and 2)

Appendix D, Figure D-2 illustrates the location of identified parks and open spaces adjacent to the Alternative 1 and Alternative 2 alignments.

4.7.5 Environmental Consequences

This subsection identifies the potential direct, indirect, and construction-related impacts to visual resources under the No Action Alternative and the build alternatives.

4.7.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. The No Action Alternative would not include changes to current track configurations to accommodate passenger rail service. Passenger rail service and operations would continue at current levels (three round trips per day between Eugene and Portland). Activities related to railroad maintenance would continue to occur mostly within existing ROW. Therefore, views along the UPRR mainline, looking both from and toward the railroad, would remain essentially the same as they currently exist, and the scenic quality of identified visual resources would be unaffected. The continuation of existing passenger rail service would not result in adverse visual impacts under the No Action Alternative.

However, ODOT and FRA anticipate a 40 to 50 percent increase in freight demand between 2010 and 2035 under the No Action Alternative (ODOT, 2014f). This increase in freight demand could increase freight traffic and, in cases where the railroad is visible but is not a prominent feature until a train passes by, increase foreground views of passing freight trains. This change could represent a visual impact to sensitive receptors, particularly those viewing from their residences. Other people with short, infrequent views of the railroad might not notice the increased number of freight trains. In addition, changes to current track configurations to accommodate freight rail service may occur due to demand.

Alternative 1

Potential Impacts for Viewer Groups

Alternative 1 would include construction of intermittent new mainline track and sidings, as well as improvements to at-grade crossings; these improvements would be constructed immediately adjacent to existing UPRR mainline track and within or adjacent to the existing railroad ROW. Therefore, new infrastructure under Alternative 1 would essentially expand the current visual condition. Furthermore, in the developed parts of the study area, additional track would not be highly visible because vegetation, buildings, or, less frequently, slopes screen the ROW from view in many locations. Views from the tracks (train passenger views) would not change noticeably with the proposed improvements.

Additional tracks and/or expanded ROW could require clearing of vegetation or property that would change views to and from the tracks. Where clearing of vegetation to expand the rail ROW would expose views of the railroad to adjoining residential areas, the changes in views could affect sensitive receptors, providing new, close-up views of passing trains. However, these impacts would be temporary, because new vegetation would eventually grow to screen or block views of the railroad from adjacent properties.

Alternative 1 would result in eight more passenger trains per day (four round trips per day) traveling on the alignment. When considered along with the anticipated increase in freight traffic discussed above, Alternative 1 could create a noticeable visual change (i.e., more frequent views of trains) for viewers from adjacent properties.

Alternative 1 envisions a potential new rail station in Woodburn near where the UPRR track intersects OR 214/Newberg Highway. The analysis conducted for this EIS did not identify any specifically scenic resources within the station study area. The study area includes vacant land, residential development, and Woodburn High School and St. Luke's Cemetery. A station would not be visually out of character for the area and could result in a visual improvement, potentially providing an architectural anchor in this transitioning neighborhood.

Potential Impacts to Key Scenic Resources

Of the key scenic resources identified in subsection 4.8.4, Affected Environment, the Alternative 1 alignment intersects (via at-grade crossings) the Willamette Valley Scenic Bikeway and the Silver Falls Tour Route. The Alternative 1 alignment intersects the Willamette Valley Scenic Bikeway at three locations and runs parallel to it briefly near the rural community of Jefferson. Because railroad crossings and track already exist at these locations, no adverse visual impacts on the Bikeway are expected. For the same reason, ODOT does not anticipate adverse visual impacts to occur where Alternative 1 would intersect the Silver Falls Tour Route at two locations.

Potential Impacts to Parks and Open Spaces

Vegetation clearing of the existing ROW along the Alternative 1 for the track improvements could increase the visibility of trains from various parks and open spaces, as shown in Appendix D, Figure D-2. ODOT and FRA anticipate that visual impacts to these parks and open spaces would be minor, because these parks and open spaces are next to an active freight mainline (UPPR), which existed prior to the resource establishments. All of these resources are currently subject to visual intrusion from freight and passenger rail activity. Additional analysis of potential visual impacts will be conducted during Tier 2.

Alternative 2

Potential Impacts for Viewer Groups

Alternative 2 would include construction of 81 miles of new mainline track, located predominantly along the east side of I-5 and the PNWR line, as well as 39 miles of rail sidings placed every 10 to 12 miles. Instead of exclusively following the existing UPRR railroad line (as under Alternative 1), the Alternative 2 alignment would follow the I-5 freeway between Eugene and Salem, the PNWR line between Salem and Wilsonville, and I- 5/I-205 between Wilsonville and Portland. The addition of a new rail alignment would introduce a new visual element along the I-5 and I-205 freeways.

In comparison to Alternative 1, Alternative 2 would include significantly more elevated structures, including viaducts, bridges, and retained earth walls, throughout its alignment. Depending on the height, lateral extent, design aesthetic, and proximity to specific neighboring properties, elevated structures could result in adverse visual impacts as follows:

- **Elevated Structures.** Alternative 2 would introduce over 20 miles of elevated structures that would pass above freeway interchanges and overpasses. Because of the heights that would be required, these elevated structures could be visible from significant distances beyond the railroad ROW and could be visually dominating when viewed from the adjacent landscape. Particularly, such impacts could occur where the elevated structures would be visible from neighboring residential development; from visually sensitive areas such as parks, where the structures might block existing highly scenic views; or where the structures would require property changes or impacts (such as right-of-way acquisition).
- **Bridges.** Several new bridges associated with Alternative 2 would be visually prominent and could result in impacts. Specifically, the proposed rail bridge over the Willamette River adjacent to the I-205 Abernethy Bridge would be prominently visible to drivers and pedestrians on McLoughlin Boulevard in Oregon City, and especially for viewers from a recently completed pedestrian promenade and overlook that faces toward the Abernethy Bridge and provides views of the river. The majority of viewers would view the bridge from below, which could make it more visually dominant. West Bridge Park (West Linn) and Jon Storm Park (Oregon City) are located on the riverfront, and would also have views of the new bridge adjacent to the I-205 Abernethy Bridge. Drivers, bicyclists and pedestrians on the Oregon City Arch Bridge, which carries Oregon Highway 43 (OR 43) over the Willamette River, would also have views of the bridge, though it would be seen in the middle ground and would not dominate the view. In addition, a new bridge structure would cross the Willamette River at Alton Baker Park-Eastgate Woodlands, along the park's western boundary and adjacent to the I-5 Whilamut Passage Bridge. The new rail bridge would be most prominently visible from its east side to west-facing viewers, including river recreationists, park trail users, and cyclists and pedestrians on a bike path north of Franklin Boulevard. Currently, these users have good views of the I-5 bridge's double-arch span, so a new rail bridge here would effectively obscure those views.
- **Retained Earth Structures.** Alternative 2 could require retained-earth wall approach structures. These walls would introduce new elevated visual features potentially visible from surrounding residential areas or parks.

Taken as a whole, the extent of elevated structures under Alternative 2 has the potential to result in adverse visual effects.

While the potential for adverse effects exists for viewers looking toward Alternative 2 improvements, it is likely that the frequently elevated position of the Alternative 2 alignment could provide rail passengers with highly vivid and scenic views of the Willamette Valley landscape in general, as well as of specific landmarks. These vivid and scenic views for rail passengers could be available equally in developed areas and in rural landscapes. For example, river crossings over the Willamette, McKenzie, and Santiam Rivers would be attractive, as could potential views of Cascade Mountain peaks to the east.

Alternative 2 would involve the construction of four new stations; the study area includes seven potential locations for the new stations.[20] The analysis conducted for this Tier 1 EIS did not identify any specifically scenic resources within the station study areas for Alternative 2. Direct impacts to visual character would be dependent on specific siting and design of any future stations selected for development, as well as surrounding viewers. Potential impacts to the seven potential station locations include the following considerations:

- **Springfield Station Location.** The Springfield station location would be sited in an industrial/commercial setting with a fair amount of underdeveloped or vacant land within the study area. A station would not be visually out of character for the area and could result in a visual improvement.
- **Albany Station Location.** The Albany station location would be built near industrial land uses and I-5. ODOT anticipates minimal visual impacts associated with development of a station in this location.
- **Salem Station Location.** ODOT anticipates minimal visual impacts associated with development of this station adjacent to I-5, because development within the study area consists of large-scale retail uses such as the regional shopping center (Lancaster Mall). Given the amount of surface parking lots in the study area, a station could result in a visual improvement.
- **Keizer Station Location.** The potential Keizer station location is adjacent to a large-scale, regional shopping center (Keizer Station). Therefore, ODOT anticipates minimal visual impacts associated with development of a station in this location.
- **Woodburn Station Location.** This potential Alternative 2 station would be located outside of city limits to the west, along the existing PNWR line. The area is rural agricultural, and the station would introduce a change in the appearance of the area. No residences are located in the immediate vicinity of the potential station. If constructed, the station would require a new roadway to connect it to the developed areas of Woodburn. Because the station would represent a new type of development in the surrounding area, visual impacts could occur. Future Tier 2 environmental studies would be required to determine whether adverse effects would occur.
- **Wilsonville Station Location.** Most of the land within the Wilsonville station study area is currently dedicated to public transportation and commuter options accommodating TriMet's WES and Wilsonville's South Metro Area Regional Transit. The study area also includes industrial and commercial uses. Therefore, a new station would likely be visually consistent with the land uses already in the study area, and ODOT anticipates minimal visual impacts associated with development of a station in this location.
- **Tualatin Station Location.** The potential Tualatin station location would be located in the I-5/I-205 interchange median; however, parking areas would likely need to be located southeast of the interchange on agricultural land. In addition, some views from residential areas on the west side of I-5 could be affected. Future Tier 2 environmental studies analyzing station site layout and design details would be required to determine whether adverse effects would occur in association with residential and agricultural views.

Potential Impacts to Key Scenic Resources

Of the key scenic resources identified in subsection 4.8.4, Affected Environment, the Alternative 2 alignment has the potential to affect the Willamette Valley Scenic Bikeway, the Over the Rivers and Through the Woods Scenic Byway, and views of Willamette Falls. Visual impacts to the Willamette Valley Scenic Bikeway would be possible at specific locations where elevated crossings would pass over the bike route, introducing a new, and potentially dominating, visual element that could obstruct open views of the surrounding landscape. Specifically, the Alternative 2 alignment would pass over the Bikeway in four

[20] See Chapter 3 for details. Potential new stations include: (1) Springfield; (2) Albany; (3) Salem or Keizer; and (4) Wilsonville or Tualatin.

locations (at Diamond Hill Drive, Linn-West Drive, Grand Prairie Road, and Talbot Road). It is reasonable to predict that the structures would be visually dominant to bicyclists, because they would be located above and crossing over the bicycle route. They would interrupt open views of the landscape currently available from atop the freeway overpasses, and could result in adverse effects at these specific locations. The Alternative 2 alignment would also be visible to drivers along the Over the Rivers and Through the Woods Scenic Byway (at its western terminus at OR 228) and the terminus of the Silver Falls Tour Route (west of Turner at Delaney Road and I-5). However, each of these locations is at a freeway connection, and drivers would have only very brief views of the rail alignment as they began or ended their journeys. Therefore, any visual impacts would be minor, and ODOT does not anticipate adverse effects to the scenic qualities of this the Over the Rivers and Through the Woods Scenic Byway or the Silver Falls Tour Route. The proposed new railroad bridge over the Willamette River between West Linn and Oregon City could affect views of Willamette Falls from surrounding parks and open spaces, depending on the specific viewpoint. Detailed analysis will be conducted in Tier 2.

Potential Impacts to Parks and Open Spaces

In addition to the scenic resources, the improvements associated with Alternative 2 (primarily the elevated structures discussed above) could impact views from the adjacent parks and open spaces identified in subsection 4.8.4, Affected Environment. In some cases, Alternative 2 would include new structures immediately adjacent to existing freeway or rail bridges that are already visible from the park or open space. These structures would represent an addition to an existing visual element, rather than the introduction of a new one. In other areas, the parks are predominantly wooded and somewhat sloping, or vegetation and/or slopes would limit opportunities to view the new railroad from within the park. Therefore, at most parks/open spaces, Alternative 2 would have minor visual impacts. Detailed analysis will be conducted in Tier 2.

Alternative 2 with Central Albany Option

Under Alternative 2 with Central Albany Option, south of Albany an elevated structure would carry northbound passenger trains over I-5, from east to west, returning to grade at a location parallel to an existing (AERC) spur line. Another elevated structure near Millersburg would cross I-5 from west to east, returning to the Alternative 2 alignment on the east side of I-5. The elevated crossings could be visible from up to two miles away and would introduce a significant new visual element into the present landscape. Residents and drivers along I-5, among others, would have close views of the structures. Cyclists along the Willamette Valley Scenic Bikeway would also have views of the structures from various points in southern Albany. The Central Albany Option alignment would parallel the existing UPRR mainline adjacent to industrial and residential areas through the city of Albany. Vegetation and fencing could screen views of the track from adjacent property. Future Tier 2 environmental studies would further assess the scenic context and potential visual impacts of the Central Albany Option.

4.7.5.2 Construction Impacts

Alternative 1

Construction-related visual impacts of Alternative 1 could involve traffic congestion, views of heavy equipment and material storage, dust, and activities related to the clearing of vegetation or potential property demolition required for the expansion of rail ROW. These impacts would be most noticeable where the alignment is tightly constrained by adjoining development in urban settings and at roadway crossings (both at-grade crossings and undercrossings). Impacts would be limited in duration; that is, any potential visual impacts would occur only during those times when construction was active, and only last until construction was completed.

Alternative 2

The types of visual impacts from Alternative 2 construction would include those mentioned above for Alternative 1. However, the construction-related visual impacts under Alternative 2 would be more visible and of longer duration than those under Alternative 1, given the extents of proposed earthwork, retaining structures, elevated viaducts, and bridges. Compared to Alternative 1, the visual impacts from Alternative 2 construction activities would occur over a greater area and would require significant lengths of time, larger and more numerous staging areas, and more crews and equipment.

Alternative 2 with Central Albany Option

Construction-related visual impacts under the Alternative 2 with Central Albany Option would be similar to those described for Alternatives 1 and 2. Areas that would be more likely to experience visual impacts during construction would include those near the elevated crossings.

4.7.6 Potential Mitigation

Tier 2 environmental studies for either build alternative would consider and implement project-specific mitigation strategies for visual impacts, as appropriate. Future project-level mitigation measures could include, but would not be limited to, the following:

- Design the most visually prominent elements (such as station buildings or elevated structures) to improve the aesthetic environment;
- Employ context-sensitive design, taking into consideration regional, local, and site-specific cues (such as color, texture, form, and scale), in the designed appearance of bridge abutments, retaining walls, bridges, viaducts, and other structures;
- Provide appropriate vegetated buffers, where space allows, to screen the tracks and trains from view by adjacent developments.

4.8 Noise and Vibration

In addition to NEPA and the CEQ's NEPA implementing regulations, this section discusses the legal framework, methods of analysis, noise and vibration study areas, affected environment, potential environmental consequences and mitigation strategies related to noise and vibration for each of the OPR Project alternatives.

4.8.1 Legal Requirements

Federal and state laws, regulations and orders related to noise and vibration, and applicable to this Tier 1 analysis include the following:

4.8.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14(n)(3) of FRA's environmental procedures requires an EIS to consider noise and vibration by assessing alternatives with respect to applicable Federal, state, and local noise standards.
- **40 CFR Part 201 and 49 CFR Part 210.** These two complementary rules govern noise emissions from railroad line and yard operations: 40 CFR Part 201 – Noise Emission Standards for Transportation Equipment and Interstate Rail Carriers, and 49 CFR Part 210 – Railroad Noise Emission Compliance Regulations (FRA, 2009). The EPA standards in 40 CFR Part 201 set forth operational noise standards and procedures for noise measurements. The FRA's enforcement provisions contained in 49 CFR Part 210 include measurement criteria and operational noise standards.

- **49 CFR Parts 222 and 229.** Noise from train horns and other audible warning devices are regulated by 49 CFR Part 229 – Railroad Locomotive Safety Standards (specifically, 49 CFR Part 229.129), and 49 CFR Part 222 – Use of Locomotive Horns at Public Highway-rail Grade Crossings. These rules set both minimum and maximum sound levels for locomotive and wayside horns;[21] describe measurement instruments and test site requirements; and specify meteorological criteria, background noise criteria, sound-level measurement procedures, and recordkeeping procedures. Part 222 also provides standards for the creation and maintenance of quiet zones where the sounding of locomotive horns is not required.

4.8.2 Methods

Both FRA and the Federal Transit Administration (FTA) have issued manuals setting forth methods and procedures for determining potential noise and vibration impacts resulting from transit and passenger rail projects, and for determining potential mitigation of impacts. The noise analysis for this Tier 1 EIS is based on the methods and procedures in those manuals: FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (2012) and FTA's *Transit Noise and Vibration Impact Assessment* (2006), as described below.

4.8.2.1 Study Area Methods

For projects where technology or alignments have not been selected, the FRA and FTA manuals call for a preliminary screening of the project study area to identify noise- and vibration-sensitive land uses near a project and whether there is likely to be an impact. The preliminary screening also serves to determine the noise and vibration study areas for further analysis (FTA, 2006).

Both the FTA manual and the FRA manual prescribe a screening procedure that identifies and allows for the analysis to focus further on locations where impacts are likely. The screening procedures are based on very general assumptions about noise/impact criteria, the type of project, and noise-sensitive land uses; therefore, they can be applied in the early phases of a project before specific project elements have been defined (FRA, 2012). The screening procedures also include screening distances that delineate a project's noise study area (see subsection 4.9.3, Study Area). The study areas defined by the screening distances are meant to be sufficiently large to encompass all potentially impacted locations and are determined using relatively high-capacity scenarios for a given project type (FTA, 2006).

4.8.2.2 Noise and Vibration Analysis Methods

For the noise analysis, ODOT reviewed the following data sources to locate and inventory potentially noise- and vibration-sensitive land uses in the study area: land-use maps prepared by regional or local planning agencies; GIS databases available from state, county or local planning departments; and aerial photographs from Google Earth™ and other Internet-based mapping websites. The review did not include field investigation to confirm land uses or to identify new land uses not discovered from existing data sources.

The FRA manual bases noise impact criteria for passenger rail projects on research of community reactions to noise and on changes in noise levels using a sliding scale. The noise criteria and descriptors for human annoyance depend on land use, characterized by three categories. The FRA criteria also specify and define two levels of impact—severe and moderate—depending on the future noise exposure as determined by combining the existing noise exposure and the additional noise exposure a railroad project would generate. Given the early level of conceptual engineering and the high-level environmental analysis conducted for this Tier 1 EIS, this noise analysis does not define a level of impact for future noise exposure, nor does it consider the proximity of other transportation noise sources (such as freeways).

[21] **Wayside horn** means a stationary horn located at a highway rail grade crossing, designed to provide, upon the approach of a locomotive or train, audible warning to oncoming motorists of the approach of a train (49 CFR 222.9).

This analysis instead quantifies the numbers and general locations of noise-sensitive land uses, based on the FRA noise impact criteria land use categories. The analysis then presents general findings for each alterative. The potentially noise-sensitive land use categories include:

- **Category 1 - Lands set aside for serenity and quiet.** Land uses include amphitheaters, concert pavilions, concert halls, and national historic landmarks with significant outdoor use.
- **Category 2 - Residential areas.** The analysis uses the total area (in acres) of residential-zoned land within the noise study area as a proxy for residences.
- **Category 3 - Institutional land uses.** Land uses include parks/open spaces (including natural areas), schools, libraries, places of worship, cemeteries, monuments, museums, hospitals, and community centers.

FRA and FTA ground borne vibration impact criteria are based on existing land uses and planned train frequencies. The criteria are applied primarily to residential land uses (including hotels and other places where people sleep) and institutional land uses. Rather than applying specific impact criteria, this Tier 1 analysis compares the relative sizes of the areas of potential vibration impact among the alternatives.

4.8.2.3 Tier 2 Analysis

Future Tier 2 environmental studies would determine and quantify the potential for noise and vibration impacts at the project level. This would include the collection of background noise-level data and consideration of specific FTA and FRA noise and vibration impact criteria. Tier 2 environmental analyses would also reassess the noise study area to differentiate between rural and urban areas, proximity to other transportation noise sources (such as highways), and areas with buildings or other barriers between the noise source and the sensitive land use.

4.8.3 Study Area

The study area for noise extends 500 feet from the centerline of existing rail alignments and 600 feet from the centerline of new rail alignments. As the No Action Alternative and Alternative 1 parallel the existing passenger rail alignment, the noise study area is 500 feet for the entire length of those alternatives. Alternative 2 would include:

- New track parallel to the existing UPRR railroad alignment between new Springfield station and I-5
- New railroad alignment east of I-5 between Springfield and Keizer;
- New track parallel to the existing PNWR railroad alignment between Keizer and Wilsonville;
- A new railroad alignment along I-5 and I-205 between Wilsonville and Oregon City; and
- New track parallel to the existing UPRR railroad alignment between Oregon City and Portland.

Therefore, the noise study area for Alternative 2 is either 500 feet or 600 feet, depending on the location along the alignment. The study area for potential vibration impacts is 100 feet from rail alignment centerlines for both build alternatives.

4.8.4 Affected Environment

4.8.4.1 Noise

Generally, noise is defined as sound that is loud or unpleasant or that causes disturbance. Railroad noise varies with operating factors and conditions. Operating factors include the numbers of trains, locomotive technology, lengths of trains, types of train cars, and operating speeds. Conditions include the curvature of the track, track and vehicle maintenance, and the terrain in which the track is set. In addition, at-grade crossings require certain whistles and warning bells (except in designated Quiet Zones). The significance of the noise depends not only on conditions, but also on the particular land uses and activities that occur along the track alignment and the sensitivity of those affected by the noise. The Methods subsection above discusses categories of land use considered to be potentially noise-sensitive, including lands set aside for serenity and quiet (Category 1), residential areas (Category 2), and institutional land uses (Category 3). There are no Category 1 land uses located within the noise study areas for any of the alternatives. Therefore, this analysis focuses on residential areas and institutional land uses. **Table 4.8-1** summarizes residential areas and institutional land uses in the noise study area for each alternative.

4.8.4.2 Vibration

Vibration associated with train operations is the result of the steel wheels rolling on steel rails, creating vibrational energy that transmits through the rail structure and ground to nearby buildings. In addition, axle weight and soil conditions affect vibration. When sufficient vibrational energy reaches a building, it may result in the perceptible motion of objects and a rumbling noise generated by the motion of the structural surfaces in the room. As previously discussed, vibration criteria are applied primarily to residential land uses (including hotels and other places where people sleep) and institutional land uses. **Table 4.8-1** summarizes such uses in the vibration study area for each alternative.

Table 4.8-1. Summary of Potentially Noise- and Vibration-Sensitive Land Uses in the Study Area

Land Use	No Action Alternative/ Alternative 1	Alternative 2	Alternative 2 with Central Albany Option
Residential-Zoned Land (in acres)			
Residential-Zoned Acres[1] in Noise Study Area (Percentage of Total Acres)	1,615 (26%)	2,185 (34%)	2,055 (30%)
Residential-Zoned Acres in Vibration Study Area (Percentage of Total Acres)	317 (11%)	275 (10%)	303 (11%)
Institutional Land Uses (# of uses)			
Total in Noise Study Area	71	50	54
Total in Vibration Study Area	7	8	6

[1] Rounded to the nearest 5 acres.

Source: ODOT, 2016g.

4.8.4.3 Quiet Zones

Quiet Zones are defined in 23 CFR 222.9 as “a segment of a rail line, within which is situated one or a number of consecutive public highway-rail crossings at which locomotive horns are not routinely sounded”. In a Quiet Zone, trains do not sound their horns when approaching at-grade crossings, except in emergency situations or to comply with other Federal regulations or railroad operating rules. Train horns can be silenced only when other safety measures compensate for the absence of the horns.

Railroad Quiet Zones exist in the following locations within the study areas for each alternative; no Quiet Zones are in the Central Albany Option study area:

- No Action Alternative / Alternative 1:
  - Salem (UPRR alignment) from Mill Street SE to Market Street NE
- No Action Alternative / Alternative 1 and Alternative 2:
  - Milwaukie (UPRR alignment) from east of 37th Avenue to northern city limit
  - Portland (BNSF alignment) from NW 9th Avenue to NW 17th Avenue

4.8.5 Environmental Consequences

This subsection identifies the potential direct, indirect, and construction-related noise and vibration impacts under the No Action Alternative and the build alternatives.

4.8.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. Under the No Action Alternative, Amtrak Cascades passenger rail service in 2035 would be similar to existing conditions, with the same passenger train frequency and the same number and location of station stops. The No Action Alternative does not include modifications to track configurations for passenger rail purposes. Therefore, the No Action Alternative would not introduce new sources of noise and/or vibration to the study area. However, ODOT anticipates that freight demand will increase by 40 to 50 percent between 2010 and 2035 (ODOT, 2014f) under the No Action Alternative. This increase in freight train traffic could incrementally increase noise and vibration within the study area, particularly at at-grade crossings.

Alternative 1

Alternative 1 would involve the incremental construction of new sections of track parallel to the existing UPPR mainline track. Therefore, train-related noise and vibration are already present in the noise environment of the study area, and noise-sensitive land uses are accustomed to hearing them.

Under Alternative 1, the addition of eight additional passenger trains (four round trips) between Eugene and Portland could increase noise and vibration within the study area. Within the screening distances comprising the noise study area for Alternative 1, there are 1,615 acres of residential-zoned land use and 71 institutional uses (i.e., Category 3 noise-sensitive land uses). Within the screening distances comprising the vibration study area for Alternative 1, there are 317 acres of residential-zoned land and 7 institutional land uses. The majority of the potentially impacted residential and institutional lands under Alternative 1 are located within urban areas, where noise-sensitive uses tend to be concentrated and the existing ambient noise level is higher than rural, less developed areas.

Overall, the greatest potential for noise impacts would occur at at-grade crossings, where locomotives sound their horns as they approach. Alternative 1 would not grade-separate any existing at-grade crossings or create new at-grade crossings; however, the increased number of trains would increase the frequency of warning horns at the existing 140 at-grade crossings (but not at those in designated Quiet Zones, which are currently in central Salem, Milwaukie, and northwest Portland). Alternative 1 would also upgrade four at-grade crossings with passive warning systems to active warning devices with bells, which would increase noise when activated by passing passenger rail and freight trains.

Alternative 2

Similar to Alternative 1, Alternative 2 would add eight additional passenger trains (four round trips) between Springfield and Portland, increasing noise and vibration within the study area. However, Alternative 2 consists of a new railroad alignment between Springfield and Keizer, and between Wilsonville and Oregon City. In these locations, noise from passenger trains would be new to the ambient noise environment and could therefore be more perceptible to noise-sensitive land uses. Even so, the new Alternative 2 alignment would generally follow the I-5 and I-205 freeways—areas where land uses have adapted to freeway noise.

Within the screening distances comprising the noise study area for Alternative 2, there are 2,185 acres of residential-zoned land use and 50 institutional uses (i.e., Category 3 noise-sensitive land uses). Within the screening distances comprising the vibration study area for Alternative 2, there are 275 acres of residential-zoned land and eight institutional land uses. Alternative 2 would potentially impact more residential areas and fewer institutional uses than Alternative 1. The majority of the potential noise impacts under Alternative 2 are in urbanized areas.

Under Alternative 2, where the alignment is adjacent to existing freeways between Springfield and Salem/Keizer and between Wilsonville/Tualatin and Oregon City, all passenger rail crossings would be grade-separated. Alternative 2 would include only 46 at-grade crossings, less than half of the number of at-grade crossings under Alternative 1. Therefore, Alternative 2 would result in significantly less potential for noise impacts from horns sounding at at-grade crossings than Alternative 1.

Indirect impacts from Alternative 2 could also include revised vehicular traffic patterns in proximity to new passenger rail stations, which could increase local noise levels.

Alternative 2 with Central Albany Option

The Alternative 2 with Central Albany Option would have impacts similar to Alternative 2, with the majority of the potential noise impacts in urban areas. However, the Central Albany Option would include more potential for noise impacts near at-grade crossings (59) than would Alternative 2 (46).

4.8.5.2 Construction Impacts

Alternative 1

Construction activities under Alternative 1 could expose noise- and vibration-sensitive land uses within the Alternative 1 study area to noise and vibration originating from construction equipment, such as large machinery and track-mounted specialty vehicles. Although noise and vibrations of this type would tend to be intermittent and temporary, it could create a nuisance condition, depending on the types of construction activity and the types of equipment used for construction.

Alternative 2

The types of potential construction noise and vibration impacts would be similar to those for Alternative 1. However, ODOT anticipates that the noise and vibration construction impacts would be more severe and of longer duration under Alternative 2 than under Alternative 1. This is because Alternative 2 construction would include a mostly new railroad alignment with several grade-separated structures (that would likely require more intermittent noise-intensive pile driving), four to five new passenger rail stations, and a cut-and-cover tunnel in southeast Portland.

Alternative 2 with Central Albany Option

Construction impacts under the Alternative 2 with Central Albany Option would be similar to those described for Alternative 2.

4.8.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for noise and vibration impacts, as warranted and appropriate. Future project-level mitigation measures could include, but would not be limited to, the following:

- Selection and use of equipment and construction techniques that produce the least noise and/or vibration;
- Evaluation of the continued use of operational controls, such as the reduction of train horn noise, in compliance with the Quiet Zone requirements under FRA's whistle ban regulation in the Train Horn Rule (49 CFR 222); and
- Installation of noise barriers and/or building insulation.

4.9 Hazardous Materials

This section discusses the legal framework, methods of analysis, hazardous materials study area, affected environment, potential environmental consequences, and mitigation strategies related to hazardous materials for each of the OPR Project alternatives.

4.9.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws, regulations, and orders related to hazardous materials and applicable to this Tier 1 analysis include the following:

4.9.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14.(n)(18) of FRA's environmental procedures require an EIS to assess the transportation or use of any hazardous materials which may be involved in the alternatives, and the level of protection afforded residents of the affected environment from construction-period and long-term operations associated with the alternatives.
- Environmental Protection Agency (EPA), 42 USC 9601 et seq.: Comprehensive Environmental Response, Compensation and Liability Act (1980). In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund.[22] The law created a tax to fund the clean-up of abandoned or uncontrolled hazardous waste sites and also provides broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA authorizes the EPA to identify parties responsible for the release of hazardous substances into the environment and require cleanup of those sites.
- **EPA, 42 USC 6901 et seq.: Resource Conservation and Recovery Act (1976).** The Resource Conservation and Recovery Act (RCRA) gives the EPA the authority to control hazardous waste from "cradle to grave," including the generation, transportation, treatment, storage, and disposal of hazardous waste. The 1986 amendments to the RCRA enable EPA to address environmental problems resulting from underground tanks storing petroleum and other hazardous substances. In Oregon, the EPA has authorized the Oregon Department of Environmental Quality (DEQ) to implement and enforce RCRA requirements.
- **EPA, 33 USC 1251 et seq.: Federal Water Pollution Control Act (1972).** The Federal Water Pollution Control Act (Clean Water Act) is the principal Federal law governing pollution control for water quality.
- EPA, 42 USC 300f et seq.: Title XIV of the Public Health Service Act: Safety of Public Drinking Water Systems (Safe Drinking Water Act) (1974). This act is the key Federal law for protecting public water supplies from harmful contaminants.
- **EPA, 15 USC 2601 et seq.: Toxic Substances Control Act (1976).** The purpose of the act is to ensure the development of adequate data on the effects of chemical substances on health and the environment; to regulate the production, distribution, use, and disposal of harmful chemicals; and to provide authority to EPA to take action on those chemicals that present an "imminent hazard."
- EPA and USDOT, 49 USC 5101-5128: Hazardous Materials Transportation Control Act (Hazardous Materials Transportation Act) (1975). This act improves the uniformity of existing regulations for transporting hazardous materials, and prevents spills and illegal dumping that would endanger the public and the environment.

[22] CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) in 1986.

- **EPA, 42 USC 11001 et seq.: Emergency Planning and Community Right-to-Know Act (1986).** The Emergency Planning and Community Right-to-Know Act (EPCRA) applies to storage of hazardous materials. The EPCRA requires that facilities report storage of certain chemicals above a certain amount to the state and local authorities. The principal purpose of the EPCRA is to provide citizens with information on the manufacture, use, and environmental release of potentially toxic chemicals in their communities.

4.9.1.2 State

- **Oregon Administrative Rule (OAR) 340-122-0010, Division 122 – Hazardous Substance Remedial Action Rules Cleanup Rules.** These rules establish the procedures for implementation of a site discovery program for hazardous substance releases, including a process for evaluation and preliminary assessment of releases of hazardous substances, and a process for developing and maintaining a statewide list of confirmed releases and an inventory of sites requiring investigation, removal, remedial action, or related long-term engineering or institutional controls.

4.9.2 Methods

For the purposes of this Tier 1-level analysis of hazardous material effects on human health and the environment, ODOT reviewed the information listed in available environmental databases to identify sites of concern within the study area, as well as the potential for contaminants to migrate toward the proposed build alternative improvements. The environmental databases provided preliminary information to identify the potential presence of hazardous sites within the study area; this review did not include site-specific fieldwork or investigations. The review included the following environmental databases:

- **Oregon Department of Environmental Quality Facility Profiler Database.** This Oregon DEQ database contains information on current operations and activities, closed facilities, completed cleanups, and past operations. The following types of regulated facilities/sites are identified: permitted air and water dischargers, hazardous and solid waste sites, cleanup sites, and leaking and underground storage tanks (LUST/UST) (DEQ, 2016).
- **Environmental Cleanup Site Information Database.** The Environmental Cleanup Site Information (ECSI) is a database to track sites in Oregon with known or potential contamination from hazardous substances and to document sites where DEQ has determined that no further action is required (DEQ, 2016). The ECSI database includes all Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)-listed and former CERCLIS-listed sites, including National Priority List (NPL) sites.[23]
- **Oregon Fire Marshall's Office Database.** The Oregon Fire Marshall's Office database lists known hazardous waste spills. However, access to the database was unavailable for this review. As a proxy, the Fire Marshall's Office provided for review a spreadsheet listing the spills that occurred during transport.

The analysis considers the following specific existing conditions from the environmental databases:

- Location and approximate distance from alignment features of sites with known or reported contamination, as well as sites listed as in the process of being cleaned up;
- Location and approximate distance from alignment features of sites that are suspected of having contamination by regulatory agencies because of current or historical land use; and
- Types of known or suspected hazardous materials at the identified sites.

[23] The National Priorities List (NPL) is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants or contaminants throughout the United States and its territories.

Using this data, ODOT evaluated sites with known and/or suspected hazardous materials and waste disposal conditions that one could encounter during construction of the current conceptual engineering features for proposed new track and potential new stations. Based on general contaminant distribution modeling,[24] ODOT categorized the build alternative alignments (including potential new station areas) as having known contamination, suspected contamination or no indication of contamination. The analysis uses these categories as follows:

- **Known contamination.** When contamination has been confirmed or reported in the environmental record and the contamination is within 50 feet of a proposed track centerline or a potential new station (as measured in GIS).
- **Suspected contamination.** When contamination has been confirmed, reported or presumed in the environmental record and where migration of the contamination to within 50 feet of a proposed track centerline or a potential new station is considered possible using default assumptions for contaminant transport.
- **No indication of contamination.** Sites of concern that are located beyond migration-screening distances (i.e., 1 mile from proposed track centerlines and potential new stations) for their respective contamination types.

Subsequently, the analysis compares the hazardous materials sites to the following conceptual engineering features to assess the potential direct and indirect impacts resulting from construction:

- **At-grade.** At-grade track assumes minimal earthwork but would require subballast, ballast, tie, rails, and fasteners.
- **At-grade earthwork.** Areas that would require some cut or fill and small ballast walls. Typical application would be adjacent to a highway embankment where a bench could be needed. Includes subballast, ballast, tie, rails, and fasteners.
- **Retained fill.** Approach structures and other areas requiring retaining walls. Assumes two walls at an average wall height of 15 feet. Includes subballast, ballast, tie, rails, and fasteners.
- **Elevated viaduct.** Bridge on pier or straddle bent structures. Includes direct fixation fasteners and rails.
- **Open trench/retained cut.** Approach structures and other areas requiring retaining walls to create the track foundation. Assumes two walls at an average wall height of 20 feet. Includes subballast, ballast, tie, rails, and fasteners.
- **Tunnel – cut-and-cover.** Includes surface excavation, two walls, track grading, and cover along with required earthwork. Assumes an average cover of 20 feet. Assumes tunnel section to be 20 feet wide and 25 feet high (inside diameter) for a single track.
- **Bridges, rail bridge.** New rail bridge over roadway, river, drainage, etc. Based on a 16-foot 6-inch standard vertical clearance over roadways (National Highway System and High Routes could require greater clearances: 17-foot 0-inch and 17-foot 4-inch, respectively). Includes abutments, subballast, ballast, tie, rails, guardrail, and fasteners.

4.9.2.1 Tier 2 Analysis

Future Tier 2 environmental studies for individual projects proposed subsequent to the OPR Project could include Phase I and/or Phase II Environmental Site Assessments, as appropriate, to identify and/or characterize the extent of contamination from all known or suspected hazardous materials sites.

[24] Migration screening distances used in the modeling are necessarily only crude estimates because of the lack of detailed information collected on soil type, hydraulic gradients, contaminant release dates, and quantities and concentrations of contaminants in this Tier 1 analysis. Thus, the results are qualitative and intended as a comparative assessment of the potential for known and hypothetical contaminants to reach various segments of proposed new track and/or potential new stations.

Such assessments generally include site reconnaissance, additional database searches, and a review of historical land uses and agency records, and can take into consideration soil type, hydraulic gradients, contaminant release dates, and quantities and concentrations of contaminants.

4.9.3 Study Area

The study area for the affected environment of each build alternative alignment includes the area within 0.5 mile from new alignment centerlines and an additional area of 0.5 mile to evaluate area-wide contamination listings (for example, significant groundwater contamination plumes) (total of 1 mile). The study area for potential stations also includes the area within 0.5 mile and 1 mile to identify sites of concern. The 0.5-mile and 1-mile area distances are generally accepted minimum search distances recommended in the American Society for Testing and Materials (ASTM) Standard E1527-13, *Standard Practices for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM International, 2013) and are appropriate at the planning level to evaluate the potential for subsurface contaminant migration.

Delineation of known and suspected contamination sites within the study area boundaries sets the stage for further analysis of potential impacts based on contaminant types and severity, subsurface media, and relative proximity to areas proposed for construction. Consequently, and as a practical matter, the primary study area for evaluating potential impacts to known and suspected hazardous materials contamination sites is designated as the area within 50 feet of proposed track centerlines and potential station areas.

4.9.4 Affected Environment

The USDOT defines hazardous material as a substance or material capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and that has been designated as hazardous by Federal hazardous materials transportation law (49 CFR §171.8). As discussed above, this analysis included a review of environmental databases to identify sites of concern related to hazardous materials and waste disposal within the affected environment area for each build alternative. **Table 4.9-1** details the types of sites identified within the study area for the build alternatives. Appendix D, Figure D-4 shows sites of known and suspected contamination within the affected environment area. The potential for these sites to affect and/or be affected by construction is discussed in subsection 4.10.5, Environmental Consequences.

Table 4.9-1. Number of Hazardous Materials Sites Identified within the Study Area

Resource Indicator, Topic, or Measurement	Alternative 1	Alternative 2	Alternative 2 with Central Albany Option
Sites of concern	825	657	700
Superfund[1] sites	4	4	3
State cleanup sites[2]	303	220	238
Leaking USTs[3]	518	433	459

[1] Common reference for CERCLA sites.

[2] ECSI sites.

[3] LUST sites.

Source: ODOT, 2016h.

4.9.5 Environmental Consequences

Existing hazardous materials sites within the study area would have limited, if any, potential to affect passenger rail operations. Conversely, the operation of passenger rail service is generally not associated with the transportation and/or release of hazardous materials. As such, the potential for hazardous materials impacts from the OPR Project would primarily result from construction activities.

Subsection 4.10.5.2, Construction Impacts identifies and compares the direct and indirect impacts associated with construction of the build alternatives.

4.9.5.1 Direct and Indirect Impacts

No Action Alternative

Because no construction activities would be associated with the No Action Alternative, no known or suspected subsurface hazardous materials would be encountered. Handling and disposal of contaminated soil and groundwater would not be necessary; workers and ecological receptors would not be exposed to contamination; and contamination would not have the potential to be further released into the environment by construction disturbance and material/waste transport. Waste generation and disposal associated with current Amtrak Cascades operations and maintenance work would continue. Therefore, no direct or indirect impacts would be associated with hazardous materials and waste disposal under this alternative.

Impacts Common to Alternative 1, Alternative 2, and Alternative 2 with Central Albany Option

As discussed in section 4.3, Land Use, there are areas along both the Alternative 1 and Alternative 2 alignments where nearby buildings/structures are close (within 50 feet) to the existing rail line. The build alternatives also include improvements to existing at-grade railroad crossings. As such, the build alternatives could require removal of buildings/structures containing hazardous materials, such as asbestos or lead-based paint. The discussion below qualitatively compares the potential for the build alternatives to result in the demolition and/or modification of existing buildings and other structures. This Tier 1 analysis does not include hazardous materials surveys of specific land uses; future Tier 2 environmental studies would address the identification, handling, and remediation/disposal of all known or suspected hazardous materials in buildings proposed for demolition or modification.

Alternative 1

Although Alternative 1 would primarily involve the continued use of existing UPRR mainline track, the modification and addition of track is envisioned in selected areas. There are areas along the Alternative 1 alignment where nearby buildings/structures are close (within 50 feet) to the existing rail line. However, Alternative 1 improvements are not likely to result in the demolition or modification of these primarily industrial land uses where new or modified track is proposed. Alternative 1 track construction would also include improvements to 73 existing at-grade railroad crossings. Structures requiring demolition or modification would require hazardous materials surveys to determine the presence of hazardous materials and, if necessary, the appropriate handling and remediation/disposal.

Alternative 2

Areas along the Alternative 2 alignment where nearby buildings/structures are close to the existing rail line include: Salem (industrial and residential), Donald (industrial), near Wilsonville (commercial) and in Portland (industrial). Alternative 2 would include the addition of new track throughout the full Alternative 2 alignment, with siding tracks placed every 10 to 12 miles to facilitate passing operations. Therefore, ODOT anticipates that Alternative 2 would result in the demolition and/or modification of existing buildings and other structures to a greater degree than Alternative 1. Track construction under Alternative 2 would include improvements to 46 existing at-grade railroad crossings, far less than the 73 at-grade crossings improved under Alternative 1. Structures requiring demolition or modification would require hazardous materials surveys to determine the presence of hazardous materials and, if necessary, the appropriate handling and remediation/disposal.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option has the same alignment and operational characteristics, and thus similar hazardous materials impacts, as that described for Alternative 2. Where the Central Albany Option alignment diverges from I-5, there are areas where nearby buildings/structures are close (within 50 feet) to the existing AERC and UPRR rail lines. These areas include industrial land uses west of Marion Street and south of OR 99, as well as industrial and residential structures within the City of Millersburg. The Alternative 2 with Central Albany track construction would also include improvements to ten existing at-grade railroad crossings in addition to those improved under Alternative 2. Structures requiring demolition or modification would require hazardous materials surveys to determine the presence of hazardous materials and, if necessary, the appropriate handling and remediation/disposal.

4.9.5.2 Construction Impacts

Construction involving ground-disturbing activities (e.g., excavation and grading) increases the likelihood for encountering previously unknown hazardous materials contamination from historical use of a property. Disturbance of contaminated sites could affect human health and the environment and/or pose a safety risk to workers possibly exposed to contaminated soil, water, and vapors.

Direct impacts could include worker/public exposure, construction delays, high treatment and disposal costs, and costly remedial actions.

No Action Alternative

The No Action Alternative represents the baseline condition against which the build alternatives are measured. The No Action Alternative would not include changes to current track configurations; therefore, no construction activities would occur, and known and suspected hazardous materials would not be encountered. Handling and disposal of contaminated soil and groundwater would not be necessary; workers and ecological receptors would not be exposed to contamination; and contamination would not have the potential to be further released into the environment by construction disturbance and material/waste transport. Therefore, no direct or indirect impacts would be associated with hazardous materials and waste disposal under the No Action Alternative.

Alternative 1

While much of Alternative 1 would involve the continued use of existing track, new or modified track would be constructed in selected areas. Construction of the relevant conceptual engineering features associated with Alternative 1 (see subsection 4.10.2, Methods) could result in hazardous material impacts because of the known and suspected presence of contamination from current and historical land uses within the study area. Under Alternative 1, there are approximately 2.2 linear miles of proposed track potentially affected by known contamination, and there are five sites with known contamination that could be disturbed/affected by construction activities. There are approximately 47.4 linear miles of proposed track potentially affected by suspected contamination, and there are 117 sites with suspected contamination that could be disturbed/affected by construction activities.

Table 4.9-2 identifies and briefly summarizes the specific locations of potential direct impacts associated with hazardous materials from the construction of proposed track under Alternative 1.

Table 4.9-2. Potential Hazardous Materials Impacts – Alternative 1

Location	Construction Activity	Contamination Type and Source[a]
Southern boundary of Alternative 1 alignment to Riverfront Parkway in Eugene	At-grade earthwork	Potential presence of petroleum, laboratory waste, and coal gas tar from current and historical land uses
Central part of Halsey	At-grade track construction; at-grade earthwork	Suspected presence of petroleum
North of the OR 34 junction	At-grade earthwork	Known presence of gasoline and suspected presence of petroleum and VOC from current and historical land uses

Location	Construction Activity	Contamination Type and Source[a]
North of the OR 34 junction to Beta Drive in southern Albany	At-grade earthwork; bridge construction	Suspected presence of gasoline, petroleum, and VOC from current and historical land uses
Between northern Albany and the southern boundary of Alternative 1 alignment	At-grade earthwork; bridge construction	Suspected presence of gasoline, petroleum, VOC, SVOC and low-level radionuclides; current and historical land uses in the study area include Teledyne Wah Chang (a Superfund site and suspected source of contamination) at 1600 Old Salem Road in Albany
Silverton Road in Salem	Elevated viaduct construction; at-grade track construction; at-grade earthwork	Known presence of gasoline and petroleum contamination from current and historical land uses
Near 37th Avenue in Milwaukie	At-grade earthwork	Known and suspected presence of petroleum and VOC from current and historical land uses
North of SE Hawthorne Boulevard in Portland	At-grade track construction	Known presence of petroleum from current land use
Majority of the Alternative 1 alignment through the industrial areas of Portland	Construction activities	Two Superfund sites and suspected sources of contamination—Gould, Inc., at 5909 NW 61st, and McCormick & Baxter Creosoting Co., at 6900 N. Edgewater Avenue—are located along the Willamette River adjacent to the alignment

[a] VOC = Volatile Organic Compounds; SVOC = Semi-Volatile Organic Compounds.

Source: ODOT, 2016h.

Alternative 1 would include service at the five existing stations and there are known or suspected contaminants present at each of the five existing stations. Because Alternative 1 assumes no improvements or changes to existing stations, no station-related hazardous material impacts from Alternative 1 construction are anticipated.

Alternative 2

Alternative 2 would add new mainline railroad track throughout the full route between Springfield and Portland, as well new grade-separated passenger rail crossings built adjacent to existing road crossings at several locations along I-5. Additionally, Alternative 2 would include construction of a new, dedicated passenger rail tunnel under SE 2nd Avenue in Portland. Alternative 2 would also involve the construction of four to five new stations; the study area includes seven potential locations for the new stations. As such, Alternative 2 envisions substantially more construction activities than would occur under Alternative 1. Even so, Alternative 2 has only 0.8 linear mile of proposed track potentially affected by known contamination (as compared to 2.2 linear miles under Alternative 1). There are approximately 27.6 linear miles of proposed track potentially affected by suspected contamination under Alternative 2. This corresponds to 151 sites with suspected contamination that could be disturbed/affected by construction activities. Although Alternative 1 has fewer sites with suspected contamination that could be disturbed during construction (117 sites under Alternative 1 compared to 151 sites under Alternative 2), the sites affect fewer miles of track under Alternative 2 (27.6 miles under Alternative 1 compared to 47.4 miles under Alternative 2).

Table 4.9-3 identifies and briefly summarizes the specific locations of potential direct impacts associated with hazardous materials from the construction of proposed track under Alternative 2.

Table 4.9-3. Potential Hazardous Materials Impacts – Alternative 2

Location	Construction Activity	Contamination Type and Source[a]
Junction with OR 569	Elevated viaduct construction requiring deep excavations	Suspected presence of gasoline from current and historical land uses
Near the junction with OR 228	Construction activities with deep excavations	Migrating contamination in groundwater
At Tangent Drive and the southern approach of OR 34	Elevated viaduct construction requiring deep excavations	Suspected presence of gasoline from current and historical land uses
At southern approach of US 20 in Albany	Elevated viaduct construction	Suspected presence of gasoline from current and historical land uses
Along the northern portion of adjacent airport property through north Albany	At-grade earthwork; bridge construction	Suspected presence of gasoline, petroleum, VOC, SVOC and low-level radionuclides; current and historical land uses in the study area include Teledyne Wah Chang (a Superfund site and suspected source of contamination) at 1600 Old Salem Road in Albany
Near Murder Creek	Bridge construction	Suspected presence of gasoline from current and historical land uses
Near Viewcrest Lane in Millersburg	Elevated viaduct construction requiring deep excavations	Suspected presence of VOC from current and historical land uses
In the area south of Hoefer Road NE north of Millersburg	Elevated viaduct construction requiring deep excavations	Suspected presence of gasoline from current and historical land uses
Turner Road and the existing Union Pacific Railroad right-of-way in Salem	Elevated viaduct construction (construction of the southern approach of the viaduct)	Suspected presence of metals contamination from current and historical land uses
South of OR 213 in Salem	Retained fill	Known and suspected presence of gasoline from current and historical land uses
At the junction with Stafford Road south of Lake Oswego	Elevated viaduct construction requiring deep excavations	Suspected presence of gasoline from current and historical land uses
McLoughlin Boulevard	Elevated viaduct construction requiring deep excavations	Suspected presence of gasoline from current and historical land uses
North of OR 224	At-grade earthwork	Suspected presence of gasoline, petroleum, and VOC from historical land use
Near 37th Avenue in Milwaukie	At-grade earthwork	Known and suspected presence of petroleum and VOC from current and historical land uses
North of SE Hawthorne Boulevard in Portland	At-grade track construction	Known presence of petroleum from current land use

Location	Construction Activity	Contamination Type and Source[a]
Majority of the Alternative 2 alignment through the industrial areas of Portland	Construction activities	Two Superfund sites and suspected sources of contamination– Gould, Inc., at 5909 NW 61st, and McCormick & Baxter Creosoting Co., at 6900 N. Edgewater Avenue – are located along the Willamette River adjacent to the alignment
SE Portland	Tunnel – Cut-and-Cover (during excavation and dewatering)	Known presence of petroleum and suspected presence of gasoline, petroleum, VOC, SVOC, PCBs, pesticides, metals, acids, and cyanide from current and historical land uses

[a] VOC = Volatile Organic Compounds; SVOC = Semi-Volatile Organic Compounds; PCB = Polychlorinated biphenyls.

Source: ODOT, 2016h.

Alternative 2 would include service at the existing Union Station in Portland, as well as the potential for service at three to four new stations, as discussed above. The analysis did not identify any known or suspected contaminated sites associated with the potential new station locations under Alternative 2. While the existing Portland Union Station has nine suspected contamination sites that could affect the station, Alternative 2 assumes no improvements or changes to this station. Therefore, ODOT anticipates that the only potential hazardous materials impacts related to construction of new stations would be associated with demolition of existing structures that could be required prior to new station construction. A separate project is currently reviewing potential environmental effects of proposed building and track improvements at Portland Union Station.

Alternative 2 with Central Albany Option

Outside of the Albany area, the Alternative 2 with Central Albany Option would have similar construction-related hazardous material impacts as those described for Alternative 2. Where the Central Albany Option would provide an additional mainline track connecting to the existing Albany Station to the east of the Alternative 2 alignment, additional impacts beyond those discussed for Alternative 2 could occur. Specifically, under the Alternative 2 with Central Albany Option there are approximately 0.2 additional mile of proposed track potentially affected by known contamination and 4.4 additional miles of proposed track potentially affected by suspected contamination compared to Alternative 2.

At-grade earthwork and bridge construction from northern Albany through the Millersburg area could encounter contamination during construction activities requiring excavations because of the suspected presence of gasoline, petroleum, VOC, SVOC and low-level radionuclides from current and historical land uses. These land uses include Teledyne Wah Chang (a Superfund site and suspected source of contamination) at 1600 Old Salem Road in Albany. Potential impacts at these locations would also occur under Alternative 1 (see **Table 4.9-2**).

4.9.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for hazardous material impacts as necessary. These could include, but would not be limited to, the following:

- Use of avoidance methods and procedures, including during design of engineering features, to limit and/or address conflicts with known and suspected contamination; and
- Use of construction safety methods and procedures that protect human health and prevent/minimize hazardous materials releases during construction, including personal protection, workplace monitoring and site-specific health and safety plans.

4.10 Cultural Resources

This section discusses legal requirements, methods of analysis, study area, affected environment, potential environmental consequences, and mitigation strategies related to cultural resources (i.e., historic (built) structures and archaeological sites) for each of the OPR Project alternatives. For this Tier 1 analysis, a broad study area has been used to help identify areas of historic concern. The area of potential effects (APE) will be established for Tier 2 analysis as appropriate.

4.10.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws and regulations related to cultural resources are discussed in this Tier 1 analysis, and include the following:

4.10.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts**. Section 14(n)(21) of FRA's environmental procedures require an EIS to identify all properties that may be affected by the alternatives that are included in or eligible for inclusion in the National Register of Historic Places (NRHP).
- **Section 106 of the National Historic Preservation Act of 1966 (NHPA)** sets forth national policy and procedures regarding historic properties, which are defined as districts, sites, buildings, structures, and objects included in, or eligible for, the NRHP. Section 106 requires that Federal agencies consider the effects of their undertakings on historic properties in project planning and decision-making. Section 11504 of the FAST Act mandated development of an exemption for railroad ROWs from Section 106 review. As of the date of this DEIS, USDOT has drafted a proposed exemption, but the Advisory Council on Historic Preservation has not approved it. Once approved, the Section 106 exemption would apply to future Tier 2 projects that involve maintenance, upgrades and improvements to railroad infrastructure in existing ROW.
- **Section 4(f) of the Department of Transportation Act of 1966** establishes the requirement for consideration of potential impacts to park and recreational lands, wildlife and waterfowl refuges, and historic sites in transportation project planning and development when financial assistance or other approval from USDOT modal administrations is involved. The law is codified in 49 United States Code (USC) §303 and 23 USC §138. FRA currently does not have its own Section 4(f) implementing regulations, but in practice FRA follows those of the Federal Highway administration at 23 CFR 774.
- **36 CFR Part 800, Protection of Historic Properties**. The procedures in this part define the four-step process Federal agencies must follow to comply with Section 106 of the NHPA.
- **36 CFR 60, National Register of Historic Places (NRHP)** sets forth the procedural requirements for listing properties on the NRHP.

4.10.1.2 State

- **ORS 358.653, "Protection of Publicly Owned Historic Properties."** Obligates state agencies and all "political subdivisions" of the state (that is, counties, cities, universities, school districts, and local taxing districts) to consult with the Oregon State Historic Preservation Office (SHPO) to avoid inadvertent impacts to historic properties for which they are responsible. The statute follows the general guidance of Section 106; for this reason, in cases where Federal funds, permits, or licenses are used, ORS 358.653 is superseded by Section 106.
- **The State Land Use Planning Law – Goal 5 (OAR 660-023-0200).** Encourages state agencies and local governments (including those that participate in the Certified Local Government [CLG] program) to develop and maintain inventories of local historic resources, to adopt programs that will protect

historic resources for present and future generations, and to adopt a historic preservation plan and complementary ordinances.

- **ORS 358.905–955.** This law provides definitions of archaeological sites and significance and cultural patrimony, prohibits the sale and exchange of cultural items, and proscribes damage to archaeological sites on public and private lands. Items of cultural patrimony or those associated with human remains are protected everywhere, unless an archaeological excavation permit authorizes the activity.

4.10.2 Methods

ODOT consultants meeting the Secretary of the Interior's (SOI) Standards consulted the Oregon SHPO's GIS data to identify previously recorded historic architectural properties within the Tier 1 study area for the OPR Project (the Tier 2 APE is addressed in subsection 4.11.3, below). GIS data from the various county assessors' offices were used to identify those properties built in or before 1969 located within the Tier 1 study area for the build alternatives. Supplementary resources were also reviewed to fill gaps in the data. No primary data collection was done. Oregon SHPO records were reviewed, including historic studies of Oregon counties, cities, and statewide thematic contexts and survey records available online through the Oregon Historic Sites Database and the Oregon Historic Sites Map.

Oregon SHPO GIS data were also reviewed to identify previously recorded archaeological sites and isolated finds (isolates) within the study area of the build alternatives. Only those resources that Oregon SHPO either has recorded and assigned Smithsonian Trinomial site numbers or has identified as isolates are included in the archaeological resources analysis. No fieldwork was conducted as part of this Tier 1 analysis. Although most of these sites have not been evaluated for NRHP eligibility, this analysis assumes that unevaluated sites are potentially eligible and thus could represent an impact from the construction of a build alternative. Isolates, except in rare circumstances, are not eligible for listing in the NRHP. However, in incompletely surveyed areas, the presence of known isolates can reflect past human activity of potential archaeological significance.

For the purposes of this Tier 1 EIS analysis, the term "effect" is used to discuss analysis under Section 106 and the term "impact" is used to discuss analysis under NEPA.

Under Section 106 of the NHPA, the term "historic properties" refers to any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP.

An effect is adverse under Section 106 if it may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects are provided in 36 CFR 800.5(2) and include, but are not limited to, the following:

- Physical destruction of or damage to all or part of a property.
- Alteration of a property that is not consistent with the SOI Standards for the Treatment of Historic Properties.
- Introduction of visual, audible, or atmospheric elements that diminish the integrity of the property's significant historic features.

Under NEPA, direct impacts to historic properties are those caused by the proposed action and that occur at the same time and place. To determine the potential direct impacts to historic properties from the OPR Project, the following information was analyzed at a conceptual level:

- Location of the project components and their proximity to known historic properties
- Potential visual effects on historic properties

- Potential partial or complete acquisition of historic properties
- Construction methods
- Potential for vibration (short- or long-term) that could damage historic properties
- Potential for noise that could affect the use of historic properties

After known and potential historic properties were identified within the OPR study area, the potential for effects and/or direct impacts to these properties was assessed at a conceptual level. The conceptual-level analysis considered which possible effects could have a greater potential to be adverse under Section 106 of the NHPA. Within this context, the analysis applied the following two key assumptions:

- All known and potential historic properties within the APE that will need to be established under Tier 2 could incur Section 106 effects and/or direct impacts.
- Known and potential historic properties immediately adjacent to proposed passenger rail infrastructure improvements could incur Section 106 and/or indirect impacts.

Potential construction (temporary) impacts to historic properties (to the degree that such impacts are distinguishable from long-term direct impacts) were also identified at a conceptual level.

For indirect impacts, secondary actions (such as changes in land use) that the OPR Project could induce were identified and analyzed qualitatively, based primarily on those seen from similar projects. Potential indirect impacts could include activities related to the project but not directly part of the project or known at the time of the analysis.

4.10.2.1 Tier 2 Analysis

Future Tier 2 environmental studies for proposed actions subsequent to the OPR Project would consider the following:

- Establishment of an APE that takes into account potential direct and indirect effects of a Tier 2 project on historic properties;
- Pre-fieldwork consultation with SHPO and Tribes;
- Field studies to identify previously unrecorded historical properties and evaluate eligibility of unevaluated properties;
- Post-fieldwork consultations with SHPO and Tribal;
- Specific direct impacts related to the individual project, the extent of such impacts, and appropriate avoidance and mitigation measures (under Section 106, the detrimental effects that could be adverse would necessitate further evaluation);
- Further research to verify missing information (such as the property name, type, date of construction, and area of significance for each eligible property) for known NRHP-eligible properties within the APE (which are historic properties afforded the same review considerations as properties listed in the NRHP);
- Further evaluation to determine the effects of ROW acquisition (which could potentially result in acquisition and demolition of historic properties);
- Further evaluation to determine the effects of the construction of new elevated viaducts and bridges associated with Alternative 2 (such structures could have visual impacts and adverse effects on the settings of surrounding historic properties);
- Further effects analysis regarding any potential changes of use of historic properties;

- Further analysis related to the final proposed locations of stations and other amenities (because the APE will be refined for Tier 2 study to address the exact locations of the stations and the types and locations of amenities, properties that are not situated adjacent to the proposed station locations at this Tier 1 level of analysis could also have a potential for impact);
- Determination of potential adverse effects to archaeological sites (this Tier 1 EIS evaluation was based on existing information; Tier 2 analysis will include field investigations to inventory previously unrecorded sites); and
- Assessment of effects that could be caused by construction activities that result in access to archaeological sites not previously identified or previously inaccessible.

4.10.3 Study Area

The OPR Project study area for cultural resources is focused on identifying previously listed cultural resources, NRHP-listed properties and areas of archaeological sensitivity within the study area as gleaned through desktop analysis. The Tier 2 APE, which, based on the current level of design, represents the area within which the OPR Project may directly or indirectly cause alterations in the character or use of historic properties if such properties exist. The OPR Project APE primarily includes known and potential historic properties that are located:

- Within 100 feet of the railroad alignment centerlines (including proposed new rail improvements and existing UPRR, AERC, PNWR and BNSF alignments, and I-5 and I-205 sections);
- Within the potential locations of new stations (a 20-acre radius around proposed station locations); and
- Within existing station property boundaries.

To assess the potential consequences of increased passenger train frequency on known and potential historic properties, the APE includes the area within 100 feet of track centerlines for the full length of each build alternative alignment, regardless of where infrastructure improvements are specifically proposed. Consultation and coordination with SHPO and the Tribes are recommended to occur early in the planning process, and continue through fieldwork and evaluations, where applicable.

4.10.4 Affected Environment

One hundred twenty-one historic architectural properties were identified as listed in or eligible for the NRHP within the OPR Project study area, including 15 buildings and 3 historic districts that are listed in the NRHP (**Table 4.10-1**) and shown in Appendix D, Figure D-2. Ten built environment properties within the study area contribute to the three listed historic districts; six properties within the study area are located within one of these historic districts but have been previously determined as ineligible/non-contributing resources. The remaining 93 properties have been previously determined eligible for the NRHP by the Oregon SHPO.

The Alternative 1 study area includes more historic (built) properties, many of which are associated with the historic Oregon & California mainline, than the Alternative 2 study area.

For this Tier 1 EIS level of analysis, detailed property information was obtained only for those historic architectural properties that are listed in the NRHP; available data for properties previously determined eligible for the NRHP was obtained from the Oregon Historic Sites Database inventory records, which and were often incomplete because some information was omitted from the inventory form. Architectural historians conducted research on the listed properties to verify the information provided in the GIS data.

Table 4.10-1. NRHP-Listed Built Properties in the Study Area

Property Name	Year Built	Address	Alternative
Southern Pacific Passenger Depot	1908	433 Willamette Street, Eugene	Alternative 1
McCracken Brothers Motor Freight Building	c. 1930	375 W 4th Avenue, Eugene	Alternative 1
Hackleman Historic District (1 contributing building in APE)	c. 1860–1915	Albany, Linn County	Alternative 1; Alternative 2 with Central Albany Option
Thomas Kay Woolen Mill	1886	1313 Mill Street SE, Salem	Alternative
Salem Southern Pacific Railroad Station	1918	500 13th Street SE, Salem	Alternative 1
Aurora Colony Historic District (2 contributing buildings in APE)	c. 1856–1881	Aurora, Marion County	Alternative 1
Bank of Woodburn	1890	199 N Front Street, Woodburn	Alternative 1
Chemawa Indian School Site	1885	3700 Chemawa Road NE, Chemawa	Alternative 1
Canemah Historic District (7 contributing buildings in APE)	c. 1850–1928	Oregon City, Clackamas County	Alternative 1
Erwin Charles House (Gray-Hackett House)	1893	415 17th Street, Oregon City	Alternative 1
Jones Cash Store	1921	111 SE Belmont Street, Portland	Alternative 1
International Harvester Warehouse	1912	79 SE Taylor Street, Portland	Alternative 1
Oregon Portland Cement Building	1929	111 SE Madison Street, Portland	Alternative 1
Spokane, Portland & Seattle Railway Steam Locomotive	1938	2250 SE Water Avenue, Portland	Alternative 1; Alternative 2
Pacific Hardware & Steel Company Warehouse (Vinton Company Warehouse, Fuller, WP & Company)	1910	2181 NW Nicolai Street, Portland	Alternative 1; Alternative 2
Olympic Cereal Mill	1920	107 SE Washington Street, Portland	Alternative 1; Alternative 2
Portland Union Station	1894	800 NW 6th Avenue, Portland	Alternative 1; Alternative 2
John Deere Plow Company Building	1911	215 SE Morrison Street, Portland	Alternative 2

c. = circa

Table 4.10-2 provides a tabulation of previously recorded archaeological sites within the OPR Project study area.

Table 4.10-2. Known Archaeological Sites and Isolates in the Study Area

Site Number	Type	NRHP Status	County	Study Area
35LA209	Pre-contact	Unevaluated	Lane	Alternative 1
35LA680	Pre-contact	Unevaluated	Lane	Alternative 1
35LA1334	Historic	Unevaluated	Lane	Alternative 1
35LA1277	Multi-component	Unevaluated	Lane	Alternative 1
35LA1478	Historic	Eligible	Clackamas	Alternative 1
35CL330	Multi-component	Unevaluated	Multnomah	Alternatives 1 and 2
35MU229	Historic	Unevaluated	Multnomah	Alternatives 1 and 2
35MU235	Multi-component	Unevaluated	Lane	Alternatives 1 and 2
35LA1456	Historic	Eligible	Lane	Alternative 2
35LIN678	Pre-contact	Unevaluated	Linn	Alternative 2
35MA011	Pre-contact	Eligible	Marion	Alternative 2
35MA063	Pre-contact	Eligible	Marion	Alternative 2
35MA070	Pre-contact	Eligible	Marion	Alternative 2
35CL013	Multi-component	Unevaluated	Clackamas	Alternative 2
35CL019	Multi-component	Unevaluated	Clackamas	Alternative 2

The total number of known sites for the Alternative 2 with Central Albany Option is the same as for Alternative 2.

4.10.5 Environmental Consequences

4.10.5.1 Direct and Indirect Impacts

No Action Alternative

No track or station improvements would be made as a result of the No Action Alternative; present-day Amtrak Cascades operations and maintenance activities would continue into the future. Therefore, the No Action Alternative would have no direct impacts to NRHP-listed or eligible historic properties.

Alternative 1

Forty-eight NRHP-listed or NRHP-eligible (built) properties are located within the Alternative 1 study area for the proposed rail alignment and station facilities. For the purposes of this analysis, it is assumed that historic properties within the study area for Alternative 1 could be subject to direct impacts and adverse effects. Properties adjacent to the proposed rail alignment and station facilities of Alternative 1 where track would be added along sections of the UPRR alignment and where other infrastructure improvements would be made could experience direct impacts from the construction as well as minor visual and noise proximity impacts from the increased number of trains operating along the existing UPRR mainline. All historic or potentially historic (built) properties immediately adjacent to an existing track within the Alternative 1 study area could experience visual, noise, and vibration impacts. However, these impacts may not be adverse, because changes to the existing conditions of these historic properties, which are already adjacent to an active rail line, would likely be negligible compared to the No Action Alternative. The proposed infrastructure improvements along Alternative 1 would primarily involve construction of additional mainline railroad track 20 feet east of the existing UPRR mainline at specific locations between Eugene and Portland. Infrastructure improvements would also include sidings, cross-overs, and industry connections.

These improvements would likely not cause significant impacts to the surrounding historic (built) properties, because the historic properties along these segments of the alignment are already situated next to an existing active rail line. Depending on future detailed design, there may be ROW acquisition necessary along the existing UPRR ROW, which could result in the acquisition and demolition or removal of historic properties. This could result in a direct adverse effect, and therefore would need to be assessed further at the Tier 2 level based on the specific improvement project or projects.

Five of the six stations along Alternative 1 would use existing station buildings, all of which are historic. It is unlikely that a significant direct physical impact would occur on existing stations under Alternative 1, because physical changes to the stations are not anticipated. Any potential improvements within the station property, however, could result in changes to the settings of the existing historic stations. Three of the existing stations are listed in the NRHP—those in Eugene, Salem, and Portland. The existing Southern Pacific Co. Freight Depot (1924) in Oregon City was moved to its current location in 2009 (1757 Washington Street) and is currently within the APE. The property was recorded at its former location (1709 Washington Street) in 2004 and was described as altered but recommended as eligible for the NRHP. The existing Albany Southern Pacific Depot (c. 1910) is also eligible for listing in the NRHP. To minimize the impacts, any potential changes made to the existing stations could be done in accordance with the Secretary of Interior's standards for rehabilitation, which could result in a finding of no adverse effect.

Construction of the potential new Woodburn station adjacent to the Alternative 1 alignment could also result in acquisition and demolition or removal of potential historic (built) properties and thus could result in potential direct adverse effects.

Railroad tracks are an integral part of the settings of existing historic railroad stations. Since the construction of the former Southern Pacific mainline in the late 19th century, elements of the railroad have been routinely repaired, maintained and improved to adapt to changing train technology and changes in capacity and service levels, and to ensure safe and reliable operations. As a result of regular maintenance, repair and improvements, the settings of the existing historic railroad stations have been altered throughout history to improve their overall functionality. Such improvements, particularly those that have occurred within the period of significance for the stations, do not diminish the integrity of the historic buildings.

Under Alternative 1, direct impacts on the historic railroad line would likely occur. The existing UPRR mainline could experience impacts, including physical alterations and changes to the setting, as a result of the proposed rail improvements. The former Southern Pacific line between Eugene and Portland, however, is a very long linear resource (approximately 125 miles) composed of multiple segments of track and associated railroad features. Construction of a new adjacent track and additional sidings, cross-overs, and industry connections would affect certain segments of the former Southern Pacific line, but it is not likely that such improvements would significantly diminish the integrity of the overall resource, nor would they be likely to adversely affect the railroad line's character-defining qualities. Addition of a parallel mainline track and improvements to the existing UPRR mainline would not diminish the railroad's significant association with the early development of Oregon, its cities, and the Northwest region. For these reasons, it is unlikely that the direct impacts to the historic rail line would result in adverse effects.

Direct impacts to archaeological resources could be caused by physical, ground-disturbing actions associated with infrastructure construction. For archaeological sites, any direct impact is permanent and potentially adverse. One of the eight known archaeological sites within the Alternative 1 study area has been determined eligible for listing in the NRHP. However, additional archaeological sites could be recorded during SHPO consultation and subsequent fieldwork activities within the Tier 2 APE, and if so would require NRHP eligibility evaluation prior to construction. An inadvertent discovery plan may also be put into effect in case previously undiscovered resources are exposed during construction.

Indirect impacts to historic properties from Alternative 1 could be prompted by increases in vehicular and pedestrian traffic near Alternative 1 station areas due to growth in passenger rail ridership. As demand rises for access to passenger rail stations, related local transportation improvements and commercial growth could potentially result in physical impacts to historic properties as well as adverse effects on the settings of small towns, historic districts, and individual historic properties. Conversely, local transportation improvements and increased commercial growth could result in rehabilitation of historic buildings and revitalization of historic districts.

Archaeological data recovery is usually considered a mitigating action for adverse impacts. However, the destruction of an archaeological site, even through data recovery, is permanent, and such resources are finite. Significant archaeological sites that warrant preservation in place are protected under Section 4(f). It should be noted that this discussion addresses only those sites within the Alternative 1 study area. Additional sites adjacent to Alternative 1 (outside the study area, where no project activities are planned) are not addressed.

Indirect impacts to archaeological sites could be caused by construction activities that result in access to sites not previously identified or previously inaccessible.

Alternative 2

Thirty-three NRHP-listed or NRHP-eligible (built) properties are within the Alternative 2 study area for the proposed rail alignment and station facilities. Thirty-seven NRHP-listed or NRHP-eligible properties are located within the Alternative 2 with Central Albany Option study area. For the purposes of this evaluation, it is assumed that known or potentially historic properties within the study area could be subject to direct impacts and possible adverse effects. Alternative 2 would primarily involve capital improvements either in or adjacent to the existing I-5 and I-205 freeway corridors, adjacent to the existing the UPRR line in Springfield and between Oregon City and Portland’s Union Station, or adjacent to the existing PNWR line between Keizer and Wilsonville. A new passenger railroad track would be constructed along the entire length of the alignment. For the majority of the alignment, potentially impacted historic properties are immediately adjacent to an existing freeway. Therefore, identified historic properties are already subject to the noise, vibration, and visual effects resulting from heavy road traffic.

The addition of a mainline track adjacent to the existing freeway could result in increased visual, noise, and vibration impacts to the surrounding historic (built) properties. However, because of the existing traffic on I-5 and I-205, it is unlikely that impacts to adjacent historic properties under Alternative 2 would be significant; that is, any additional noise or impacts from the proposed infrastructure improvements would likely not be a significant change from the existing conditions. ROW acquisition could potentially result in acquisition and demolition of historic properties, which could result in adverse effects.

Alternative 2 would include construction of new elevated viaducts and bridges. Such structures could have visual impacts and adverse effects on the settings of surrounding historic (built) properties, including one NRHP-eligible site located directly east of I-5 and south of Harlow Road in Eugene, and one NRHP-eligible site that ODOT owns in Marion County south of Salem. Construction of new stations along Alternative 2 could also result in adverse effects on historic properties. Up to four[25] of the five stations proposed along Alternative 2 would be new construction. The construction of new stations would end passenger rail service to several existing stations, resulting in a potential change of use for existing historic railroad stations in Salem, Eugene, Albany, and Oregon City, although details are not known at this time. Changes that alter the characteristics of the existing railroad stations that qualify them for inclusion in the NRHP could result in an adverse effect. In addition, the potential Salem and Tualatin station location options (alternatives to the potential Keizer or Wilsonville station location options) would be adjacent to, or in the vicinity of, buildings constructed in or before 1969 that have not been evaluated for NRHP eligibility and could be historic. Those buildings would be evaluated for NRHP eligibility in Tier 2 analysis. These new stations could require demolition of existing buildings or structures, which would likely result in adverse effects on potential

[25] There would be three new stations with the Central Albany Option which would use the existing Albany Station. There would be four new stations if a new Albany station is added adjacent to I-5.

historic properties that are on or adjacent to those sites. The potential Tualatin station is proposed to be constructed in the freeway median, which should limit the impact to any surrounding historic properties.

At this time, there are no known properties constructed in or before 1969 within the study area for the potential Springfield, Albany, Keizer, Woodburn or Wilsonville stations. However, for approximately 70 properties in the study area of the aforementioned proposed station areas, the year of construction is still unknown. For this reason, the number of potentially impacted historic buildings associated with the potential stations could be higher.

Direct impacts to archaeological resources could be caused by physical, ground-disturbing actions associated with infrastructure construction. Four of the ten known archaeological sites within the Alternative 2 study area have been determined eligible for listing in the NRHP. Additional archaeological sites could be inadvertently discovered during construction, and if so would be evaluated for NRHP eligibility at that time.

For this Tier 1 EIS analysis, it is assumed that the indirect impacts to historic properties from Alternative 2 would be of greater magnitude than those from Alternative 1. Improved passenger service and increased ridership could lead to local transportation improvements and commercial growth near station areas, especially in the vicinity of the potential new stations in Springfield, Albany, Salem or Keizer, and Wilsonville or Tualatin. With an increase in commercial activity, employment near station areas could increase, while new development could potentially result in physical impacts to historic properties as well as adverse effects on the settings of small towns and individual properties. Conversely, local transportation improvements and increased commercial growth could result in rehabilitation of historic buildings.

Indirect impacts to archaeological sites could be caused by construction activities that result in access to sites not previously identified or previously inaccessible.

Alternative 2 with Central Albany Option

The Central Albany Option would diverge from the existing I-5 alignment, running northwest parallel to existing AERC track for approximately 2.5 miles, where it would join the existing UPRR line in order to reach downtown Albany. The line would transition back east to the I-5 alignment parallel to the existing UPRR track, north of Millersburg. Approximately 53,000 feet of mainline track would be constructed parallel to the existing AERC and UPRR track through Albany. The NRHP-listed Hackleman Historic District is primarily adjacent to the APE of the Central Albany Option, but one building that contributes to the Hackleman Historic District is within the Central Albany Option study area. No significant impacts to the historic district or the contributing resource are anticipated, although minor visual, noise, and vibration impacts that could affect the district's integrity of setting and feeling could occur, and could need to be further analyzed.

In addition, the NRHP-eligible Albany Southern Pacific Depot (c. 1910), Robert L Burkhart House (1922), one NRHP-eligible industrial property (44517, date of construction unknown), and one rural NRHP-eligible property (Resource 20416, date of construction unknown) are located within the Central Albany Option study area. No physical changes are expected to occur to the Albany Southern Pacific Depot. In addition, the identified (built) historic properties along the Central Albany Option, including the existing station, are already adjacent to an existing railroad line and, although some visual impacts could occur from an additional mainline track, improvements to the line would likely not have a significant direct impact or adverse effect to the historic properties. Visual, noise, and vibration impacts to historic properties would need to be further assessed for Tier 2 projects involving the Central Albany Option alignment.

Direct impacts to archaeological resources could be caused by physical, ground-disturbing actions associated with Central Albany Option construction. While there are currently no known archaeological sites within the Central Albany Option study area, archaeological sites could be inadvertently discovered during construction, and if so would be evaluated for NRHP eligibility at that time.

Indirect impacts associated with the Central Albany Option would be similar to those described above for Alternative 1 and Alternative 2.

4.10.5.2 Construction Impacts

Alternative 1

Construction impacts to historic properties within the Alternative 1 study area could include increased heavy truck traffic, temporary restriction of access, visual effects, noise, vibration, and the dust and debris of construction activities. These effects would be temporary, but could be adverse to historic properties. Potential adverse indirect construction impacts can likely be avoided or mitigated through construction protection plans and other actions. Ground-disturbing actions could also adversely affect the integrity and content of archaeological sites, which would likely constitute permanent impacts.

Alternative 2 and Alternative 2 with Central Albany Option

For this Tier 1 EIS analysis, construction impacts are anticipated to be more intense under Alternative 2 than under Alternative 1, although fewer identified historic properties are potentially impacted by construction of Alternative 2. Because an existing railroad line does not exist adjacent to substantial portions of Alternative 2 and several new passenger rail stations would be built, an increased level of construction would be necessary, along with a greater reliance on surface roads for delivery of equipment and materials. For these reasons, Alternative 2 would have more construction-related impacts than Alternative 1.

Up to four new stations would be added along the Alternative 2 alignment. No historic properties were identified immediately adjacent to the potential station locations. However, properties adjacent to the potential Salem and Tualatin station locations contain buildings that were constructed in or before 1969 that have not been evaluated for NRHP eligibility—specifically, one Salem school district property adjacent to the proposed Salem station location that has a construction date of 1964 and one residential property in the vicinity of the proposed Tualatin station location that has a construction date of 1924. These properties are potentially historic and would need to be evaluated for NRHP eligibility at the Tier 2 level. If found to be eligible, further analysis would be necessary to determine whether the possible effects from construction would be adverse.

Several properties that contain buildings constructed in or before 1969 that have not been evaluated for NRHP eligibility are located within approximately 500 feet of the proposed Albany and Woodburn stations. Because the APE would likely be revised when the exact locations of the stations are determined and the types and locations of amenities are defined, properties that are not presently situated adjacent to the proposed station locations at this Tier 1 EIS phase of analysis could also have a potential for impact. In addition, the proposed cut-and-cover tunnel in Southeast Portland would temporarily close SE 2nd Avenue to vehicular traffic. However, various construction approaches, including phased construction, could be used to minimize the temporary impacts to the adjacent historic properties, including the NRHP-listed John Deere Plow Company Building, the Olympic Cereal Mill, and three NRHP-eligible buildings.

Ground-disturbing actions could also adversely affect archaeological sites through damage or destruction, and if they did so, would likely constitute permanent impacts. Significant archaeological sites that warrant preservation in place are protected under Section 4(f).

4.10.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for affected historic properties, as appropriate.

The purpose of Section 106 review is to identify historic properties in an undertaking's APE, assess effects to those properties, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. When an undertaking is found to have an adverse effect, Section 106 requires consultation with

Oregon SHPO, affected Tribes, consulting parties and other interested parties on appropriate avoidance or mitigation measures. Mitigation for adverse effects could include redesigning aspects of individual Tier 2 projects, development and implementation of construction protection plans, relocating historic buildings, recordation of buildings and structures, data recovery of archaeological sites, and/or alternative mitigation strategies.

If a finding of adverse effect is determined for any subsequent Tier 2 project, the product of Section 106 consultation would be a Memorandum of Agreement, as stipulated in 36 CFR 800.6(c). This Memorandum of Agreement would contain stipulations that specify measures to be implemented that would avoid, minimize or mitigate the adverse effects to historic properties.

During construction, if ground-disturbing activities encounter human remains or archaeological materials, the work would be stopped, the affected area would be secured, and ODOT would contact the FRA, Oregon SHPO, and the applicable County coroner.

4.11 Geology and Soils

This section discusses legal requirements, methods of analysis, study area, affected environment, potential environmental consequences, and mitigation strategies related to geology and soils for each of the OPR Project alternatives.

4.11.1 Legal Requirements

Federal and state laws and regulations related to geology and soils and applicable to this Tier 1 analysis include the following:

4.11.1.1 Federal

- In addition to NEPA and the CEQ's NEPA implementing regulations, **FRA's Procedures for Considering Environmental Impacts** are applicable. Section 14(n) of FRA's environmental procedures require an EIS to include consideration of relevant environmental factors and impacts.

4.11.1.2 State

- Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces – OAR 660-015-0000(5). Goal 5 is one of Oregon's **Statewide Planning Goals and Guidelines**. It requires local governments to maintain current inventories of natural resources, scenic and historic areas, and open spaces, including mineral and aggregate resources. Guideline A.6 states: "In conjunction with the inventory of mineral and aggregate resources, sites for removal and processing of such resources should be identified and protected."

4.11.2 Methods

A GIS database was compiled to document the existing geology and soils conditions within the study area. Specific conditions documented include:

- Mapped faults
- Mapped slope failures
- Suspected unstable slopes
- Potentially compressible soil
- Mapped landfills
- Potentially liquefiable soil
- Slopes susceptible to seismic-induced landslides

- Mapped mineral and aggregate resource removal and processing sites

Information incorporated into the GIS database includes:

- The Oregon Geologic Data Compilation, Release 5 (OGDC-5) by the Oregon Department of Geology and Mineral Industries (DOGAMI) (Ma et al., 2009)
- The Quaternary Fault and Fold Database of the United States by the U.S. Geological Survey (USGS) (USGS, 2006)
- The Statewide Landslide Information Database for Oregon, release 3 (SLIDO-3.0) (Burns and Watzig, 2014)
- ODOT's dataset of unstable slopes affecting ODOT-owned roads (as of 10/10/2010)
- Light detection and ranging (LiDAR) data provided by ODOT
- Oregon Wetland Soils by The Wetlands Conservancy
- Oregon DEQ Facility Profiler Database
- DOGAMI Open File Report O-13-06, "The Ground Motion, Ground Deformation, Tsunami Inundation, Coseismic Subsidence, and Damage Potential Maps for the 2012 Oregon Resilience Plan for Cascadia Subduction Zone Earthquakes" by the Oregon DOGAMI (Madin and Burns, 2013)
- The Mineral Information Layer for Oregon, release 2 (MILO-2) (Niewendorp and Geitgey, 2010)
- ODOT's dataset of aggregate source locations

Within 500 feet of new alignment centerlines, existing stations, and potential new stations, OPR Project alternatives were evaluated for potential direct impacts to and from substandard geology and soil conditions, including:

- Mapped and suspected unstable slopes
- Potentially compressible soils and landfills
- Potentially liquefiable soils
- Slopes susceptible to seismic-induced landslides
- Mapped mineral and aggregate resource removal and processing sites

Data sources were evaluated in GIS for potential indirect impacts within 0.25 mile of alignment centerlines, including:

- Mapped and suspected unstable slopes
- Potentially compressible soil and landfills
- Mapped mineral and aggregate resource removal and processing sites

Appendix D, Figure D-4 shows mapped locations of unstable slope, historic landslide, scarp, landslide hazard area, and hydric soils.

Tier 2 Analysis

Future Tier 2 environmental studies for individual projects proposed subsequent to the OPR Project would entail detailed project-level geological analysis based on advanced design.

4.11.3 Study Area

The study area for the affected environment and potential direct impacts to geology and soils includes the area within 500 feet of alignment centerlines, existing stations, and potential new stations. A 10-mile buffer was used for mapped faults. A larger buffer is appropriate for faults because of the inherent imprecision in the mapped locations and the potential for catastrophic impacts, such as a surface rupture.

The study area for indirect impacts for the geology and soils technical analysis includes terrain within 0.25 mile of alignment centerlines and station areas. This relatively large buffer area is appropriate because several related features and events (such as landslides) could impact the project from a greater distance.

4.11.4 Affected Environment

The build alternative alignments traverse nearly the entire length of the Willamette Valley physiographic province, a north–south trending, elongated lowland stretching from the Columbia River to Cottage Grove, OR. Bounded on the west by the Coast Range and on the east by the Cascade Range, the valley is approximately 130 miles long and generally 20 to 40 miles wide, tapering down to a point at its southern terminus. Much of Oregon’s geologic history, including that of the Willamette Valley, has been shaped by an adjacent tectonic plate boundary, where oceanic crust is subducting beneath the North American continental crust.

Tables 4.11-1 and **4.11-2** provide a summary of the geology and soils characteristics that represent the affected environment.

Table 4.11-1. Summary of Geology and Soils Characteristics for Each Alternative Alignment

Resource Indicator, Topic, or Measurement	Alternative 1[a,b]	Alternative 2[a,b]
Number of Mapped Class A Faults	15	16
Linear Miles of Mapped Slope Failures	7.4 miles (1.4 miles)	11.7 miles (2.3 miles)
Acres of “All Hydric” Soil within Study Area	4,102 acres (2,039 acres)	8,423 acres (6,412 acres)
Acres of Liquefaction-Susceptible Soil within Study Area	6,854 acres (2,905 acres)	7,648 acres (4,029 acres)
Linear Miles of Mapped Earthquake-Induced Landslide-Susceptible Slopes	116 miles (57 miles)	115 miles (68 miles)
Number of Mapped Mineral and Aggregate Resources Sites	2	7

[a] The No Action Alternative and Alternative 1 follow the same general alignment.

[b] Values in parentheses apply only to the portions of the alignment where new track would be constructed, where different.

Table 4.11-2. Summary of Geology and Soils Characteristics for Each Existing and Proposed Station

Resource Indicator, Topic, or Measurement	Springfield	Eugene[b]	Albany[a]	Salem[a]	Keizer	Woodburn[a]	Wilsonville	Tualatin	Oregon City	Portland
Miles to Mapped Class A Fault	30 miles	30 miles	5 miles 7 miles	4 miles 3 miles	7 miles	1 mile 2 miles	4 miles	2 miles	1 mile	0.5 mile
Percentage of "All Hydric" Soil within Station Area	0%	0%	100% 25%	0% 10%	0%	10% 25%	0%	10%	0%	0%
Percentage of Liquefaction-Susceptible Soil within Station Area	0%	0%	100% 100%	0% 100%	100%	0% 0%	75%	75%	100%	75%
Earthquake-Induced Landslide-Susceptible Slopes within Station Area?	No	Yes	Yes Yes	No Yes	Yes	Yes Yes	Yes	Yes	Yes	Yes

[a] Top value applies to Alternative 1 station location. Bottom value applies to Alternative 2 station location.

4.11.5 Environmental Consequences

4.11.5.1 Direct and Indirect Impacts

No Action Alternative

No impacts to or from geology and soils would result from the No Action Alternative. Routine maintenance and emergency repair of infrastructure following events such as rockfall, landslides, flooding, or earthquakes would continue to be required.

Alternative 1

Minor grade changes and no major retaining structures are planned. Therefore, limited changes to the stability of existing slopes and no impacts from compressible soils are anticipated.

No impacts due to mapped liquefaction-susceptible soils are anticipated from Alternative 1. However, without mitigation, liquefaction-related ground displacements could impact the completed track, associated structures, and station facilities during an earthquake. The existing Albany Station is located in an area mapped with a liquefaction susceptibility of "very high."

Limited impacts from earthquake-induced, landslide-susceptible slopes are anticipated from Alternative 1. Areas with a relatively high risk of slope failure, both static and seismic-induced, appear to be river and stream banks and the following list of general locations with steep slopes within 500 feet of the alignment centerline. This list of locations below is based on a preliminary review of the available data with the conceptual engineering developed for the OPR Project. These areas appear more likely to require mitigation to construct the project without causing failures or to achieve an acceptable factor of safety for static or seismic slope stability.

- East of the alignment to Scravel Hill Road NE, north of Millersburg
- East of the alignment between Cemetery Hill Road SE and Parrish Gap Road SE, north of Jefferson
- West of the alignment between Parrish Gap Road SE and Pearson Road SE, north of Jefferson

- West of the alignment between Delaney Road SE and Timber Drive SE in Turner
- West of the alignment from Kuebler Boulevard SE to north of the I-5 undercrossing south of Salem
- West of the alignment along Mill Race Road NE, south of Ehlen Road NE, in Aurora
- From Ehlen Road NE north about 1.25 miles to approximately where the alignment becomes adjacent to OR 99E, north of Aurora
- East of the alignment along the adjacent sand and gravel mine pit in Turner
- West of the alignment near the intersection of Otto Road and OR 99E in Canby
- East of the alignment from E Territorial Road to the northern edge of Canby at the Willamette River
- From the northern edge of Canby at the Willamette River 6.3 miles north to 12th Street in Oregon City (In this area the Alternative 1 alignment is located on a relatively narrow area between the Willamette River and steep slopes and rock cuts. Near 1st Street in Oregon City, the tracks are close to the riverbanks; therefore, riverbank stability to the west and slope stability to the east are both hazards. North of 1st Street, the tracks are farther from the riverbank, and the primary hazard is rockfall from the adjacent cliffs to the east. The ODOT data indicates a significant number of rockfall events affecting OR 99E near Oregon City.)
- North of the Clackamas River near 82nd Drive and SE Charles Court to south of OR 212/OR 224
- West of the alignment along NW St. Helens Road/OR 30 north of NW Kittridge Avenue in Portland
- Both sides of the alignment from N Edgewater Street to N Fessenden Street in Portland

Indirect impacts due to slope failures are possible at the same locations identified for direct impacts. Indirect impacts could consist of rockfall or landslide debris on the tracks, but these are less likely to require complete reconstruction of the tracks.

Alternative 2 and Alternative 2 with Central Albany Option

Several bridges and elevated viaduct structures with retained approach fills are planned for Alternative 2. Most of the area is mapped as “All Hydric” soil; therefore, mitigation for settlement could be required for construction of some fills. The following list identifies specific areas that appear to be at higher risk due to compressible soil.

- Long-term settlement of approach fills on the north bank of the Willamette River in Springfield could occur if landfill deposits or non-engineered fill extend below the tracks.
- Variable, unconsolidated deposits may be present where the alignment crosses a mapped fan deposit, between the McKenzie River and just north of Coleman Road.
- Talbot Road, north of Millersburg
- From 37th Avenue SE to Hagers Grove Road SE in Salem
- South approach to SW Norwood Road viaduct structure
- North of Blankenship Road

No impacts due to mapped liquefaction-susceptible soils from Alternative 2 or Alternative 2 with Central Albany Option are anticipated. However, liquefaction-related ground displacements could impact the track, associated structures, and station facilities during an earthquake.

Areas with a relatively high risk of slope failure, both static and seismic-induced, appear to be rock cuts, river and stream banks, and the following list of general locations with steep slopes within 500 feet of the alignment centerline. This list of locations is based on a preliminary review of the available data with the conceptual engineering developed for the OPR Project. These areas appear more likely to require mitigation to construct the project without causing failures or to achieve an acceptable factor of safety for slope stability or earthquakes.

- River and stream banks and slopes near the east end of Arnold Lane NE in Albany
- Proposed cut south of Dever Conner Road NE/Santiam Bluffs Road NE
- East of the alignment between OR 164/Jefferson Highway and south of Jackson Hill Road SE
- West of the alignment between Twin Hills Drive SE and south of Jackson Hill Road SE, south of Salem
- Proposed cuts and slopes along both sides of I-5 between Jackson Hill Road SE and Battle Creek, from Turner to Salem
- Proposed cuts near Kuebler Boulevard SE in Salem
- From the northern end of NE Prahl Road, south of Wilsonville
- Proposed cut south of Dever Conner Road NE/Santiam Bluffs Road NE
- East of the alignment between OR 164/Jefferson Highway and south of Jackson Hill Road SE
- West of the alignment between Twin Hills Drive SE and south of Jackson Hill Road SE, south of Salem
- Proposed cuts and slopes along both sides of I-5 between Jackson Hill Road SE and Battle Creek, from Turner to Salem
- Proposed cuts near Kuebler Boulevard SE in Salem
- From the northern end of NE Prahl Road, south of Wilsonville
- East of I-205 near SW 65th Avenue
- Both sides of I-205 in the vicinity of SW Prosperity Park Road
- Both sides of I-205 in the vicinity of S Woodbine Road
- Along Willamette Falls Drive between 6th Street in West Linn and the east end of the viaduct structure over the Willamette River in Oregon City

The quarry located just north of the McKenzie River on the east side of I-5 could be impacted, depending on the distance from the tracks to the constructed rock cut and the location of the property line.

The alignment would cross the access to the Frohmader Quarry from Enchanted Way SE on an elevated viaduct, and the alignment would be very close to the edge of the pits in some locations. Mitigation could be required to attain an acceptable factor of safety of the slope, particularly for placing fill at the top of the slopes. If a failure of the slope along the edge of the pit adjacent to the tracks is expected to cause displacement of the soil supporting the tracks, the most cost-effective mitigation measure to construct would require placing engineered fill in the pit to increase the offset from the top of the slope to the tracks.

Rock cuts below I-205 and above Willamette Falls Drive would require careful design and construction following a comprehensive geologic exploration program, particularly below the existing landslide deposit between South Salamo Road and Beaconhill Drive in West Linn, where a large bedrock failure occurred during excavation for I-205 southbound. It is likely that design and construction of the rock cut along Willamette Falls Drive would be the most challenging portion of Alternative 2 with respect to geology and soils.

With regard to direct impacts explicitly associated with the Central Albany Option, the Albany Station is located in an area mapped with a liquefaction susceptibility of "very high."

Indirect impacts of slope failures are possible at the same locations identified for direct impacts. Indirect impacts could consist of rockfall or landslide debris on the tracks, but these are less likely to require complete reconstruction of the tracks.

4.11.5.2 Construction Impacts

Alternative 1

If unmitigated settlement were to be caused adjacent to existing facilities or right-of-way boundaries, the adjacent facilities, utilities, or properties could be impacted.

Moderate quantities of high-quality sand, gravel, and crushed rock would likely be required for construction, increasing demand for materials from aggregate sources in the vicinity of the alignment. Limited grade changes and no major retaining structures are proposed for Alternative 1, so impacts to local aggregate sources would likely be limited.

Alternative 2 and Alternative 2 with Central Albany Option

The construction impacts identified for Alternative 1 also apply to Alternative 2. Alternative 2 would require significantly more earthwork than Alternative 1 and is, therefore, more likely to impact the supply, demand, and cost for aggregate resources in the vicinity of the project.

Construction impacts would also be associated with a cut-and-cover tunnel in SE Portland. Considerations related to geology and soils associated with this tunnel include:

- Dewatering and groundwater control would be a major issue. The groundwater elevation along SE 2nd Avenue is expected to be close to the water level in the Willamette River, which has an average elevation of about 10 feet. The lowest portion of the tunnel would be around elevation -8 feet, about 18 feet below the river level.
- Protecting adjacent building foundations and utilities from vibration, settlement, and displacement while the cut is open would be important. Many of the facilities are old and likely sensitive to minor ground displacements. In addition, complete records documenting their foundation types and design assumptions might be difficult to locate.
- Temporary easements would probably be required for installation of tiebacks to support the shoring walls that would be needed to keep the trench open during construction. The tiebacks for the walls would probably be much longer than what could be installed within the SE 2nd Avenue ROW.
- Historically, large quantities of fill material have been placed along the Willamette River. This fill is typically highly variable, and it often contains obstructions, wood debris, and other undesirable material.

4.11.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies to address local geologic and soil conditions, as appropriate. Technical mitigation measures during construction would likely be required for the project design criteria to be met where unstable slopes, liquefiable soils, and/or compressible soils are present within the construction area. Mitigation measures could include retaining walls, slope re-grading, deep foundations, foundations designed to resist landslide-induced lateral loads, surcharge fills, ground improvement, rock bolts, and other measures. Rock tunneling would be an approach to avoid unstable slopes and rockfall from the cliffs on both sides of the Willamette River through West Linn and Oregon City.

4.12 Biological Resources

This section discusses legal requirements, methods of analysis, study areas, affected environment, potential environmental consequences and mitigation strategies related to biological resources for each of the OPR Project alternatives.

4.12.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws and regulations related to biological resources and applicable to this Tier 1 analysis include the following:

4.12.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14(n)(5) states that an EIS should assess both construction-period and long-term impacts of alternatives on wildlife and vegetation in the affected environment. Section 14(n)(7) states that an EIS, where applicable, should discuss the impacts of the alternatives on endangered or threatened species or wildlife.
- **Endangered Species Act of 1973 (ESA) (16 USC Section 1531 et seq.)** provides protection for federally listed fish, wildlife, and plant species, and designated critical habitat. The ESA outlines procedures to follow when actions may impact listed species; it also contains exceptions and exemptions to take (e.g., to capture, wound, harass, kill, or otherwise injure the species).
- **The Magnuson-Stevens Fisheries Conservation Management Act** governs the conservation and management of ocean fishing, and it protects anadromous fish habitat.
- **The Migratory Bird Treaty Act (MBTA)** prevents the unpermitted take, killing or possession of migratory birds. Removal of inactive nests (i.e., devoid of eggs or dependent young) does not require a permit; therefore, removal of a nest should occur before nest occupancy. A take permit may be issued at the discretion of the U.S. Fish and Wildlife Service (USFWS), but early coordination is critical.
- **The Bald and Golden Eagle Protection Act** prohibits the take or possession of and commerce in bald and golden eagles and their nests, with limited exceptions authorized by a USFWS permit.
- **Section 401, Water Quality Certification, of the Federal Clean Water Act** specifies that projects with in-water work or discharge into the Waters of the United States or the state may need a water quality certification permit. This permit is concurrent with the Section 404 review process.
- **Section 404 of the Federal Clean Water Act** enables the U.S. Army Corps of Engineers to regulate fill, including pilings and other structures, within Waters of the United States.
- **Executive Order 11990: Protection of Wetlands**, was issued in 1977. The Executive Order directs Federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

4.12.1.2 State

- **Oregon Department of Fish and Wildlife (ODFW) – Oregon laws (ORS 509.580 through 910 and OAR 635, Division 412)** regulate artificial obstructions located in waters in which native migratory fish are currently, or were historically, present. Native migratory fish include but are not limited to native salmon, trout, lamprey, sturgeon, and suckers. Fish passage requirements are triggered by the installation, major replacement or abandonment of an artificial obstruction (e.g., culverts).
- **The Oregon Removal/Fill Act** enables the State of Oregon to regulate fill or removal within waters of the state.

- **The Oregon Endangered Species Act (Oregon ESA) (ORS 496.171 to 496.192, 498.026, and 564.100 to 564.135)** protects state-listed threatened and endangered species. It includes most native species listed under the Federal ESA that reside in Oregon as well as additional species designated threatened or endangered by ODFW and the Oregon Department of Agriculture. Invertebrates are not protected under Oregon state law.

4.12.2 Methods

4.12.2.1 Existing Conditions

The following information sources were used to document existing conditions within the potential impact areas of the OPR Project. No field work was conducted as part of this Tier 1 biological resources analysis to verify or supplement data collection efforts.

- The USFWS ESA species list and ODFW species list for Lane, Linn, Marion, Clackamas, Washington, and Multnomah counties (USFWS, 2015; ODFW, 2012) were used to identify listed, proposed, and candidate species.
- The Oregon Biodiversity Information Center (ORBIC) database (ORBIC, 2015) was used to map known locations of rare, threatened, and endangered plant and animal species over the last 25 years.
- USFWS and National Marine Fisheries Service (NMFS) critical habitat maps (USFWS, 2014a, b; NMFS, 2014a, b) were used to identify designated and proposed critical habitat.
- StreamNet (StreamNet, 2014) and ODFW Distribution/Habitat maps (ODFW, 2010) were used to identify salmon and steelhead trout occurrence and habitat use. In addition, the total number of stream crossings were identified and tabulated by project alternative and by occurrence of listed fish species.
- The Oregon Conservation Strategy (OCS) (ODFW, 2005) was used to identify non-listed species and habitats of conservation concern. Strategy habitats in the Willamette Valley include oak woodland and savannah, riparian areas, grasslands (including Willamette Prairie), and wetlands.
- The ODFW Centralized Oregon Mapping Products and Analysis Support System (COMPASS) (ODFW, 2014a); the Northwest Habitat Institute (NWHI) Vegetation Land Cover Map (NWHI, 2000); and other Federal and state fish, wildlife, and vegetation natural resource GIS databases mentioned previously were used to identify species and habitats occurring along the study area.
- ODFW hosted a 2007 workshop that identified wildlife linkages (ODFW, 2007). The information from that workshop was used to evaluate potential impacts to wildlife linkages by comparing the number of times a proposed alignment would cross a wildlife linkage.
- The Nature Conservancy has worked with government agencies and nonprofit partners to produce a synthesis of the major Willamette Basin conservation planning efforts. The Willamette Valley Synthesis Map (ODFW, 2005) was used to evaluate whether the proposed rail alignments would cross conservation opportunity areas.
- Potential fish passage barriers were tabulated as the number of new and existing stream crossings by alternative alignments from data provided by ODFW (2013).
- The National Conservation Easement Database (NCED, 2014), a national database of conservation easement information, was used to identify easements within each of the study areas. This database compiles records from land trusts and public agencies throughout the United States to help organizations plan more strategically and identify opportunities for collaboration.

4.12.2.2 Direct Impacts

Direct impacts are defined as habitat and species impacts caused by an action at the time of the action (e.g., loss of habitat, addition of infrastructure to a natural environment, etc.). Direct impacts that could result from the OPR Project were assessed for terrestrial and aquatic species and their habitats, including designated and proposed critical habitat, within 100 feet of proposed rail centerlines and a 20-acre area for each potential new rail station location. Multiple Federal and state GIS data sets were used to characterize existing biological conditions and hypothesize about possible project impacts.

In practice, infrastructure improvements needed for a future build alternative would not result in direct impacts to the entire direct impacts study area. However, for the purposes of the OPR Tier 1 EIS, the known resources within the direct impacts study area were used as a means to compare the alternatives, and to make preliminary assessments regarding which alternative would likely have greater impacts on biological resources. The following measures were used to assess potential direct impacts to biological resources:

- General wildlife habitat types (acres potentially impacted)
- Wildlife and plant critical habitat (acres potentially impacted)
- Threatened, endangered, proposed, and candidate wildlife or plant species (number of known populations or individuals)
- OCS non-listed species (number of known populations or individuals)
- ODFW wildlife linkages (number of intersections with proposed rail alignments)
- Non-listed fish species (number of proposed stream crossings and area of riparian disturbance)
- Threatened and endangered fish species (number of proposed stream crossings in occupied habitat, in proposed or designated critical habitat, and across watersheds)
- Fish and aquatic habitat (number of proposed new stream crossings)

For the purposes of this conceptual-level assessment, it was assumed that the more habitat and species locations within the study area, the greater the probability that these resources would be impacted. Additionally, the total number of streams in the direct impacts study area was used as an indicator of potential impact on all fish species, whether resident, anadromous, native, or introduced. The number of stream crossings with listed and proposed fish species present was used as an indicator of potential impact on those species.

4.12.2.3 Indirect Impacts

The potential indirect impacts of the OPR Project on terrestrial species were derived from general disturbance impacts that could be caused by the construction, operation, and maintenance of passenger rail infrastructure, and through potential fragmentation impacts to the biological resources in the study area.

Two primary variables were used to assess potential indirect impacts on fish and other aquatic species: (1) the number of locations of riparian clearing (not associated with stream crossings) and, more important, (2) the area of new impervious surface generated by proposed build alternatives. Permanent clearing of substantial areas of riparian vegetation for project facilities could impair ecological functions such as water temperature moderation, stream bank stabilization, runoff filtration, and the contribution of woody debris for stream structure development and organic matter to the aquatic trophic system. Because the ultimate area of riparian clearing cannot be determined for each alternative alignment without detailed project design, the number of locations where new railroad would be within 100 feet of a stream was used to represent the relative risk for potential indirect impacts to aquatic resources.

The net increase in impervious surface typically has the most significant indirect impact on fish and other aquatic life because of the fundamental and persistent changes it causes to hydrology and water quality. New impervious surface created by the OPR Project would be related to new or expanded bridges and any new station developments and their paved parking areas. Most of the proposed rail infrastructure would consist of compact soil and gravel that would be pervious and allow for infiltration, though infiltration could be compromised compared to existing conditions due to compaction of built facilities.

4.12.2.4 Construction Impacts

Potential temporary (construction-related) biological resources impacts were identified at a conceptual level. Specific temporary impacts, the extent of temporary impacts, and appropriate mitigation measures would be evaluated in more detail in subsequent Tier 2 environmental studies.

4.12.2.5 Tier 2 Analysis

Future Tier 2 environmental studies for individual projects proposed subsequent to the OPR Project would consider:

- Performing field work based on advanced design, which could result in avoidance and minimization of many of the potential impacts described in this biological resources section;
- Evaluating oak woodland/savannah and the native grassland habitats that have been reduced to small remnant patches and as such are not evident on larger-scale maps; and
- Analyzing construction impacts to biological resources.

4.12.3 Study Area

4.12.3.1 Terrestrial

The study area for the direct impacts analysis for terrestrial species included the area within 100 feet of proposed rail centerlines and a 20-acre area for each potential new rail station location. The study area for the assessment of existing conditions and indirect impacts included the areas within 2,000 feet of proposed rail centerlines and a 20-acre area surrounding each existing and potential new rail station. A 0.5-mile buffer from proposed rail centerlines was used to identify known bald and golden eagle nests.

4.12.3.2 Aquatic

All analyses of potential direct impacts to aquatic resources (with the exception of stormwater) were based on the area within 100 feet of proposed rail centerlines and the 20-acre areas surrounding potential new stations. Post-construction indirect impacts to stormwater could occur beyond the 100-foot distance from centerlines because of the fundamental and persistent changes new impervious surface can cause to hydrology and water quality downstream greater than 100 feet from the centerline.

4.12.4 Affected Environment

Because of the wide variety of geographic features, habitat types, and special status species located within the sizeable OPR Project study area, this section is divided into the following seven biological resources categories:

(1) Special Status Terrestrial Species and Critical Habitats

(2) General Wildlife Habitat

(3) OCS Species and Habitat

(4) Wildlife Linkages

(5) Conservation Opportunity Areas

(6) Conservation Easements

(7) Aquatic Resources

Appendix D, Figure D-5 shows wildlife linkages, conservation opportunity areas, conservation easements, and major water bodies that provide aquatic habitat.

4.12.4.1 Special Status Terrestrial Species and Critical Habitats

Special status species, as defined for this Tier 1 EIS, include Federal and state listed, proposed, and candidate species. ORBIC data was used to determine known locations of special status species (ORBIC, 2015).

There is no designated or proposed critical habitat for any terrestrial species within the study area. The number of known occurrences of special status species is listed by build alternative in **Table 4.12-1** (ORBIC, 2015).

4.12.4.2 General Wildlife Habitat

There are 293 native vertebrate species reported to be residents, seasonal migrants, or irregular visitors to the Willamette Valley ecoregion. Birds comprise the greatest number of species (186), followed by mammals (73), amphibians (18), and reptiles (16). At least 19 non-native vertebrate species are established in the Willamette Valley (Oregon Explorer, 2014).

The vast majority of the habitats common to all alternatives is agricultural land, followed by urban land. With the exception of wetland habitats, the remaining habitat types are fairly evenly distributed among the alternatives. For wetland habitats, Hawthorne-Willow Scrubland is the most abundant type, with Palustrine Forest Wetland and Palustrine Emergent Wetland nearly equally distributed. Although some habitat types, such as grasslands or areas dominated by shrubs rather than forest, likely occur in the study area, they are not identified on the larger-scale habitat maps used in this Tier 1 analysis.

Table 4.12-1. Habitat Use by Special Status Species with the Potential to Occur within the OPR Project Terrestrial Study Area

Species	Federal Status[a]	State Status[b]	Habitat [c]
Plants Nelson's sidalcea *(Sidalcea nelsoniana)*	LT	LT	Willamette Valley populations of Nelson's checkermallow are typically found in open prairie remnants along the margins of streams, sloughs, ditches, roadsides, fence rows, and drainage swales and in fallow fields. Occasionally, the species occurs in the understory or at the edges of ash woodlands or among woody shrubs. Substrates at Willamette Valley sites range from gravelly, well-drained loams to poorly drained, hydric clay soils.
Shaggy horkelia (*Horkelia congesta* ssp. *congesta)*	SOC	C	Within Willamette Valley prairies, populations occupy a variety of microsites, ranging from slight topographic rises within wet prairies to distinctly dry uplands, and from completely open areas (i.e., grassy balds) to shady understories of oak/fir woodlands.
Thin-leaved peavine (*Lathyrus holochlorus*)	SOC	–	The characteristic habitat of this species is believed to be prairie edge/oak savanna/prairie-oak woodland ecotone, which historically was maintained by fire. Currently occupied habitats include roadsides, fencerows, partially cleared land, grasslands and pastures, low scrubby vegetation, creek banks, forest edges, and open woods and clearings. Soil is usually a moist loam.

Species	Federal Status[a]	State Status[b]	Habitat[c]
White rock larkspur (*Delphinium leucophaeum*)	SOC	LE	White rock larkspur is found on the edges of oak woodlands, in dry roadside ditches, on basalt cliffs, along riverbanks and bluffs, on moist rocky slopes, and in moist lowland meadows. It inhabits loose, shallow soils typically 5 to 7 cm deep with a high organic matter content and high level of sand relative to the soils in which other Pacific Northwest delphiniums occur.
White-topped aster (*Sericocarpus rigidus*)	SOC	LT	The majority of white-topped aster populations, those occurring in western Washington, are found primarily on gravelly, glacial outwash soils. The southernmost populations of Oregon occupy deep, poorly drained clayey soils, and the northernmost populations of British Columbia occupy very shallow soils overlying bedrock. The species occurs in open, grassy, seasonally moist prairie and savannah habitats.
Tall bugbane (*Cimicifuga elata*)	–	C	This species grows in moist woods and forest habitat. It is mostly restricted to lower elevations and is more common on north-facing slopes.
Howell's montia *(Montia howellia)*	–	C	Moist to wet habitat, including vernal pools and meadows. It sometimes grows in shallow standing water such as puddles.
Birds Streaked horned lark (*Eremophila alpestris strigata*)	LT	C	Found in wide-open spaces with no trees and few or no shrubs. Nests are found on the ground in sparsely vegetated sites dominated by grasses and forbs (ODFW, 2014b; Pearson and Altman, 2005).
Bald Eagle (*Haliaeetus leucocephalus*)	–	SV	Breeding habitat most commonly includes areas close to (within 4 km) coastal areas, bays, rivers, lakes, reservoirs, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, or seabirds (Campbell et al., 1990). Nests usually are in tall trees or on pinnacles or cliffs near water.
American peregrine falcon (*Falco peregrinus*)	–	SV	The species lives mostly along mountain ranges, river valleys, coastlines, and increasingly in cities (Ferguson and Christie, 2001).
Reptiles Western pond turtle (*Actinemys marmorata*)	SOC	SC	Habitat includes permanent and intermittent waters of rivers, creeks, small lakes and ponds (including human-made stock ponds and sewage-treatment ponds; Germano, 2010), marshes, unlined irrigation canals, and reservoirs. Substantial populations can exist in water bodies in urban areas (Spinks et al., 2003). It often basks on logs, vegetation mats, or rocks.
Painted turtle (*Chrysemys picta*)	–	SC	Painted turtles live in slow-moving, shallow waters with soft bottoms, basking sites, and aquatic vegetation: streams, marshes, swamps, ponds, lakes, and reservoirs. They may colonize seasonally flooded areas near permanent water. Hibernation occurs in water. Females dig nests in soft soil in open areas up to several hundred meters from water. Hatchlings usually remain in nest in winter and emerge in spring (Packard and Packard, 1995).
Insects Fender's blue butterfly (*Icaricia icarioides fenderi*)	LE	–	Occurs in native prairie habitats (USFWS, 2006).

[a] USFWS (2015).

[b] ODFW (2008) and ODFW (2012).

[c] ODA (2016), unless otherwise noted.
C = candidate
LE = listed endangered
LT = listed threatened
SC = sensitive critical
SOC = species of concern
SV = sensitive vulnerable

Notable points about the affected environments for the respective build alternatives include:

- Alternative 1 contains fewer acres of mixed conifer/mixed deciduous forest than Alternative 2
- Alternative 1 contains fewer acres of Oregon white oak forest than Alternative 2
- Alternative 1 contains the greatest amount of palustrine forest wetland
- Alternative 2 contains a greater amount of alder/cottonwood riparian habitat than Alternative 1
- Both build alternatives would avoid most of the open water in the study area

4.12.4.3 Oregon Conservation Strategy (OCS) Species and Habitat

The OCS is a conceptual framework for long-term conservation of Oregon's native fish, wildlife, invertebrates, and plants (ODFW, 2006). The OCS emphasizes proactively conserving declining species and habitats to reduce the possibility of future Federal or state listings. It is not a regulatory document. Instead, it presents issues and opportunities, and recommends voluntary actions that will improve the efficiency and effectiveness of conservation in Oregon. The OCS was used to identify non-listed species and habitat that could be impacted by the OPR Project. OCS habitats in the Willamette Valley include oak woodland/ savannah, riparian, native prairie (including Willamette prairie), and wetlands. It should be noted that the habitat types listed by the OCS do not precisely match the sources used for habitat mapping. Oak woodland/savannah and the native grassland habitats have been reduced to small remnant patches that are not evident on larger-scale maps.

4.12.4.4 Wildlife Linkages

ODFW, under the Oregon Wildlife Movement Strategy and in partnership with ODOT and other government agencies, identified wildlife linkages in Oregon. Wildlife linkages are key movement areas for wildlife (ODFW, 2007). This Tier 1 analysis focused on wildlife linkage areas that have been identified and prioritized by ODFW.

Table **4.12-2** shows the number of times a build alternative alignment crosses an identified wildlife linkage (ODFW, 2007). The table includes only medium- and high-priority linkages; low-priority linkages were not included in the data in order to focus attention on higher-priority linkages. This information is provided in an attempt to describe the type of information currently available for wildlife linkages, and should be considered preliminary at this stage. Later analysis for specific rail improvement projects would need to review each linkage separately to determine the attributes that could be affected.

Table 4.12-2. Wildlife Linkages within the Terrestrial Study Area

Wildlife Linkage Rank	Alternative 1 – Total Crossings	Alternative 2 – Total Crossings
Medium Priority	34	77 (79)
High Priority	14	47

Note: The amount within parentheses refers to the Alternative 2 with Central Albany Option when the amount differs from that of Alternative 2.

4.12.4.5 Conservation Opportunity Areas

Conservation Opportunity Areas (COAs) were identified under the OCS as priority areas for conservation actions that directly benefit wildlife and natural habitats (ODFW, 2006). Generally, these are either areas of high biodiversity or areas with unique habitat values where conservation actions will best meet the needs of OCS species and natural habitats. There are nine Conservation Opportunity Areas within the study area (see **Table 4.12-3**). The COAs include waterways, riparian, and upland habitat.

Table 4.12-3. Conservation Opportunity Areas within the Terrestrial Study Area

Conservation Opportunity Areas	Alternative 1: COA Acreage in Study Area	Alternative 2: COA Acreage in Study Area
Calapooia River	501	702 (719)
Coburg Ridge Area	0	410
McKenzie River	0	625
Lower and North Santiam River	800	507
Lower Little Pudding River	1,540	0
Portland Forest Park	49	49
Salem Hills-Ankeny National Wildlife Refuge	189	191
Smith-Bybee Lakes	269	269
Willamette River Floodplain	5,399	3,352 (3,547)
Total Acreage in COAs	**8,747**	**6,105** **(6,317)**

Note: Amounts within parentheses refer to the Alternative 2 with Central Albany Option when the amount differs from that of Alternative 2.

Source: Oregon Comprehensive Wildlife Conservation Strategy, ODFW 2006.

4.12.4.6 Conservation Easements

A conservation easement is a legal agreement between a landowner and a land trust or governmental agency that permanently limits the uses of the land to protect its conservation values (Land Trust Alliance, 2014). Conservation easements have some flexibility; some might allow land use activities such as farming and the addition of structures, while others with rare wildlife habitat might prohibit any development.

The National Conservation Easement Database (NCED), a national database of conservation easement information, was used to identify easements within the study area (NCED, 2014). Some of the easements identified are part of the Wetlands Reserve Program. The purpose of this program is to achieve the greatest wetland functions and values, as well as optimum wildlife habitat (USDA-NRCS, 2011). **Table 4.12-4** lists the acreage in conservation easements within the study area for each of the build alternatives (e.g., the full alignment).

Table 4.12-4. Conservation Easements Acreage within the Terrestrial Study Area

Alternative 1: Total Acreage of Easements	Alternative 2: Total Acreage of Easements
128	49

Note: There was no difference in the number of easements between Alternative 2 and the Alternative 2 with Central Albany Option.

4.12.4.7 Aquatic Resources

The OPR Project study area falls within nine different watersheds and many subbasins. Special status species, as defined for this Tier 1 EIS, include Federal and state listed, proposed, and candidate species. ORBIC data was used to determine whether a special status species is known to occur (ORBIC, 2015). **Table 4.12-5** shows the special status aquatic species that occur within the aquatic study area from NMFS and ORBIC databases. The special status fish species are present in study areas for both Build Alternatives. Additionally, for each of the species listed below, there is critical habitat within the study area for both Alternatives 1 and 2.

Table 4.12-5. Special Status Fish Species Present in the Aquatic Study Area

Listed Species	Federal Status	State Status
Columbia River chum salmon (*Onncorhynchus keta*)	LT	–
Lower Columbia River coho salmon (*Oncorhynchus kisutch*)	LT	LE
Lower Columbia River Chinook salmon (*Oncorhynchus tshawytscha*)	LT	–
Lower Columbia River steelhead trout (*Oncorhynchus mykiss*)	LT	–
Upper Willamette River Chinook salmon (*Oncorhynchus tshawytscha*)	LT	–
Upper Willamette River steelhead trout (*Oncorhynchus mykiss*)	LT	–
Bull trout (*Salvenlinus confluentus*)	LT	–
Eulachon (smelt) (*Thaleichthys pacificus*)	LT	–

LE = listed endangered

LT = listed threatened

Sources: NMFS (2014a, b) and ORBIC (2015).

4.12.5 Environmental Consequences

4.12.5.1 Direct and Indirect Impacts

No Action Alternative

The No Action Alternative would have no direct impacts related to construction or operation of new or modified rail infrastructure. There would be no increase in passenger train traffic or maintenance activities between the existing Eugene Depot and Portland's Union Station, and no new passenger rail infrastructure would be constructed in adjoining terrestrial habitats, streams, and other waters. Potential impacts from continued long-term rail operations and maintenance would involve pesticides and clearing/mowing, while continuing operations cause air emissions, can include potential releases of grease, tar, oil, solvents, and involve grinding of metal on metal which can end up in surface waters. There could also be a minor increased risk of material spills from freight trains, because freight train traffic would increase under the No Action Alternative.

Build Alternatives

The build alternatives addressed in this section include Alternative 1, Alternative 2, and Alternative 2 with Central Albany Option. For each biological resources category, potential direct impacts within the study area are addressed for the proposed new track as well as with respect to potential new stations. **Table 4.12-6** summarizes potential direct impacts to biological resources associated with each build alternative.

Table 4.12-6. Summary of Potential Direct Impacts to Biological Resources

Biological Resources	Alternative 1	Alternative 2 (Alternative 2 with Central Albany Option)
Special-Status Terrestrial Species	13 species	7 species (5 species)
General Wildlife Habitat[a]	95 acres	284 acres (258 acres)
Oregon Conservation Strategy (OCS) Habitat	7.4 acres	20.6 (20.9) acres
Wildlife Linkages	14 linkages	64 linkages (65 linkages)
Conservation Opportunity Areas	260 acres	175 acres
Conservation Easements	1.8 acres	2.8 acres (0 acres)
Stream crossings with proposed new or modified bridges/culverts	40 crossings	115 crossings (117 crossings)
Stream crossings with new or modified bridges/culverts proposed at designated critical fish habitat [b]	10 crossings	22 crossings (22 crossings)
Number of locations with riparian impacts [c]	9 streams / 5 wetlands	10 streams / 32 wetlands (12 streams / 33 wetlands)
Lineal feet of stream / acres of wetland within potential impact area (stream or wetland not crossed by project) [c]	6,850 ft streams / 1.8 acre wetlands	2,260 ft streams / 14.4 acres wetlands (3,785 ft streams / 14.9 acres wetlands)
Number of locations with riparian impacts along designated critical fish habitat [b, c]	0	0 (0)

Amounts within parentheses refer to the Alternative 2 with Central Albany Option.

[a] Does not include Urban and Agricultural Habitat types.

[b] Occurrence of listed and proposed fish species was found to coincide with critical habitat.

[c] Riparian impacts: locations at which new construction could encroach within 100 feet of a stream, but would not involve a stream crossing. For example, areas where a wetland or waterway approaches but is not crossed by the alignment.

Indirect impacts would be similar for both build alternatives. Increased passenger train frequency, as well as reduced travel times for passenger trains between urban areas, could accelerate current and planned transportation and development patterns around stations, which could in turn accelerate impacts to biological resources through potential increased impervious surfaces, stormwater contaminants, and habitat disturbance.

For new stations, parking lots with impervious pavement would likely be constructed. The impervious surface could introduce automotive-related pollutants (including oil and copper) into downstream aquatic habitat. Runoff from impervious pavement could also contribute to channel erosion and streamflow fluctuation.

If unsealed, treated wood were to be used for railroad ties near surface waters and/or on new bridges, wood-treatment chemicals could leach into the streams at those stream crossings. There could also be a minor increased risk of material spills from freight trains, because freight train traffic would increase under either of the build alternatives.

Changes to the frequency of passenger train traffic could increase noise levels, which could in turn impact wildlife species. For the most part, the new passenger rail alignments would be constructed through developed areas and/or along existing rail lines or highways. Resident wildlife occurring along these developed transportation corridors are more likely to be accustomed to elevated noise levels. However, less tolerant species could abandon habitat.

Special Status Terrestrial Species and Critical Habitats

Alternative 1 has a higher potential to impact special status species than Alternative 2, because the Alternative 1 direct impacts study area contains the greatest number of known occurrences of special status species (13 compared to 7 for Alternative 2, or 5 for Alternative 2 with the Central Albany option). However, potential for impact varies greatly by species. Plants are represented almost equally between alternatives, but occurrences of reptiles are greater under Alternative 1, and two bald eagle nests occur near Alternative 1, while none are known to occur near Alternative 2. The location of the rail improvements within the study area will dictate the actual impact potential for special status species.

General Wildlife Habitat

The vast majority of potential impacts would be to agricultural and urban land (more urban land for Alternative 1, three times more agricultural land for Alternative 2). Thus, general wildlife habitat that could be impacted is almost three times as high for Alternative 2 compared to Alternative 1 (284 acres compared to 95 acres). Although species are able to use Urban and Agricultural Habitat types at times for feeding and breeding, those that use it regularly are adapted to the recurring disturbances associated with these lands.

Potential direct impacts to acreage of Oregon white oak forest, an OCS habitat, and potential impacts on mixed Douglas fir/white oak forest are greater for Alternative 2 than for Alternative 1. Perhaps the most important difference in relative potential impacts could be on palustrine forest wetland – 36 acres for Alternative 1, 22 acres for Alternative 2, and 25 acres for Alternative 2 with Central Albany Option. However, all build alternatives could avoid portions of these habitats through sensitive design, e.g., by adjusting the location or scope of improvements to avoid specific habitats.

Oregon Conservation Strategy Species and Habitat

Alternative 1 has less potential to impact OCS habitat than Alternative 2 (7.4 acres compared to 20.6 acres), because the Alternative 2 direct impacts study area contains the greatest total acreage of OCS habitats and the greatest amount of Oregon white oak forest, which provides habitat for many OCS species. The Alternative 2 direct impacts study area also contains the greatest acreage of natural habitats and the only acreage of alder/cottonwood riparian gallery.

Limited information is available for mapping OCS habitats due to the scale and accuracy at which they are currently mapped. Both oak woodland/savannah habitat and the prairie habitat have been reduced to small remnant patches that are not evident on larger-scale maps. Mapping of resources and assessment of potential impacts will increase in accuracy as the project progresses to separate, identifiable projects with associated specific Tier 2 environmental analyses.

Wildlife Linkages

The build alternative alignments would be adjacent to existing rail lines or high capacity roadways. New rail lines could create additional barriers wildlife would need to negotiate, and the build alternatives would increase train volumes from three round trips per day to seven round trips per day. Alternative 1 would likely result in the least impact to wildlife linkages because it crosses less than one quarter of the linkages crossed by Alternative 2 (14 crossings compared to 64 or 65 crossings for Alternative 2 and the Alternative

2 with Central Albany Option, respectively). However, Alternative 2 would generally cross roadways on elevated structures, so would possibly avoid some of the impacts via design of those structures.

Conservation Opportunity Areas (COAs)

Alternatives 1 and 2 would cross four COAs, with both alternatives crossing the Calapooia, Willamette, and Lower and North Santiam Rivers. Alternative 1 would also cross the Lower Pudding River COA, and Alternative 2 would cross the McKenzie River COA. Both build alternatives would cross the Willamette River Floodplain COA multiple times. The Alternative 1 potential impacts on the Willamette River Floodplain COA would be to urban habitat, with lower conservation opportunities. Alternative 2 and the Alternative 2 with Central Albany Option would have a lower potential acreage impact on the Willamette River Floodplain COA, but Alternative 2 would cross the Willamette River three times. An additional passenger rail track in this area would reduce conservation opportunities. A portion of Alternative 2 would impact the McKenzie River COA, which has floodplain areas with high value for fish and wildlife. Potential impacts would be predominantly to agriculture with palustrine forest along the river. There are 260 acres of COAs in the Alternative 1 direct impacts study area, as compared to 175 acres for Alternative 2.

Conservation Easements

Alternative 1 would be expected to result in the least impact to conservation easements, because it would cross less acreage than Alternative 2 (1.8 acres compared to 2.8 acres). Although conservation easements may have the greatest potential to be impacted under Alternative 2, there is the potential for mitigation within the easements. There is some flexibility with conservation easements; some might allow land use activities such as farming and the addition of structures, while others with rare wildlife habitat might prohibit any development. The allowable activities within the conservation easements will need to be determined in the Tier 2 analysis.

Aquatic Resources

As noted above, eight different Federal- and state-listed fish species are known to occur within the direct impacts aquatic areas for the build alternatives. Additional listed stocks of Snake River and Columbia River salmon and steelhead trout not included those totals may also require consideration because of downstream project effects. Specifically, the stocks of Snake River and Columbia River salmon and steelhead trout downstream of the direct impact areas defined in this document would likely fall within potential consultation and review processes by the jurisdictional regulatory/resource agency (NMFS).

The number of new stream crossings proposed in association with the two build alternatives represent potential for direct impacts on aquatic resources because of culverts or bridge abutments or pilings placement in waterways. Stream crossing construction impacts could also occur from hazardous material spills and sediment discharge to waters, for example. The amount of potential riparian impacts (i.e., locations at which new construction could encroach within 100 feet of a stream, but would not involve a stream crossing) represents the relative potential for effects on riparian functions as described under "Methods."

Table 4.12-6 identifies the number of proposed new or modified stream crossing structures, and those crossing critical habitat for listed fish. It also presents the number of locations and measures of riparian impacts and riparian areas that are adjoining critical fish habitat. (Note that the occurrences of listed and proposed fish species were found to coincide with critical habitat.)

Overall, Alternative 1 has fewer and lesser impacts than Alternative 2, and impacts associated with Alternative 1 are in areas that are already affected by railroad infrastructure and use. Alternative 2 would introduce nearly three times as many stream crossings than Alternative 1, with twice as many in designated critical fish habitat. However, some of the potential impacts associated with Alternative 2 could be avoided or mitigated through design and application of best management practices.

As shown in the table, Alternative 2 could have a substantially greater potential impact on streams than Alternative 1, with 75 more locations for stream-crossing construction, including 12 more on critical habitat for listed fish species. Alternative 1 would have fewer new culverts or bridges at stream crossings than Alternative 2, and all of the crossings for Alternative 1 already have rail infrastructure across them. The majority of the stream or river crossings associated with Alternative 2 would be new crossings in the greenfield alignment; these would create new impacts to aquatic species.

The measures for potential riparian area impacts not included in the stream crossing analysis are similar to the results of the stream crossing analysis; Alternative 2 would potentially affect more riparian areas than Alternative 1, both in number and potential acreage. Alternative 1 would have more potential stream-bank riparian impacts than Alternative 2 because more streams run parallel to the proposed new track, which follows the existing UPRR mainline. Alternative 2 would have more wetland-related riparian impacts. Since Alternative 2 would primarily be a new passenger rail alignment and separated from existing freight rail alignments, riparian impacts could be more easily avoided by shifting the proposed alignment in sensitive sections. For either alternative, depending on the actual location of the rail infrastructure improvements, these riparian impacts could be avoided or minimized by making improvements away from sensitive areas.

All proposed crossings and all riparian impacts caused by either build alternative could also potentially impact populations of unlisted, but native, fish species. All riparian and in-stream impacts could also have a cumulative impact on water quality within each watershed and subbasin in which they occur. Alternative 2 would be likely to result in more temporary and long-term impacts on waterways and aquatic resources than Alternative 1, including native and introduced fish populations in the affected waterways.

4.12.5.2 Construction Impacts

Build Alternatives

Potential construction impacts were largely addressed in the direct impacts sections above. In addition to the construction of the rail infrastructure itself, construction staging areas and possible transportation detours could result in additional environmental impacts. Staging areas could cause disturbance, displacement, or injury to species as a result of changes to habitats, grading, vegetation, hydrology, water quality, noise levels, or visual characteristics. Construction could disrupt natural processes and habitat elements within the impacted area on a permanent basis at new track locations or on a temporary basis at staging areas. The duration and types of impacts would vary, depending on the construction activities, the best management practices implemented, and the species and habitats occurring at each area. Both Build Alternatives would be adjacent to existing transportation corridors (rail or road), which would help minimize construction impacts. Based on the proposed improvements, construction of Alternative 1 would be less intensive and lengthy than Alternative 2, because it would be a smaller-scale effort than Alternative 2, which would require construction along the entire route.

Impacts to biological resources could be avoided or minimized through design by effective placement of facilities and staging areas away from sensitive and protected resources. Best management practices would be implemented to minimize short-term construction impacts. The build alternatives would be constructed in accordance with Federal and state regulations, and would include federally approved conservation measures.

4.12.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for biological resources, as appropriate. Mitigation measures for impacts to biological resources would follow a hierarchy of avoidance, minimization, and compensation for impacts. Future project-level mitigation measures could include, but would not be limited to, the following actions:

- Impacts to biological resources could be avoided or minimized during design by:

  - Locating new tracks, sidings, and other facilities away from known occurrences of listed species and critical habitats, and wetlands;
  - Minimizing rail alignment impact areas with retaining walls instead of fill placement (these walls would need to be designed to minimize barrier effects); and
  - Minimizing construction staging areas by utilizing the rail bed itself for staging.
- The project could maintain the preconstruction hydrologic regime of the area, creating replacement wildlife habitat and rehabilitating existing nearby habitat, and improving water quality.
- The project could mitigate for construction activities by revegetating disturbed areas.
- For wildlife crossings within wildlife linkage areas, careful design and placement of culverts and bridges could be incorporated to include wildlife passage features. Furthermore, rail bed embankments alongside other ROWs are potential ecological corridors that could be used for providing connectivity between habitats (English Nature, 2002).
- Potential direct impacts on streams and aquatic habitat would be associated with work in the water for stream crossings; this includes pile driving, culvert installation, and placement of bridge-abutment footings. One potential strategy to avoid direct impacts to biological resources from this type of work would be to build crossings as full-span bridges; the engineering feasibility of this approach could be assessed in subsequent design efforts and Tier 2 environmental studies. Mitigation strategies for unavoidable in-water construction activities would include best management practices for erosion and sediment control, spill prevention and pollution control measures, and seasonal work restrictions.
- Best management practices for the protection of migratory birds are to avoid disturbance between February 1 and July 31, when birds are nesting and rearing their young. If disturbance is anticipated during those months, conduct activities to prevent nesting prior to February 1.

Most potential indirect impacts created by new rail stations would be associated with stormwater runoff from new pavement. These impacts could be mitigated by collecting and treating runoff for water quality using best management practices (such as bioswales and filters).

4.13 Floodplains

This section discusses legal requirements, methods of analysis, study area, affected environment, potential environmental consequences, and mitigation strategies related to floodplains for each of the OPR Project alternatives.

4.13.1 Legal Requirements

In addition to NEPA and the CEQ’s NEPA implementing regulations, Federal and state laws, regulations, and orders related to floodplains and applicable to this Tier 1 analysis include the following:

4.13.1.1 Federal

- **FRA’s Procedures for Considering Environmental Impacts.** Section 14(n)(8) states that each project shall determine whether any proposed alternatives would affect a base floodplain. If one or more alternatives will affect a base floodplain, the draft EIS shall discuss any risk associated with each such alternative, the impacts on natural and beneficial floodplain values, the degree to which the alternative supports incompatible development in the base floodplain, and the adequacy of the methods proposed to minimize harm.
- **The National Flood Insurance Program (NFIP)** was established pursuant to the National Flood Insurance Act of 1968 (as amended) and the Flood Disaster Protection Act of 1973 (as amended). Generally, NFIP regulations are enforced at the local level through municipal codes. It is anticipated that

counties and major cities have floodplain regulations within their local codes. Typically, these are consistent with the Federal Emergency Management Agency (FEMA) Model Floodplain Code.

- **FEMA regulations (EO 11988, Floodplain Management [Carter, 1977]).** Under these regulations, no alteration of flood zones shall result in an increase in the base flood elevation (BFE) or an increase in the velocity of floodwaters without FEMA approval. The BFE is defined in the FEMA regulations as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year," which is also referred to as the 100-year flood. EO 11988 directs all Federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative.
- **Order DOT 5650.2, *Floodplain Management and Protection* (USDOT, 1979)** describes policies and procedures for "ensuring that proper consideration is given to avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs and budget requests."
- **U.S. Coast Guard Navigational Clearance Permit.** This permit is required for bridge development. Clearances are defined as the navigational clearances established by the U.S. Coast Guard for a particular navigable water of the United States.

4.13.1.2 State

- The **Oregon Fish Passage Law (ORS 509.585)** requires that the ODFW approve actions that could potentially affect fish passage. Any obstructions, such as bridge piers placed in fish-bearing streams, would require ODFW review and approval for hydraulic fish passage conditions.

4.13.2 Methods

Potential effects would result from construction of new rail infrastructure (such as bridges, culverts, mainline track, sidings, and stations) within the area of the 1 percent (100-year) floodplain. Existing floodplains were identified through the use of FEMA Flood Insurance Rate Maps (FIRMs) (FEMA, 1987–2010) for the majority of the build alternative alignments. The Oregon National Flood Zone Hazard Layer geodatabase was also used to identify the affected environment.

Areas where the build alternative alignments would intersect with the floodplain boundaries were considered areas of potential direct impact. Any areas where the proposed rail alignments would cross floodplains or areas where embankments could be constructed within the floodplain were identified as a potential direct impact. Temporary construction measures could also cause direct impacts to floodplains. Construction activities could involve temporary in-water work bridges and other temporary structures in the floodplain that could impact the BFE. Changes in floodplain elevations were not computed for this Tier 1 analysis.

A high-level qualitative analysis of indirect impacts was conducted, including an analysis of potential impacts to properties adjacent to the floodplain that could affect potential use.

4.13.2.1 Tier 2 Analysis

Future Tier 2 environmental studies for individual rail improvement projects included in the OPR Project would consider:

- Preparation of project-level quantitative analysis of direct impacts in specific floodplains, including potential flood elevation map changes.
- Further evaluation regarding indirect impacts. Indirect impacts include potential impacts on adjacent property near the rail alignments and potential new stations; any rise in the floodplain caused by rail infrastructure improvements could affect local property uses and values.

- Evaluation of potential construction impacts. During any subsequent Tier 2 floodplain analyses, construction impacts could be balanced against the length of the potential impact period and the corresponding statistical risk.

4.13.3 Study Area

The study area for potential floodplain impacts includes all major drainage ways within 200 feet on either side of the proposed rail centerlines, existing station areas, and a 20-acre area surrounding each potential new station.

4.13.4 Affected Environment

FEMA regulates proposed actions with the potential to adversely impact floodplains as mapped on FEMA FIRMs. These maps were analyzed to determine potential impacts to floodplains. Appendix D, Figure D-5 shows mapped floodplains. The build alternatives would cross a substantial portion of high-risk floodplain areas (see **Table 4.13-1**). Placement of fill below the BFE to construct the rail bed for new track and potential new rail stations could affect these high-risk floodplain areas. **Table 4.13-1** identifies the affected environment by alternative, flood zone, and amount of acreage in each zone (determined by using a 200-foot-wide buffer on either side of the proposed rail alignment centerline).

Each flood zone designation (defined below Table 4.13-1) reflects the severity or type of flooding in an area. Zones A, AE, AH, and AO are all high-risk flood zones. These areas have a 1 percent (100-year) annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage.

New stations could adversely impact floodplain BFEs because of their size of obstruction and the amount of fill material. The proposed Woodburn station (for Alternative 1 only) would be partially located in high-risk Flood Zone AE. All other proposed stations would be located in areas of low flood risk.

Table 4.13-1. 100-year Floodplain Area within the Study Area by Alternative

High-Risk Flood Zone	Alternative 1	Alternative 2
Flood Zone A	95 acres	325 acres
Flood Zone AE	137 acres	929 acres
Flood Zone AO	6 acres	12 acres
Flood Zone AH	–	45 acres
Total Amount of Floodplain in Study Area	238 acres	1,311 acres

Flood Zone A = area where BFEs have not been determined

Flood Zone AE = area where BFEs have been determined

Flood Zone AH = area where BFEs have been determined, usually in the form of a pond, with an average depth of 1 to 3 feet

Flood Zone AO = area where BFEs have been determined, usually in the form of sheet flow, with an average depth of 1 to 3 feet

4.13.5 Environmental Consequences

Direct impacts to floodplains are defined in this analysis as potential incidences of any new rail alignment crossing perpendicular to, or coinciding parallel with, major drainage ways (areas with a high risk of flooding). In some areas, these impacts would include placement of fill material for additional track and sidings, culvert replacements or extensions, and new bridge or rail station facilities. For the purposes of this Tier 1 EIS analysis, the direct impacts could occur within a buffer zone of 200 feet to either side of proposed rail centerlines. It is assumed that all potential construction, rail operations, and facilities would be located within this buffer zone. The lineal feet (lf) measurement used is intended to represent relative potential direct impact.

Indirect impacts to floodplains are defined in this analysis as changes the proposed alternatives could cause that are later in time or farther removed in distance, but still reasonably foreseeable. These effects could include changes in land use patterns, such as transportation improvements near station areas, and the potential effects these could have on floodplains.

Construction impacts to floodplains are defined in this analysis as temporary impacts during any construction phase of the build alternatives.

4.13.5.1 Direct and Indirect Impacts

No Action Alternative

Under the No Action Alternative, intercity passenger rail service would continue to operate on the existing UPRR tracks, and no new structures or fill would be placed in floodplains. There is the potential for increased traffic on the existing UPRR tracks; however, the increase in traffic would not constitute an impact to floodplains, since such impacts to floodplains are associated with structures, fill or construction activities.

There are no direct or indirect impacts to floodplains associated with the No Action Alternative.

Build Alternatives

Table 4.13-2 summarizes the affected environment and potential direct impacts to the 100-year floodplain for each of the proposed build alternatives. Overall, of the two build alternatives, Alternative 1 would have the least impacts to the high-risk floodplain area. The Alternative 2 with Central Albany Option would have slightly higher potential floodplain impacts than Alternative 2.

Each build alternative would intersect with at least one high-risk flood zone (Flood Zones A, AE, AH, and AO). Rail alignments, as well as potential new stations, located in areas of high-risk flood zones are reflected in the lineal-foot measurement of floodplain intersection shown in Table 4.13-2.

The use of lineal feet is an effective measurement tool for direct impacts because it implies that a width is associated with the linear quantity. In the case of rail alignment, this is true. (Examples of widths are rail lines, rail beds, embankments, and facilities.)

Alternative 1 would have the potential to directly impact approximately 100,087 lf total of high-risk floodplain, which comprises approximately 25 percent of the total proposed length of rail facility improvements (75 miles) for Alternative 1. Alternative 2 would have the potential to directly impact approximately 113,440 lf of high-risk floodplain, which comprises approximately 16 percent of the total proposed length of rail facility improvements (131 miles) of Alternative 2. Each of the potential new stations under Alternative 2 is located in areas of low flood risk.

The Alternative 2 with Central Albany Option would have the potential to directly impact 113,450 lf of high-risk floodplain, which comprises approximately 16 percent of the total proposed alignment length (134 miles) of the Alternative 2 with Central Albany Option.

Table 4.13-2. Summary of Affected Environment and Potential Direct Impacts on the 100-year Floodplain

Parameter	Alternative 1	Alternative 2	Alternative 2 with Central Albany Option
High-risk floodplain area within study area[a]	287 acres	1,110 acres	1,114 acres
Rail alignment coincidence with high-risk floodplain	100,087 lf	113,440 lf	113,450 lf

[a] Within 200 feet of proposed rail centerlines, existing station areas, and a 20-acre area surrounding potential new stations.

lf = lineal feet

Indirect impacts could include potential impacts to adjacent property near the proposed rail alignments and potential new stations. Any rise in the BFE caused by rail infrastructure improvements could affect local property uses and values. Concerning potential new rail stations, any new impervious surface and fill material placed in high-risk flood zones could increase the risk of raising BFEs, which could in turn negatively affect existing adjacent properties.

4.13.5.2 Construction Impacts

Temporary impacts to floodplains could result from construction of the build alternatives. In-water work structures could be required for construction of the permanent bridges. Soil erosion and sedimentation could occur in association with cut-and-fill operations. Construction equipment and site materials present in high-risk flood zones could also pose a risk to floodplains.

4.13.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for floodplains, as appropriate. Future project-level mitigation measures could include, but would not be limited to, the following actions:

- Potential long-term and construction-period floodplain impacts could be avoided or minimized by use of appropriate best management practices during any future design and construction phases. Examples of potential best management practices that may be explored include: locating the station facility outside of a flood zone, elevating structures and utilities, and providing flood openings in new construction. Where no reasonable alternative location outside of flood zone may be available for a new station, designing the facilities to be flood-resistant may be an option.
- Prior to construction, as specific unavoidable impacts are recognized, preferential mitigation measures and potential FEMA map revisions could be identified as project commitments.

Other potential construction BMPs applicable to water quality/surface water/stormwater, and wetlands and waterways, and including such resources within floodplains are listed below in Section 4.14.6.

4.14 Water Quality/Surface Water/Stormwater

This section discusses legal requirements, methods of analysis, study area, affected environment, potential environmental consequences, and mitigation strategies related to water quality, surface water, and stormwater for each of the OPR Project alternatives.

4.14.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws and regulations related to water quality, surface water, and stormwater and applicable to this Tier 1 analysis include the following:

4.14.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14(n)(2) states that the consistency of project alternatives be assessed with respect to Federal and state standards concerning drinking water, storm sewer drainage, sedimentation control, and nonpoint source discharges (such as runoff from construction operations).
- **Federal Water Pollution Control Act (33 USC 1342, 1344), commonly referred to as the Clean Water Act (CWA).** The CWA is the primary law governing water quality. The intent of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources; provide assistance to publicly owned treatment works for the improvement of wastewater treatment; and maintain the integrity of wetlands. If an ODOT project requires a CWA Section 404 permit, then Section 401 of the CWA requires water quality certification from the Oregon DEQ.

- CWA Sections 401 and 402 establish the National Pollutant Discharge Elimination System (NPDES) permit for the discharge of any pollutant into waters of the United States.

4.14.1.2 State

- **ORS Chapter 468B and OAR Chapter 340 Division 041.** The ORS and OAR refer to the beneficial uses, policies, standards, and treatment criteria in the statewide water quality maintenance plan. ODOT construction projects that disturb more than 1 acre are regulated under the NPDES 1200-CA permit, and are required to develop and implement an erosion prevention and sediment control plan to address potential water quality impacts that could occur during construction prior to groundbreaking. If ODOT is not the agency directing the work, a 1200-C permit approved by Oregon DEQ could be required.
- Discharge of stormwater through a public system is regulated through **Oregon DEQ's Municipal Stormwater Program**. Municipalities are required to obtain an NPDES permit for their Municipal Separate Storm Sewer System (MS4). The NPDES MS4 permit requires communities to implement measures to reduce the impacts of stormwater pollution discharged through their MS4, resulting in reductions in pollutants being discharged to rivers and streams. The ultimate ownership of the OPR Project facilities and infrastructure would determine whose MS4 permit would regulate stormwater for the project. If ODOT were the ultimate owner, ODOT's MS4 permit would require that discharge of post-construction stormwater comply with ODOT's stormwater management plan to provide water quality treatment at the project level.

4.14.2 Methods

Areas where the build alternatives would intersect with CWA Section 303(d)-listed waterbodies (impaired waterbodies) were considered areas of potential direct impacts to water quality, surface water or stormwater. Direct impacts are defined as impacts that are caused by the action, and occur at the same time and place. No computations of quantitative changes in water quality, surface water or stormwater were calculated in this Tier 1 EIS analysis. Encroachments on 303(d)-listed water quality parameters were identified and presented in tabular format as the affected environment, and impacts resulting from the No Action Alternative and build alternatives were identified and discussed as environmental consequences.

Potential construction impacts to water quality, surface water, and stormwater impacts were identified at a conceptual level. Construction impacts are typically temporary in nature and are the primary short-term impacts detailed, by alternative, in this analysis.

Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts to water quality, surface water, and stormwater are qualitatively assessed for this Tier 1 EIS analysis. Long-term indirect impacts of the build alternatives are not anticipated. Any new development that is induced by the OPR Project, including wetland fill and removal of riparian vegetation, would require water quality and stormwater mitigation.

Tier 2 Analysis

Future Tier 2 environmental studies for individual rail improvement projects proposed as part of the OPR Project would consider:

- Detailed, project-level analysis of water pollutants specifically associated with the OPR Project.
- Assessment of additional specific temporary impacts and the extent of temporary impacts.

4.14.3 Study Area

The OPR Project study area includes the areas through which the proposed rail alignments would be constructed in Lane, Linn, Marion, Clackamas, and Multnomah counties in Oregon. The proposed rail alignments pass through metropolitan areas in Eugene-Springfield, Albany, Salem, and Portland, OR, paralleling existing transportation infrastructure.

The major U.S. watershed in which the proposed rail alignments are located is the Columbia Watershed, in the Willamette Basin. This watershed covers many subbasins, including the Upper and Middle Willamette, Molalla-Pudding, and Columbia Slough subbasins, among others. Land use surrounding the proposed rail alignments is primarily cropland and pasture, although a significant area is also urban. Forest and water/wetlands are also present in smaller quantities surrounding the proposed build alternatives.

The area studied for water quality, surface water, and stormwater impacts included lands within 100 feet of proposed rail centerlines of the alternatives and a 20-acre area surrounding each potential new station, and the built facilities at existing stations.

4.14.4 Affected Environment

Mapping available through the USGS (USGS, 2004 and 2013) indicates that the proposed rail alignments do not pass through any karst areas in Oregon. The OPR Project is located over two types of aquifers: Willamette Lowland basin-fill aquifers (unconsolidated sand and gravel aquifers) and Pacific Northwest basaltic-rock aquifers (igneous and metamorphic-rock aquifers). The DEQ Groundwater Protection Program indicates that the build alternatives coincide with one of the designated Groundwater Management Areas (ODEQ, 2014). Groundwater in the Southern Willamette Valley Groundwater Management Area has elevated nitrate concentrations that primarily result from nonpoint sources unrelated to transportation activities. Passenger rail activity does not contribute to nitrate concentration.

This Tier 1 EIS section identifies the affected environment as any impaired waterbody within 100 feet of the centerline of the proposed rail alignments and a 20-acre area surrounding each potential new station. The study area contains perennial and intermittent waterbodies, and other surface water resources that could be affected by runoff of pollutants from the build alternatives. CWA Section 303(d) requires each state to identify those waters that have issues (that is, are impaired by pollutants) and therefore are not meeting the state's water quality standards. This list of impaired (water quality-limited) surface waters is referred to as the 303(d) list. The data in the following tables was acquired from Oregon DEQ publicly available sources (ODEQ, 2012).

Tables 4.14-1 and **4.14-2** enumerate the 303(d)-listed waterbodies associated with each of the two build alternatives, along with their respective numbers of associated pollutants (as defined by the Oregon DEQ).

Table 4.14-1. Impaired Waterbodies within Alternative 1 Study Area

Waterbody Name	Number of Listed Pollutants
Flat Creek	7
Willamette River	62
Camous Creek	7
Muddy Creek	39
Little Muddy Creek	8
Unnamed	7
Calapooia River	58
Lake Creek	6
Unnamed	7
Oak Creek	11
Periwinkle Creek	1

Waterbody Name	Number of Listed Pollutants
Truax Creek	22
Murder Creek	15
Santiam River	34
Marion Creek	3
Perrin Lateral	1
Mill Creek	59
Pringle Creek Tributary	26
Pringle Creek	52
Shelton Ditch	4
Clagget Creek	17
Lake Labish Ditch	1
Mill Creek	15
Pudding River	48
Molalla River	40
Beaver Creek	5
Abernethy Creek	5
Clackamas River	57
Cow Creek	8
Mount Scott Creek	6
Johnson Creek	98
Crystal Springs Creek	2
Saltzman Creek	7
Willamette River	56
Columbia Slough	70
Columbia River	53
Beaver Creek	5

Table 4.14-2. Impaired Waterbodies within Alternative 2 Study Area

Waterbody Name	Number of Listed Pollutants
Willamette River	28
McKenzie River	56
Muddy Creek Tributary	19
Muddy Creek	54
Little Muddy Creek	8
Courtney Creek	9
Calapooia River	58

Waterbody Name	Number of Listed Pollutants
Sodom Ditch	2
Lake Creek	6
Unnamed	7
Oak Creek	11
Periwinkle Creek	3
Truax Creek	22
Murder Creek	15
Santiam River	34
Chehulpum Creek	6
Battle Creek	10
Mill Creek	59
Clagget Creek	17
Lake Labish Ditch	1
Patterson Creek	7
Periwinkle Creek	3
Willamette River	55
Tualatin River	87
Abernethy Creek	5
Clackamas River	57
Cow Creek	8
Mount Scott Creek	6
Johnson Creek	98
Crystal Springs Creek	2
Saltzman Creek	7
Willamette River	56
Columbia Slough	70
Columbia River	53

[a] The Alternative 2 with Central Albany Option would affect the same impaired waterbodies as Alternative 2, although the locations of the impacted waterbodies are slightly different.

4.14.5 Environmental Consequences

4.14.5.1 Direct and Indirect Impacts

No Action Alternative

Under the No Action Alternative, there would be no project-related construction and, therefore, no new project-related impacts on water quality, surface water or stormwater. However, the potential for minor impacts from the continued existing operations and maintenance activities of intercity passenger rail and buses would still exist.

The No Action Alternative would have no new direct water quality, surface water or stormwater impacts. The current railway and road infrastructure would continue to be used to handle increasing activity, resulting in continued potential minor impacts on water quality, surface water, and stormwater. Erosion and sedimentation from existing railroads and roadways next to water resources, as well as potential pollutant runoff and spills from operation and maintenance activities, could potentially reach adjacent water resources.

The increasing activity of existing transportation services could lead to land use changes, such as the addition of highway lanes to ease vehicle congestion. Other indirect impacts are not anticipated, because the No Action Alternative would maintain the existing Amtrak Cascades service.

Alternative 1

Table 4.14-3 summarizes the potential impacts to water quality, surface water, and stormwater for Alternative 1. Long-term direct impacts would come from operations and maintenance activities associated with new rail track, as well as from one potential new passenger rail station.

Common types of pollutants expected from rail activity, facilities, and stations (including park-and-ride areas and vehicles accessing rail via park-and-ride lots) consist of machine lubricants (grease and oils), polycyclic aromatic hydrocarbons (whether leaked directly or through the deposition of air emissions), heavy metals (such as lead, iron, chromium, and zinc), suspended solids, and herbicides (applied to the rail bed to prevent unwanted vegetation growth). These pollutants have the potential to be carried by runoff, especially during large storm events, and could be directed into nearby streams. This polluted runoff would negatively impact water quality in those streams, and would pose a risk to the environment and aquatic organisms. Alternative 1 would cross 43 Section 303(d)-listed impaired waterbodies that would have the potential for additional impacts from pollutants related to Alternative 1.

Indirect impacts to water quality, surface water, and stormwater were not quantitatively assessed for this Tier 1 EIS analysis. However, long-term indirect negative impacts of Alternative 1 are not currently anticipated, because any new development induced by Alternative 1 would require water quality and stormwater mitigation.

While not included in Alternative 1, the potential new station in Woodburn (located close to the impaired Mill Creek) would include the addition of impervious surface in the form of parking lots (which would increase runoff) and would induce vehicular traffic to and from the station. If the station were constructed, stormwater runoff retention and treatment would be implemented to minimize potential long-term direct impact to water quality, surface water, and stormwater.

Alternative 2

Table 4.14-3 summarizes the potential impacts to water quality, surface water, and stormwater for Alternative 2. Long-term direct impacts would come from operations and maintenance activities associated with the new passenger rail lines, as well as installation of up to five new passenger rail stations. The potential new stations in Springfield, Albany, Salem or Keizer, and Wilsonville or Tualatin could have long-term direct impacts to water quality, surface water, and stormwater. These stations would include the addition of impervious surface in the form of facilities and parking lots (which would increase runoff) and would induce vehicular traffic to and from the stations, and stormwater runoff retention and treatment would be implemented to minimize potential long-term direct impact to water quality, surface water, and stormwater.

As mentioned previously, common types of pollutants expected from rail activity, facilities, and stations (including park-and-ride areas and vehicles accessing rail via park-and-ride areas) consist of machine lubricants (grease and oils), polycyclic aromatic hydrocarbons (whether leaked directly or through the deposition of air emissions), heavy metals (such as lead, iron, chromium, copper, and zinc), suspended solids, and herbicides (applied to the rail bed to prevent unwanted vegetation growth). These pollutants have the potential to be carried by runoff, especially during large storm events, and could be directed into nearby streams. This polluted runoff would negatively impact water quality in those streams, and would pose a risk to the environment and aquatic organisms. Alternative 2 would cross 40 Section 303(d)-listed impaired waterbodies that would have the potential for additional impacts from project pollutants.

Alternative 2 also has the potential to diminish existing stormwater treatment for highway infrastructure along I-5, which would impact water quality. Alternative 2 would convert existing vegetation along I-5 used as informal stormwater treatment best management practices to hard surface, which could require a substantial amount of additional treatment infrastructure. Stormwater inlets and culverts along I-5 would need to be re-evaluated and designed to function with the new rail system. Inspection and maintenance of highway drainage features would be more difficult and costly, because the new rail alignment would be close to or within the highway ROW.

Indirect impacts on water quality, surface water, and stormwater were not quantitatively assessed for this Tier 1 EIS analysis. Long-term indirect negative impacts of Alternative 2 currently are not anticipated, because any new development induced by Alternative 2 would require water quality and stormwater mitigation.

While not included in Alternative 2, the potential new station in Woodburn (located close to the impaired Mill Creek) would include the addition of impervious surface in the form of parking lots (which would increase runoff) and would induce vehicular traffic to and from the station. If the station were constructed, stormwater runoff retention and treatment would be implemented to minimize to minimize potential long-term direct impact to water quality, surface water, and stormwater.

Alternative 2 with Central Albany Option

Outside of the Albany area, Alternative 2 with Central Albany Option would cross the same impaired waterbodies as Alternative 2. However, as it passes through Albany, the Central Albany Option alignment would require two additional modified stream crossings (over Santiam-Albany Canal and Periwinkle Creek) and require building and operating more track than Alternative 2. The Central Albany Option would use the existing Amtrak station in central Albany rather than a new station near I-5. Therefore, the direct impacts would be similar to those of Alternative 2. Such impacts would be slightly reduced compared to those of Alternative 2, because this option would construct one less new station. However, the existing Albany Station could experience more vehicular traffic than under the No Action Alternative.

Table 4.14-3. Summary of Potential Water Quality, Surface Water, and Stormwater Impacts

Source of Potential Impact	Alternative 1	Alternative 2 (Alternative 2 with Central Albany Option)
Modified or new crossings of impaired waterbodies[a]	36	40 (42)
Total existing[b] passenger rail stations	5[c]	1[d] (2)
Total potential new passenger rail stations	1[e]	5[f] (4)

[a] Includes crossings of the same waterbody more than once.

[b] Potential improvements to existing passenger rail stations are related to ancillary infrastructure that could increase impervious surfaces, such as expanded parking areas.

[c] The five existing passenger rail stations are in Eugene, Albany, Salem, Oregon City, and Portland.

[d] Alternative 2 and Alternative 2 with Central Albany Option would use the existing Union Station in Portland. In addition, Alternative 2 with Central Albany Option would use the existing Albany Station.

[e] Alternative 1 analysis includes a potential new station in Woodburn.

[f] The potential new passenger rail stations for Alternative 2 are in Springfield, Albany, Salem or Keizer, and Wilsonville or Tualatin. The impacts also include a potential new passenger rail station in Woodburn.

4.14.5.2 Construction Impacts

Build Alternatives

Alternative 1 and Alternative 2 direct impacts would be primarily construction-related. For Alternative 1, runoff and sedimentation from grading and filling operations, clearing activities, culvert work, and spills of fuel or other chemicals are typical examples of potential construction impacts that would be temporary in nature, and would cease upon completion of the project's construction. In addition to these types of impacts, Alternative 2 would involve pier and abutment construction associated with bridges. Construction activities have the potential to release sediment into nearby waterbodies as the result of ground disturbance. Of particular concern would be ground disturbance on steep slopes near waterbodies. Spills of hydraulic fluids and other construction-related materials would also be possible. Any in-water work for the placement of piers, abutments or in-water falsework within waterbodies could result in potential adverse impacts to water quality.

4.14.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies with respect to water quality, surface water, and stormwater, as appropriate. Future project-level mitigation measures could include, but would not be limited to, the following actions:

- Mitigation would be required for treatment of stormwater from all new and redeveloped impervious surfaces within the specific project. Stormwater runoff from new impervious areas would require permits from local jurisdictions in addition to Oregon DEQ. Stormwater management would be required to meet all Federal and state requirements at the time of construction, including conditions from the Biological Opinion.
- Erosion prevention and sediment control (EPSC) would be implemented prior to construction. The project would need to have approved erosion and sediment control plans before the start of any construction. EPSC measures could include sediment fences and wattles for disturbed areas, inlet protection for storm systems, prevention of construction equipment leakage, gravel construction entrances, wheel washes, and vegetative cover of disturbed areas. An in-water work plan would be required, where appropriate. The contractor would also be required to maintain a spill control kit to be used in case of a material spill.
- Although construction impacts to water quality could occur as a result of soil erosion, sedimentation, and potential construction pollutant loading of stormwater runoff, they would be temporary. Such impacts would cease after construction was completed. However, the prevention or minimization of construction and long-term pollution would be accomplished by use of appropriate stormwater BMPs, in accordance with state and Federal water quality runoff treatment and flow control requirements.

Potential BMPs could include the following:

- Prepare and follow a Temporary Erosion and Sediment Control (TESC) Plan to minimize potential erosion, surface water runoff, and dust generation.
- Prepare and implement an approved Spill Prevention, Control, and Countermeasures Plan (SPCC) during construction. The SPCC would address construction activities related to equipment fueling and maintenance, including types of hydraulic fluids used, emergency spill containment procedures, and spill containment materials.
- Prepare and implement a construction Stormwater Pollution Prevention Plan (SWPPP) to minimize sediment, spills, and dust from escaping the site.

- Remove sediment prior to any stormwater runoff leaving the site using appropriate BMPs.
- Handle and dispose of all on-site pollutants, including waste materials and demolition debris in accordance with sound practice to avoid contamination of stormwater.
- Remove all waste oils and machinery fluids off-site when they are generated, and store no waste oils or fluids on site.
- Apply chemicals such as fertilizers and pesticides in accordance with sound practices to avoid loss of chemicals to stormwater runoff.
- Provide separate handling of highly turbid stormwater and contaminated wastewater.
- Maintain proper surface drainage to unnecessary avoid ponding.
- Discharge drain flow back into affected areas, including wetlands, if it is necessary to install seepage drains for fill embankments.
- Stabilize disturbed areas with native grass and plant species following construction.
- Prior to the start of construction, identify on-track vehicle machinery/maintenance, fueling locations, work staging and construction material stockpile areas and develop in upland locations.
- Provide secondary containment equal to 150 percent of storage capacity for any on-site fuel storage.
- Cover and stabilize disturbed soil areas so they would not remain open to become a possible source of offsite sediment pollution (i.e., storm water runoff or construction dust) for more than 7 days.
- Clearly mark clearing/grading limits with stakes/flagging or high visibility orange sediment fencing.
- Contain and regularly manage construction waste.
- Place and regularly maintain portable toilet facilities in the construction areas.
- Provide and implement wheel washing to remove particulate matter that vehicles would otherwise carry offsite.
- Remove particulate matter (mud and windblown dust) deposited on paved roadways.

4.15 Wetlands and Waterways

This section discusses legal requirements, methods of analysis, study area, affected environment, potential environmental consequences, and mitigation strategies related to wetlands and waterways for each of the OPR Project alternatives.

4.15.1 Legal Requirements

In addition to NEPA and the CEQ's NEPA implementing regulations, Federal and state laws and regulations related to wetlands and waterways and applicable to this Tier 1 analysis include the following:

4.15.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts.** Section 14(n)(6) of FRA's environmental procedures require that a determination be made as to whether any of the alternatives will be located in a wetland area, and notes procedures to follow in accordance with USDOT Order 5660.1A.
- **Federal Water Pollution Control Act** (33 USC 1342, 1344), commonly referred to as the Clean Water Act, or CWA. Establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

- **U.S. Army Corps of Engineers, Section 10 of the Rivers and Harbors Act.** Requires authorization from the U.S. Army Corps of Engineers for the construction of any structure in or over any navigable waters of the United States, the excavation and dredging or deposition of material, or any obstruction or alteration to a navigable water. Work outside the limits of navigable waters may require a Section 10 permit if the structure or work affects the course, location, condition, or capacity of the waterbody.
- **Executive Order 11990: Protection of Wetlands**, was issued in 1977. The Executive Order directs Federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

4.15.1.2 State

- **Oregon Department of State Lands (DSL), Oregon State Removal-Fill Law.** Oregon's Removal-Fill Law (ORS 196.795-990) requires a permit from the Department of State Lands when a project will remove or place fill material in wetlands or waterways.

4.15.2 Methods

Applicable guiding documents and plans were reviewed and readily available GIS data was used to document the quantity and type of wetlands and waterways within the study area. The primary source of wetland GIS data was the Oregon Wetland Coverage shapefile from the Oregon Wetlands Geodatabase.

Potential direct impacts were evaluated quantitatively by overlaying the existing conditions mapping of all wetlands and high-value wetlands with the direct impact study area to derive estimates of maximum total wetland impact and high-value wetland impact acreage. High-value wetlands were considered to be wetlands that met any of the following criteria:

- Overlap with critical habitat for endangered species
- Are located in a protected area (such as a city park or USFWS refuge)
- Are locally significant wetlands (as determined by local planning code Local Wetland Inventory designations)
- Are wetlands that occur within areas designated as “wetland priority sites”
- Are in areas mapped as wetland mitigation banks and areas enrolled in the Wetland Reserve Program

Because the wetlands and waterways analysis was based on a conceptual level of design (i.e., the precise locations of proposed rail infrastructure improvements are unknown at this time), the potential direct impact acreages reported include all identified wetlands and waters within the direct impacts study area. Actual impacts would likely be smaller than the totals presented in this Tier 1 EIS. A brief qualitative review was also conducted to identify potential risks to high-value wetlands. Mitigation requirements that could be triggered as a result of total direct impact acreage were also reviewed, using typical Oregon DSL mitigation ratios. Based on typical Oregon DSL mitigation ratios, mitigation in the form of restoration occurs at a one-to-one mitigation ratio; mitigation in the form of enhancement occurs at a three-to-one ratio (that is, 3 acres of mitigation for each acre of impact).

The indirect impacts analysis assessed the acreage of high-value wetlands that occur within the wetland evaluation indirect impacts study area (that is, a 500-foot buffer from the edge of the direct impacts project area). A brief qualitative review of project impacts to high-value wetlands was also conducted and focused on the potential for hydrologic impacts of the OPR Project on neighboring wetlands. Indirect effects on wildlife are addressed within the biological resources technical analysis (Section 4.13).

Tier 2 Analysis

Future Tier 2 environmental studies for individual rail improvement projects proposed as part of the OPR Project would entail detailed project-level analysis of potential impacts to wetlands based on advanced design.

4.15.3 Study Area

The study area for direct impacts to wetlands and waterways used in the analysis included existing stations, 20-acre areas representing potential new station impact areas, and the area within 100 feet of proposed rail centerlines. The study area for indirect impacts on wetlands and waterways was a 500-foot-wide buffer beyond the 100-foot direct impact study area. The intent of the 500-foot-wide buffer for indirect impacts was to identify nearby high-value wetlands that could potentially experience hydrologic impacts/alterations as a result of new rail-related infrastructure. The study area for the affected environment was the sum of the direct and indirect impact study areas (that is, within 600 feet of proposed rail centerlines).

4.15.4 Affected Environment

The Willamette Valley contains considerable acreage of wetlands, from high-value/functioning wetlands to farmed wetlands that typically provide lower ecological function. Appendix D, Figure D-5 shows wetlands and high value wetlands and **Table 4.15-1** shows wetland and waterway acreage within the study area for the build alternatives (covering both the direct impact and indirect impact study areas), including the acreage of high-value wetlands and waterways. It should be noted that farmed wetlands typically do not show up in National Wetland Inventory or similar GIS mapping sources, and therefore, the acreage of wetlands may be higher than noted in **Table 4.15-1**. The Environmental Consequences subsection accounts for this difference by including the area of hydric soils not mapped as wetland.

The affected environment study area includes similar dimensions for the build alternatives: 19,139 acres for Alternative 2, 19,500 acres for Alternative 2 with the Central Albany Option, and 19,710 acres for Alternative 1. However, the actual impact areas would differ substantially, because Alternative 1 entails improvements at select locations along an existing rail line, while Alternative 2 entails constructing primarily a new rail line.

Total wetland acreages within the affected environment study area are similar for the build alternatives: 1,273 acres (Alternative 1), 1,286 acres (Alternative 2), and 1,304 acres (Alternative 2 with Central Albany Option), representing a difference of only 31 acres among the alternatives (see **Table 4.15-1**). However, this is not the case for high-value wetlands. Alternative 1 has considerably greater acreage (674 acres) within the affected environment study area than both the Alternative 2 study area (443 acres) and the Alternative 2 with the Central Albany Option (426 acres). It is important to note that these amounts represent the total acreage of wetlands within the study areas of each alternative, but do not reflect potentially impacted areas, which are described in the Environmental Consequences subsection, below.

Table 4.15-1. Acreage of Wetlands and Waterways in the Affected Environment Study Area

Resource Indicator, Topic, or Measurement	Alternative 1 (acres)	Alternative 2 [Alternative 2 with Central Albany Option] (acres)
Study Area Size	19,710	19,139 [19,500]
Total Acreage of All Wetlands and Waterways	1,273	1,286 [1,304]
Total Acreage of High-Value Wetlands and Waterways	674	426 [443]

Resource Indicator, Topic, or Measurement	Alternative 1 (acres)	Alternative 2 [Alternative 2 with Central Albany Option] (acres)
Total Acreage of Hydric Soils Not Mapped as Wetlands	4,548	4,627 [4,959]

Note: Acreages based on affected environment study area (within 600 feet of proposed rail centerlines and a 20-acre area around each potential new station).

Table 4.15-2 summarizes key wetland and waterway areas of interest within the affected environment study area. These are defined as high-value wetland areas where additional design review might be warranted to avoid or minimize impacts. Some high-value wetlands are identified where no work is currently proposed in the Alternative 1 study area. However, these locations are still located within the affected environment study area, and as such, are noted in Table 4.15-2 below.

Table 4.15-2. Key Wetland and Waterway Areas of Interest within the Affected Environment Study Area

Area of Interest	Alternative	Description
Log Pond Wetland Restoration Site	2	Wetland restoration or mitigation site along south side of existing tracks.
Alton Baker Park/Patterson Slough	2	Forested wetlands/riparian area in park adjacent to Willamette River and east side of I-5.
Armitage County Park/McKenzie River	2	McKenzie River crossing with forested wetlands/riparian areas in a park.
Coburg Hills Wetlands	2	High concentration of wetlands and drainages defined as high value.
Willamette River/Curtis Slough	1	Crossing of Willamette River and Curtis Slough; potential sensitive habitats. (No improvements proposed in this section.)
Courtney Creek/Calapooia River/Sodom Ditch Systems	2	Series of drainages and some forested wetlands defined as high value.
Calapooia River Floodplain	1	Crossing of Calapooia River and floodplain containing forested wetland/riparian habitats. (No improvements proposed in this section.)
Oak Creek/Freeway Lakes County Park	2	Crossing of Oak Creek and floodplain. Forested wetland/riparian habitats and lakes within park.
Oak Creek Floodplain	1	Crossing of Oak Creek and floodplain. Forested wetland/riparian habitats, particularly on east side of OR 99W.
Second Lake	1	Large oxbow lake and forested wetland/riparian area in Willamette River floodplain along west side of Alt. 1 corridor.
Santiam River	1	Crossing of Santiam River. Forested wetland/riparian habitats, particularly along west bank. (No improvements proposed in this section.)
ODOT Santiam River Mitigation Bank	2	Crossing of Santiam River at ODOT mitigation bank. Willow/sandbar island and side channel habitats.

Area of Interest	Alternative	Description
Wetland Reserve Program – A	1	Large multiparcel Wetland Reserve Program area within study area.
Wetland Reserve Program – B	1	Wetland Reserve Program area within study area. (No improvements proposed in this section.)
Mill Creek/Walter Wirth Lake	2	Mill Creek riparian corridor runs parallel to west side of study area.
Claggett Creek	1	Creek restoration/mitigation wetlands occur along west side of existing rail corridor. (No improvements proposed in this section.)
Pudding River	1	Crossing of Pudding River and floodplain with forested wetland/riparian habitats. (No improvements proposed in this section.)
Willamette River	1	Willamette River and adjacent riparian habitat runs for several miles along the west side of the study area.
Willamette Crossing	1 and 2	Crossing of Willamette River in area defined as high value. (No improvements proposed for Alternative 1 in this section.)
Saum Creek and Park	2	Forested upland and wetland habitats along Saum Creek situated along north side of I-205.
Clackamas Crossing	1 and 2	Crossing of Clackamas River in area defined as high value.
Crystal Springs Creek	1 and 2	Crossing of creek with narrow fringe of wetlands. However, this is an important link for salmon migrating to upstream spawning habitats.
Smith and Bybee Wetlands	1 and 2	Large wetland and riparian habitat natural area along west edge of study area. (No improvements proposed in this section.)

4.15.5 Environmental Consequences

4.15.5.1 Direct and Indirect Impacts

No Action Alternative

Under the No Action Alternative, there would be no project-related construction and, therefore, no new project-related wetland and waterway impacts. However, the potential for indirect impacts from the continuation of existing Amtrak Cascades operations and maintenance activities would still exist.

Build Alternatives

Potential direct wetland and waterway impacts from the proposed build alternative alignments are summarized in **Table 4.15-3**. Potential station-area impacts are listed in **Table 4.15-4**.

Comparing Alternatives 1 and 2, Alternative 1 would have the lowest potential direct impacts, both in terms of overall wetland acreage and acres of high-value wetlands (32 acres and 7 acres, respectively, for Alternative 1, compared to 144 acres and 49 acres, respectively, for Alternative 2). The amount of hydric soils (excluding areas mapped as wetland) within the Alternative 1 direct impact study area is a little less than half that of Alternative 2 (378 and 818 acres, respectively). Therefore, it appears that Alternative 2 would have a notably larger potential direct impact on wetland and waterway resources.

Although the Alternative 2 with Central Albany Option would add 1 acre of potential direct impacts to Alternative 2, no additional acreage of high-value wetlands would be added. The Alternative 2 with Central Albany Option would add 70 acres of potential hydric soil impacts to Alternative 2. Therefore, the Alternative 2 with Central Albany Option would likely have the largest potential for direct impacts of any build alternative.

Indirect impacts to wetlands, particularly hydrologic connection of wetlands from one side of the rail line to the other, would likely be minor and mostly avoidable through appropriate design (that is, culvert and bridge sizing and spacing). Although all wetland and waterway crossings would need to be reviewed and designed to maintain hydrologic connections and, likely, fish and wildlife movement, additional scrutiny might be warranted in areas identified as key wetland and waterway areas of interest (see **Table 4.15-2**).

Table 4.15-3. Summary of Potential Direct Impacts to Wetlands and Waterways from Proposed Rail Alignments

Resource Indicator	Alternative 1	Alternative 2 [Alternative 2 with Central Albany Option]
Total Acreage of All Wetlands and Waterways	32	144 [145]
Total Acreage of High-Value Wetlands and Waterways	7	49 [49]
Total Acreage of Hydric Soils Not Mapped as Wetlands	378	818 [888]

Note: Acreages are based on rail alignment direct impacts study area (within 100 feet of proposed rail alignment centerlines).

Table 4.15-4. Potential Direct Impacts to Wetlands and Waterways near Station Areas

Station Area	Alternative	Study Area (acres)	All Wetlands (acres)	High-Value Wetlands (acres)	Hydric Soils Not Mapped as Wetlands (acres)
Eugene – Existing	1	4.5	0	0	0
Springfield – Potential	2	20.0	0.6	0.6	0
Albany – Existing	1 and 2 (Central Albany Option)	9.63	0	0	6.8
Albany – Potential	2	20.0	0.3	0	0.9
Salem – Existing	1	4.6	<0.1	0	0
Salem – Potential	2	20.0	0	0	0
Keizer – Potential	2	20.0	0	0	0
Woodburn – Potential[a]	1	20.0	0.9	0.9	0
Woodburn – Potential[a]	2	20.0	0	0	1.2
Wilsonville – Potential	2	20.0	0.7	0	0
Tualatin – Potential	2	20.0	0.2	0	0.8
Oregon City – Existing	1	2.0	0	0	0
Portland – Existing	1 and 2	6.2	0	0	0

[a] Potential new Woodburn station impacts are provided for reference, but would not be constructed under either proposed build alternative

4.15.5.2 Construction Impacts

Build Alternatives

Potential construction-related impacts, other than within the direct impact area, would likely be temporary. These impacts would include vegetation removal, soil compaction, erosion control, and water quality issues. These temporary impacts could be avoided or minimized by applying best management practices, locating staging areas outside of sensitive areas, and performing site restoration activities (for example, revegetation) after construction.

4.15.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies with respect to water quality, surface water, and stormwater, as appropriate.

Wetland mitigation estimates for each build alternative are presented in **Table 4.15-5** below. The range of potential mitigation acreage for Alternative 1 is less than the potential needs for Alternative 2, including the Alternative 2 with Central Albany Option. Estimate assumptions are included in the notes following the table. As shown, there is roughly an order-of-magnitude difference between the low and high estimates for each build alternative. In part, this is because a large amount of hydric soil occurs within the study area, and there is a high degree of uncertainty as to whether these hydric soils areas contain wetlands. The range in estimates is also large because the type of mitigation is unknown. Typically, based on Oregon DSL ratios, mitigation in the form of restoration occurs at a 1:1 mitigation ratio; mitigation in the form of enhancement occurs at a 3:1 ratio (that is, 3 acres of mitigation for each acre of impact).

Table 4.15-5. Estimated Wetland Mitigation Acreage Requirements

Estimate	Alternative 1 (acres)	Alternative 2 (acres)	Alternative 2 with Central Albany Option (acres)
Low	16	72	73
Medium	118	329	346
High	219	585	618

Notes:

- Low estimate is based on a 1:1 mitigation ratio for 50 percent of potential direct impacts to areas mapped as wetland. This estimate assumes that direct impacts have been overestimated, because the analysis uses a 200-foot-wide direct impact study area (that is, the actual impact area would be considerably less).
- Medium estimate is an average of the low and high estimates.
- High estimate is based on a 3:1 mitigation ratio for 50 percent of potential direct impacts to areas mapped as wetland and 15 percent of areas in the direct impact area mapped as hydric soils but not wetland.

As described in more detail below, the mitigation strategy for direct impacts could be based on the following three strategies:

1. Using wetland mitigation banks
2. Establishing project-specific wetland mitigation sites
3. Combining Strategies 1 and 2

4.15.6.2 Wetland Mitigation Banks

Wetland mitigation banks within the Willamette Valley could potentially be used to offset impacts from the OPR Project. Mitigation banks contain a set number of credits and cover a set service area. As of May 2017, thirteen wetland mitigation banks were present along the project study area (DSL, 2017). The combined service areas of these banks cover the entire geographic extent of the project build alternatives with the exception of the Portland area along the Willamette River north of the confluence with the Clackamas River. Availability of existing banks would need to be assessed at the time of Tier 2 project-specific design, environmental analysis and implementation to determine if the desired amount of credits to cover the service areas are available. However, new mitigation banks might be available in the future.

Project-Specific Mitigation

Project-specific mitigation could occur through strategic acquisition of property within the Willamette Valley where wetland restoration, creation, or enhancement could occur. Converting agricultural lands with installed drainage systems to native wetland habitats would likely be the most viable opportunity (for example, breaking up drain tiles, filling drainage ditches). It would be desirable for wetland mitigation to occur in coordination with other potential natural resource mitigation requirements for the project and in line with the OCS. Such mitigation could include listed species habitat enhancement within mitigation wetlands, restoration of native wet prairie habitats, and other measures.

Combining Wetland Mitigation Banks and Project-Specific Mitigation

It is likely that any build alternative would be implemented incrementally, and this should be factored into the overall mitigation strategy, whether using mitigation banks, project-specific mitigation, or a combination of the two. Ultimately, the preferred solution for mitigation could be a combination of using wetland mitigation banks and project-specific mitigation.

4.16 Air Quality

This section discusses legal requirements, methods of analysis, affected environment, potential environmental consequences, and mitigation strategies related to air quality for each of the OPR Project alternatives.

4.16.1 Legal Requirements

In addition to NEPA and CEQ's NEPA implementing regulations, Federal laws and regulations related to air quality and applicable to this Tier 1 analysis include the following:

- **FRA's Procedures for Considering Environmental Impacts**. Section 14(n)(1) of FRA's environmental procedures requires that there be an assessment of the consistency of the alternatives with Federal and state plans for the attainment and maintenance of air quality standards.
- **Clean Air Act (42 U.S.C. §7401 et seq.).** As required by the Clean Air Act (CAA), the EPA has promulgated National Ambient Air Quality Standards (NAAQS) to protect human health and welfare. The NAAQS include primary standards designed to protect human health and secondary standards to protect public welfare and concerns not directly related to human health. Oregon has adopted State Ambient Air Quality Standards (SAAQS) largely identical to the NAAQS with some exceptions. **Table 4.16-1** summarizes the applicable NAAQS and the Oregon SAAQS in the study area.

  Regulatory agencies compare measured ambient air concentrations to the applicable NAAQS and Oregon SAAQS to evaluate ambient air quality and determine the attainment status of designated geographic areas. Nonattainment areas are those where measured background concentrations for air pollutants are greater than the maximum allowable ambient concentrations defined in the NAAQS or SAAQS. Maintenance areas are those that were once nonattainment areas, but now meet the applicable ambient air quality standards.

  When the EPA designates an area as nonattainment, the state is required to develop and implement a State Implementation Plan (SIP) to meet standards. When proposed within nonattainment and maintenance area boundaries, transportation and Federal plans, programs, and projects must conform to the purpose and intent of the SIP to attain and maintain air quality standards.

- **General Conformity Regulations (40 CFR 51)**. General conformity regulations prohibit Federal agencies (including the FRA) from adopting, accepting, approving, permitting, or funding activities that are inconsistent with the air quality goals in the approved SIP. Under the general conformity rule, Federal actions must meet the requirements of the CAA and applicable SIP by ensuring that air emissions related to the action do not:
  - Cause or contribute to new violations of a NAAQS,
  - Increase the frequency or severity of any existing violation of a NAAQS, or
  - Delay timely attainment of a NAAQS or interim emissions reductions.

  A formal general conformity demonstration is required if the Federal action would occur in a nonattainment or maintenance area, is not exempted under the regulations, and would result in total direct and indirect emissions that are at or above the applicable *de minimis* levels established in 40 CFR 93.158 (b). Further, per OAR 340-250-0020, when the total of direct and indirect emissions of any pollutant from a federal action does not equal or exceed the SAAQS rates, but represents 10 percent or more of a non-attainment or maintenance area's total emissions of that pollutant, the action is defined as a regionally significant action and subject to the State's general conformity rule. This is an Oregon requirement, not a requirement of the USEPA.

- **Toxic Pollutant Regulations (40 CFR 80).** In addition to the criteria air pollutants for which there are NAAQS, the EPA regulates air toxics, also known as hazardous air pollutants (HAPs). Mobile Source Air Toxics (MSATs) are those pollutants from mobile sources (such as locomotive engines) that are known or suspected to cause cancer, or other serious chronic or acute health effects.

Table 4.16-1. Criteria Pollutant Standards

Pollutant	Averaging Time	Violation Determination	Federal (NAAQS)	Oregon (SAAQS)
Carbon Monoxide (CO)	8-hour	Not to be exceeded more than once per year	9 ppm	9 ppm
	1-hour	Not to be exceeded more than once per year	35 ppm	35 ppm
Lead (Pb)	Rolling 3-month Average	Not to be exceeded	0.15 μg/m^3	0.15 μg/m^3
	Quarterly	Not to be exceeded	1.5 μg/m^3	1.5 μg/m^3
Ozone[a]	8-hour	3-year average of the annual 4th highest daily maximum 8-hour average concentration	70 ppb	75 ppb
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	Annual arithmetic mean	53 ppb	53 ppb
	1-hour	3-year average of the 98th percentile of the daily maximum 1-hour average	100 ppb	100 ppb
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	Not to be exceeded more than once per year	–	0.02 ppm
	24-hour	Not to be exceeded more than once per year	–	0.10 ppm
	3-hour	Not to be exceeded more than once per year	0.50 ppm	0.50 ppm
	1-hour	3-year average of the 99th percentile of the daily maximum 1-hour average	75 ppb	75 ppb
PM_{10}	24-hour	The expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than 1 over a 3-year period	150 μg/m^3	150 μg/m^3

Pollutant	Averaging Time	Violation Determination	Federal (NAAQS)	Oregon (SAAQS)
$PM_{2.5}$	Annual Average (primary)	3-year average of the annual arithmetic mean	12 µg/m³	–
	Annual Average (secondary)	3-year average of the annual arithmetic mean	15 µg/m³	15 µg/m³
	24-hour	3-year average of the 98th percentile of 24-hour concentrations	35 µg/m³	35 µg/m³

[a] U.S. EPA revised the Federal 8-hour ozone standard from 80 ppb to 75 ppb in 2008, and from 75 ppb to 70 ppb on October 1, 2015 (USEPA, 2015).

Notes:

µg/m³ = micrograms per cubic meter

PM_{10} = particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers

$PM_{2.5}$ = particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers

ppb = parts per billion

ppm = parts per million

Sources: USEPA, *National Primary and Secondary Ambient Air Quality Standards*, 40 CFR 50; Oregon Administrative Rules (OAR) 340-202-0050 through -0130 (http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_tofc.html#202).

4.16.2 Methods

Based on monitored concentrations of various pollutants in ambient air, the EPA assigns attainment, maintenance, and nonattainment designations to geographic areas (such as counties or air basins) for the NAAQS. The evaluation of the affected environment for the OPR Project uses the NAAQS designations for each county within the study area. To indicate current ambient air quality conditions, data on the most recent measured concentrations of relevant pollutants has been collected, using air quality information provided by the Oregon DEQ (2015).

In this Tier 1 EIS analysis, a preliminary evaluation of general conformity applicability has been conducted for areas designated as nonattainment or maintenance for any of the NAAQS. Based on project-related emissions increases (and decreases) of the relevant pollutants and their precursors, this preliminary evaluation provides an indication of the potential impacts associated with each alternative.

For locomotives, annual emissions of NO_x, CO, volatile organic compounds (VOCs), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), and particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$) have been calculated by multiplying estimated daily fuel use (in gallons) by emission factors from *Emission Factors for Locomotives* (USEPA, 2009) for an average fleet of diesel-fueled locomotives in year 2035. Daily fuel use estimates for all alternatives assume a fuel efficiency of 0.8 mile per gallon for passenger rail (WSDOT, 2009).

The following emission factors were used:

- $PM_{2.5}$ emissions – estimated as 0.97 times the PM_{10} emissions, meaning that nearly all of the PM_{10} is less than 2.5 microns in diameter
- Nitrogen oxides (NO_x) – 33 grams per gallon (g/gal)
- Carbon monoxide (CO) – 27 g/gal
- Hydrocarbons – 0.7 g/gal (multiplied by 1.053 to obtain VOCs)
- PM_{10} – 0.5 g/gal

For Thruway buses, annual emissions of NO_x, CO, VOCs, PM_{10}, and $PM_{2.5}$ have been calculated using estimated vehicle miles and emissions factors from the latest version of the *USEPA Motor Vehicle Emission*

Simulator (this model is referred to as "MOVES2014"). These calculations use default project-level values for the planning horizon year (2035), except for the following assumptions:

- Thruway buses are diesel-fueled
- Buses travel at an average speed of 55 mph.
- Emission factors are based on meteorological conditions for Multnomah County, OR, during winter peak morning hours and summer peak afternoon hours for each of the road types.
- The age distribution of buses is as provided by ODOT (Liljenwall, 2015).

The emission factors used are as follows:

- PM2.5 – 0.02 grams per vehicle-mile (g/veh-mile)
- PM_{10} – 0.05 g/veh-mile
- NOx – 1.2 g/veh-mile
- CO – 0.3 g/veh-mile
- VOCs – 0.03 g/veh-mile

In addition to emissions evaluations, this Tier 1 analysis reviews the relevant transportation plans (RTPs and TIPs) to assess whether the OPR Project is consistent with the applicable plans.

Sulfur dioxide (SO_2) and lead (Pb) emissions are not included as part of this Tier 1 EIS analysis, because they were not considered to be pollutants of concern. Sulfur contents in diesel fuels are being drastically reduced for all uses, and SO_2 emissions are not anticipated to be an issue of concern for passenger rail operations. Similarly, because Pb is not emitted from any transportation operation other than general aviation, it was not anticipated to be of concern for passenger rail operations.

The *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* (FHWA, 2012) defines the following three categories for analyzing MSATs:

- No analysis for projects that have no potential for meaningful MSAT effects;
- Qualitative analysis for projects with low potential MSAT effects; or
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

According to the *Interim Guidance Update on Mobile Source Air Toxics in NEPA*, Federal Highway Administration engineers predict that EPA regulations for on-road motor-vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with the EPA's MOVES2014 model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT emissions from 2010 to 2050, while vehicle-miles of travel are projected to increase by over 100 percent. Accordingly, the EPA regulations would reduce the background levels of MSAT emissions and would likewise reduce the MSAT emissions from Thruway bus vehicles that would result from this project.

Further, the EPA has developed emission standards, codified at 40 CFR 1033, applicable to locomotive engines manufactured or remanufactured after 1972. These standards would increasingly reduce emissions of hydrocarbons as locomotive engines are replaced over time. To the extent that air-toxic emissions are proportional to hydrocarbon emissions, toxic emissions would also be reduced. Because it is common for locomotives to remain in service for as long as 50 years, the EPA has designed the standards to achieve more immediate reductions, such as the requirement that older locomotives be retrofitted with emission controls when they are remanufactured.

This analysis includes a qualitative evaluation of the potential temporary air quality impacts, specifically related to construction.

4.16.2.1 Tier 2 Analysis

Future Tier 2 environmental studies for individual projects proposed subsequent to the OPR Project would consider:

- Analysis of localized pollutant concentrations or "hot spots" and addressing of relevant requirements.
- Calculation of the net emissions increases associated with the project for the analysis of general conformity applicability and requirements. If required at the time of the Tier 2 analysis, the net emissions increase for each pollutant would be calculated for the proposed alternative. These emissions would be estimated in tons per year for the peak construction year and for the planning horizon year (2035), and for each year between these two milestone years. The net increase in emissions for each pollutant would be compared to the applicable general conformity *de minimis* threshold levels. If the estimated net emissions increases exceed the applicable *de minimis* threshold levels, a formal general conformity demonstration, including public notice and review, would be required. If the estimated emissions increases are less than the *de minimis* threshold levels, the project would be assumed to conform, and no further general conformity analysis would be required.
- Quantitative analysis of the details and relative magnitude of the shift from motor vehicle travel to rail travel.
- Analysis of the details and relative magnitude of increased vehicle trips to and from local rail stations, including any new stations identified in the Preferred Alternative (no new stations for Alternative 1 and up to four new stations for Alternative 2).
- Analysis of the construction of new sections of rail line and operation of passenger locomotives on the new sections.
- Qualitative analysis of MSATs.

4.16.3 Study Area

For this air quality analysis, the study area was limited to the air quality management areas that are subject to general conformity requirements and their respective local governmental planning entities.

4.16.4 Affected Environment

Table 4.16-2 lists the counties and air basins in the study area that the EPA has designated as maintenance areas for the NAAQS. Appendix D, Figure D-3 shows air quality maintenance areas for Ozone and CO that are described below.

Table 4.16-2. Air Quality Maintenance Areas in the Study Area

County	Pollutant	Designation
Lane	PM_{10}	Limited Maintenance
Polk, Marion	CO	Limited Maintenance
Polk, Marion	8-hour ozone	Attainment/Maintenance[a]
Multnomah, Clackamas	CO	Maintenance
Multnomah, Clackamas	8-hour ozone	Attainment/Maintenance[a]

[a] Due to regulatory changes in 2005, these areas have maintenance plans for ozone that demonstrate achievement of standards through 2015.

An air quality maintenance area for PM_{10} is located in the Eugene-Springfield area. On April 11, 2013, the EPA took direct final action to approve the Eugene-Springfield PM_{10} Limited Maintenance Plan and redesignate the area to attainment for PM_{10}. The Lane Regional Air Protection Agency continues to implement the control strategies outlined in the SIP, and the area has not exceeded the NAAQS since 1987.

Oregon DEQ does not currently monitor for CO in the Eugene-Springfield area.

A designated air quality maintenance area for CO is centered on the city of Salem, in the counties of Polk and Marion. The Salem-Keizer Area Transportation Study (SKATS) air quality area achieved the NAAQS for CO in 1987 (Oregon DEQ, 2007a), and was classified as a maintenance area in 2009 (USEPA, 2014) with the approval of the submitted Limited Maintenance Plan. The SKATS area became an attainment/maintenance area for ozone with the revocation of the Federal 1-hour ozone standard in June 2005. Because this area is subject to the anti-backsliding provisions of the revised standard, the Oregon SIP section for the Portland-Vancouver Air Quality Maintenance Area (Oregon Portion) and Salem-Keizer Area 8-hour Ozone Maintenance Plan (Oregon DEQ, 2007b) was required to demonstrate continued compliance with the 1997 8-hour ozone standard through at least 2015.

Oregon DEQ does not currently monitor for CO in the Salem area.

The Portland area is a designated air quality maintenance area for CO, and the Portland area became an attainment/maintenance area for ozone with the revocation of the Federal 1-hour ozone standard in June 2005. Because this area is subject to the anti-backsliding provisions of the revised standard, the Oregon SIP section for the Portland-Vancouver Air Quality Maintenance Area (Oregon Portion) and Salem-Keizer Area 8-hour Ozone Maintenance Plan (Oregon DEQ, 2007b) was required to demonstrate continued compliance with the 1997 8-hour ozone standard through at least 2015. No violations of the 1-hour ozone standard have been recorded in Portland since 1998, and no violations of the 8-hour ozone standard have ever been recorded (Oregon DEQ, 2007b and Oregon DEQ, 2015). The last exceedance of the CO standard occurred in 1991 (Oregon DEQ, 2007b and Oregon DEQ, 2015).

4.16.5 Environmental Consequences

4.16.5.1 Direct and Indirect Impacts

Direct impacts to air quality from the OPR Project would occur from the increased use of diesel-powered passenger trains with locomotive engines or DMUs within the study area and the increase or reduction in the frequency of Thruway bus service. **Table 4.16-3** presents the estimated annual locomotive engine and bus emissions in 2035 for each of the alternatives considered in this Tier 1 EIS analysis. This analysis reflects the shift, for the build alternatives, from Thruway Bus service to rail, but it does not reflect other potential modal shifts (i.e., the emissions shown here do not reflect the project-related emissions benefits that could be associated with rail service replacing passenger-vehicle, bus (other than Thruway bus), and plane trips along the route). As shown in **Table 4.16-3**, compared to the No Action Alternative, locomotive engine emissions would increase for all pollutants for both build alternatives, while Thruway-bus-service emissions would decrease for all pollutants for both build alternatives. Because they are estimated to be a fraction of the locomotive emissions, the emissions associated with Thruway bus service do not add to the total emissions beyond one significant digit and therefore are not considered further in this analysis.

No Action Alternative

Table 4.16-3 provides a summary of estimated direct impacts to air quality associated with the No Action Alternative from locomotive and Thruway bus emissions. Comparisons between air quality conditions under the No Action Alternative and the two build alternatives is provided in the discussion of the build alternatives below. There would be a low potential for project-related MSAT impacts from Thruway buses due to existing regulations that are reducing emissions from the sources over time. Additionally, Washington State purchased eight next generation locomotives with greater fuel efficiency and lower emissions and put them into passenger rail service through the PNWRC.

Build Alternatives

The estimated OPR Project impacts to air quality would be limited to increases in locomotive engine emissions, and decreases of emissions from Thruway buses compared to the No Action Alternative. The estimated direct impacts, summarized in **Table 4.16-3**, suggest that increased Thruway bus service for the No Action Alternative and increased locomotive engine operations for both of the build alternatives would have low potential to result in any meaningful impact on air quality. Additionally, results indicate that the build alternatives would conform to the purpose and intent of the SIPs and Maintenance Plans for achieving the NAAQS. Because both build alternatives would pass through designated air quality maintenance areas, a general conformity applicability analysis would be required in subsequent Tier 2 environmental reviews and documentation. There would be a low potential for project-related MSAT impacts from locomotive engines due to existing regulations that are reducing emissions from these sources over time.

The OPR Project would generate indirect impacts related to changes in roadway traffic flow because of increased frequency of passenger train service. Under Alternative 2, passenger rail trains would travel on a predominantly new alignment containing many grade-separated crossings. While the existing at-grade crossings on the current UPRR alignment would remain open, they would be used by freight trains only. Although this change in track usage would reduce the amount of idling emissions from vehicles waiting for existing passenger rail traffic to pass on the current alignment, the potential increased freight rail traffic on the current UPRR alignment would result in increased idling emissions at existing at-grade crossings. Where increased frequency of passenger train service would be added without grade separations (i.e., the Oregon Electric Railway portion of Alternative 2), slight increases in air emissions associated with idling vehicles could occur.

Table 4.16-3. Summary of Estimated Direct Impacts from Locomotive and Thruway Bus Emissions to Air Quality (2035)

Pollutant	No Action Alternative	Alternative 1	Alternative 2
Impacts from Locomotive Emissions Track miles (one way)	135.7	135.7	130.7
Number of locomotive round trips/day	3	7	7
Miles traveled (one way), bus	122	122	122
NO_x (tons per year), locomotive	14	32	30
CO (tons per year), locomotive	11	25	24
PM_{10}/$PM_{2.5}$ (tons per year), locomotive	0.2	0.5	0.5
VOCs (tons per year), locomotive	0.3	0.7	0.7
Impacts from Bus Emissions Round trips per day, bus	7	2	2
NO_x (tons per year), bus	0.80	0.23	0.23
CO (tons per year), bus	0.21	0.06	0.06
PM_{10} (tons per year), bus	0.04	0.01	0.01
$PM_{2.5}$ (tons per year), bus	0.01	0.004	0.004
VOCs (tons per year), bus	0.02	0.01	0.01

Note: The No Action alternative would result in 1 additional Thruway bus round trip over current conditions; Thruway-bus-service emissions do not add to the total emissions beyond one significant digit and are not considered further in this analysis.

4.16.5.2 Construction Impacts

During construction, emissions of CO, VOCs, NO_x, and particulate matter would temporarily increase because of dust emissions from land disturbance and construction vehicle travel, and from exhaust from fuel combustion in construction vehicles and equipment.

All construction work must comply with Federal, state, and local air quality regulations regarding temporary emissions. Transportation conformity demonstrations are not required to address construction emissions if they last less than five years at any individual site. No construction-emission component of either build alternative would exceed five years at any single location. Project-specific investigations would determine whether future passenger rail projects would impact air quality.

Alternative 2 would have greater construction impacts than Alternative 1, because more new rail stations are proposed for construction (potentially in Springfield, Albany, Salem or Keizer, Woodburn, and Wilsonville or Tualatin) and because Alternative 2 would require more infrastructure to be constructed along the Oregon segment of the Pacific Northwest Rail Corridor.

4.16.6 Potential Mitigation

Tier 2 environmental studies would consider and implement project-specific mitigation strategies for air quality, as appropriate. Construction contractors would have to meet applicable standards and BMPs, such as those listed in Section 4.14.6 and potential additional BMPs for air quality including:

- Spraying haul roads with water to reduce dust and particulate matter emissions.
- Maintaining construction equipment with required pollution-control devices.

- Limit equipment idling to the extent practicable.
- Restricting burning.

4.17 Energy/Climate Change

This section discusses legal requirements, methods of analysis, the energy/climate change study area, affected environment, potential environmental consequences, and mitigation strategies related to energy and climate change for each of the OPR Project alternatives.

4.17.1 Legal Requirements

In addition to NEPA and CEQ's NEPA implementing regulations, Federal regulations and state laws related to energy and climate change and applicable to this Tier 1 analysis include the following:

4.17.1.1 Federal

- **FRA's Procedures for Considering Environmental Impacts**. Section 14(n)(10) of FRA's environmental procedures requires an EIS to assess any irreversible or irretrievable commitments of energy resources likely to be involved in each alternative and any potential energy conservation.

4.17.1.2 State

- **Oregon House Bill 2001.** Passed in 2009, this legislation contains requirements aimed at reducing greenhouse gas (GHG) emissions from the state transportation system.
- **Oregon Senate Bill 1059.** Passed in 2010, this legislation contains requirements aimed at reducing GHG emissions from the state transportation system.

4.17.2 Methods

4.17.2.1 Affected Environment

This analysis assessed the relative efficiencies of the primary transportation modes (light-duty vehicle, plane, bus, passenger rail) used between Eugene-Springfield, OR, and Vancouver, WA, with respect to energy consumption and GHG emissions. The amount of fuel currently used by the Amtrak Cascades route between Eugene, OR, and Vancouver, WA, was calculated. This information was used for comparisons between the No Action Alternative and the build alternatives in the analysis of environmental consequences.

4.17.2.2 Direct Impacts

Direct impacts were assessed using both quantitative and qualitative methods. Specifically, quantitative methods were used for estimates of operational use and construction, while a qualitative approach was used to estimate potential shifts in travel mode that would affect energy use and GHG emissions.

Operational impacts were calculated based on the number of passenger rail trips planned for the Amtrak Cascades alignment between Eugene-Springfield, OR, and Vancouver, WA, and for the Thruway bus trips between Eugene, OR, and Portland, OR (see Table 3-6 for a summary of the bus and train trips under each alternative). Projected fuel usage was calculated for the full buildout year (2035) and was converted to carbon dioxide equivalent (CO_2e) emissions (CO_2e represents the equivalent amount of CO_2 emissions created by all greenhouse gasses emitted). The fuel usage estimate was adjusted to account for the improved efficiency of trainsets in operation, based on the same assumptions the Washington Department of Transportation made in the *Program Environmental Assessment for the Pacific Northwest Rail Corridor Washington State Segment – Columbia River to the Canadian Border* (WSDOT, 2009). These assumptions include the following:

- The build alternatives would potentially enhance fuel efficiency for passenger and freight trains by increasing the number of usable sidings and creating other capacity and efficiency improvements. Currently, at a few locations, some trains must wait for opposing traffic to pass. By decreasing the amount of time the trains sit idling on a siding, the OPR Project should improve energy efficiency through reduced fuel consumption.
- The build alternatives and the No Action Alternative would have future fuel efficiency gains with the use of the new models of locomotives being built for this route. Because locomotives being introduced today are 10 to 12 percent more energy efficient than locomotives built in the mid-1990s, it is assumed that new passenger locomotives purchased to operate on the route in the future will be at least 12 percent more fuel efficient than the existing locomotives currently in use. Because at least one additional locomotive will be needed to operate six daily round trips, the future overall average fuel economy is estimated to increase by 4 percent (one of the three trains in operation).
- Bus fuel economy is projected to increase from 6 miles per gallon in 2014 to 7 miles per gallon by 2035.

Energy use was calculated for 2014 (the most recent year data was available at the time of analysis) as well as for the future (2035) year under the No Action Alternative and build alternative scenarios. These estimates were converted into CO_2e emissions (as proxy for GHG emissions) using industry-accepted conversion factors from the California Department of Transportation (Caltrans, 1983) and the EPA (USEPA, 2009). Metric tons (MT) of CO_2e emissions were used to compare GHG emission levels among alternatives. CO_2e emissions take into account not only the carbon dioxide emitted but also other GHGs (for example, nitrous oxide and methane associated with fuel use).

In addition to the operational energy locomotives use, improved passenger rail service has the potential to displace automobile, bus, and airplane trips in the project study area, as well as to generate demand for new rail trips. An evaluation of the estimated displacement of other modes of travel and changes in traffic congestion patterns identified a portion of the potential energy impacts and GHG emission impacts associated with the OPR Project.

Planning-level cost estimates were used to estimate the energy consumed during the construction of each build alternative, which is summarized as a direct impact. Different elements in the cost estimates were categorized using a Caltrans methodology for estimating energy consumption during construction based on construction costs (Caltrans, 1983; Caltrans, 2014). A conversion factor was applied to the energy use to calculate CO_2e emissions associated with construction.

This Tier 1 analysis did not estimate energy use during maintenance. Based on the defined operating scenarios, the energy that would be used in maintaining the operations of the passenger rail service for the two build alternatives is assumed to be similar.

Indirect Impacts

Indirect impacts were addressed qualitatively by estimating changes in roadway traffic flow because of the greater service frequency of passenger trains, the potential for mode shift between roadway and rail, and the potential for shifting passenger trains from a route with many at-grade crossings to one with more grade-separated crossings.

The OPR Project would generate indirect impacts related to changes in roadway traffic flow because of the greater service frequency of passenger trains within the transportation system, the incremental replacement of the Thruway bus mode by passenger trains, and the potential for trips diverted from the roadway system.

4.17.3 Study Area

The study area for the energy and climate change analysis includes the primary transportation system between Eugene-Springfield and Vancouver (WA), specifically the road or rail routes traversed by trains or buses in the No Action Alternative and build alternative scenarios. The analysis of energy and climate change relied on the potential use of fuel for operations and construction, and the relative energy use for passenger rail and passenger bus modes of transportation.

4.17.4 Affected Environment

Currently, passenger trains make three round trips daily between Eugene-Springfield and Portland, OR — two Amtrak Cascades round trips and one Coast Starlight round trip. There are currently five round trips between Portland and Seattle (four Amtrak Cascades and one Coast Starlight). Thruway buses currently make six daily round trips between Eugene-Springfield and Portland (Thruway buses do not travel north of Portland). **Table 4.17-1** presents route information, fuel use, and annual GHG emissions (identified as MT CO2e emissions). For a detailed listing of the number of trains and buses in the existing conditions, see Table 3-6.

Table 4.17-1. Existing Conditions: Passenger Train and Thruway Bus Energy Use Affected Environment (2014)

Item	Eugene to Portland	Portland to Vancouver (WA)	Total[a]
Daily Round trip Amtrak Cascades Trips	2	4	2/4
Daily Round trip Amtrak Coast Starlight Trips	1	1	1
Daily Round trip Thruway Bus Trips	6[b]	0	6[b]
One-way Trip Track Miles (Bus Miles)	125.8 (122.3)	9.9 (0)	135.7 (122.3)
Daily Fuel Use from Train and Bus Operations (gallons)[c]	1,481		
Annual GHG Emissions from Train and Bus Operations (MT CO2e)[d]	5,460		

[a] Numbers may not sum because of rounding.

[b] In addition to these six round trips, there is a Thruway bus running between Salem-Portland daily; fuel use by that route is included in the calculation.

[c] Daily fuel use assumes 0.7 mile per gallon (mpg) for existing fuel efficiency for passenger trains (WSDOT, 2009) and 6 mpg for Thruway buses (American Bus Association, 2014).

[d] MT CO2e = metric tons of carbon dioxide equivalent (1 gallon diesel contains 22.2 pounds carbon dioxide equivalent [USEPA, 2009, with additional resources at USEPA, 2014]).

4.17.5 Environmental Consequences

The potential effect of the OPR Project on energy and climate change would be limited to increases in energy use from locomotives and buses, increases and decreases in on-road energy use from shifting transportation patterns, and increases in energy use from construction.

4.17.5.1 Direct and Indirect Impacts

No Action Alternative

Overall, it is anticipated that, by 2035, the No Action Alternative would result in a 9.5 percent decrease in fuel use (and GHG emissions) compared to existing conditions. This decrease is based in part on expected improvement in fuel efficiency from new locomotives.

Alternative 1

Table 4.17-2 provides a summary of direct impacts from energy expenditure and GHG emissions (2035) for Alternative 1.

Fuel Use and GHG Emissions

Fuel use under Alternative 1 would increase compared to the No Action Alternative because of the increase in the number of daily passenger rail round trips (although there would be a small compensating reduction because of the decrease in bus trips). Compared to existing conditions, Alternative 1 would benefit from the same fuel efficiency gains as the No Action Alternative, and those are accounted for in this analysis. Overall, Alternative 1 would increase fuel use (and GHG) emissions by approximately 80 percent compared to the No Action Alternative because of the changes in bus and rail service frequencies.

In addition to the operational energy locomotives use, improved passenger rail service has the potential to displace automobile, bus, and airplane trips along the length of the study area, as well as to generate demand for new rail trips. Ridership is projected to increase under Alternative 1 compared to existing conditions and the No Action Alternative. Based on ridership modeling completed in 2015, Oregon-supported Amtrak Thruway bus and rail ridership in 2013 of approximately 700 riders a day would increase 35 percent by 2035 under the No Action Alternative and 155 percent under Alternative 1. Alternative 1 ridership would be 89 percent higher than that of the No Action Alternative. A portion of this increase would be attributed to mode shift, including replacing Thruway bus trips with passenger rail trips.

Alternative 1 would generate indirect impacts related to changes in roadway traffic flow because of the increase in passenger train service within the transportation system. To allow increased frequency of passenger trains, improve reliability, and potentially decrease overall travel time, an increase in the number of usable sidings and the creation of other capacity and efficiency improvements would be implemented. These improvements would help reduce the existing bottlenecks along the existing Amtrak service alignment and allow freight and passenger trains to pass each other while they are in motion. These improvements to the existing UPRR alignment would allow more efficient and uninterrupted flow of both freight and passenger rail, thus reducing train stoppages and delays, but increasing the number of stops and associated travel delays for roadway traffic at railroad crossings. These changes would reduce the fuel that roadway vehicles use while waiting for existing passenger rail traffic to pass and would marginally reduce GHG emissions.

Alternative 2 and Alternative 2 with Central Albany Option

Table 4.17-2 provides a summary of direct impacts from energy expenditure and GHG emissions (2035) for Alternative 2 and Alternative 2 with Central Albany Option.

Fuel Use and Greenhouse Gas Emissions

Compared to existing conditions, Alternative 2 would benefit from the same fuel efficiency gains as the No Action Alternative and Alternative 1, and those are accounted for in this analysis.

As with Alternative 1, fuel use under Alternative 2 would increase compared to the No Action Alternative because of the increase in the number of daily round trips. The increase would be less for Alternative 2 than for Alternative 1, because the total trip distance is shorter. In addition, if passenger trains are shifted to Alternative 2 from the existing route, some efficiency gains could be associated with reducing conflicts at at-grade crossings between passenger trains and freight trains, or between passenger trains and motor vehicle traffic. Overall, Alternative 2 would increase fuel use (and GHG emissions) by approximately 75 percent compared to the No Action Alternative because of the increase from three to seven daily passenger rail round trips and the change in bus frequencies. However, fuel use related to Alternative 2 would be 4 percent lower than with Alternative 1, because Alternative 2 would have fewer track miles.

In addition to the operational energy locomotives use, improved passenger rail service has the potential to replace automobile, bus, and airplane trips along the length of the study area, as well as to generate demand for new rail trips. Ridership is projected to increase under Alternative 1 compared to existing conditions and the No Action Alternative. Based on ridership modeling completed in 2015, Oregon-supported Amtrak Thruway bus and passenger rail ridership in 2013 of approximately 700 riders a day would increase 35 percent by 2035 under the No Action Alternative and 151 percent under Alternative 2. Alternative 2 ridership would be 85 percent higher than that of the No Action Alternative. A portion of this increase would be attributed to mode shift, including replacing Thruway bus trips with passenger rail trips.

In addition to the indirect impacts noted for Alternative 1, Alternative 2 would provide additional benefits to the transportation system. Overall, along the Oregon segment of the Amtrak Cascades alignment, Alternative 2 would have fewer at-grade crossings (49) than Alternative 1 (138). The substantially reduced passenger rail traffic at at-grade crossings would reduce the fuel used by roadway vehicles waiting for passenger trains to pass. It would also marginally reduce GHG emissions because of the reduced fuel consumption of roadway vehicles no longer delayed by passenger trains at railroad crossings.

4.17.5.2 Construction Impacts

Construction of the build alternatives would require energy for the manufacture and installation of materials (including the operation of construction equipment). Construction energy is the summation of the energy used for each type of construction activity, which is a function of the cost of construction.

Alternative 1

Table **4.17-2** shows the estimated construction energy use and GHG emissions associated with Alternative 1. Alternative 1 would require less than half the energy for construction than would Alternative 2.

Alternative 2

Table **4.17-2** shows the estimated construction energy use and GHG emissions associated with Alternative 2 and Alternative 2 with Central Albany Option. Alternative 2 is expected to cost more to construct than Alternative 1 largely because of the greater extent of new infrastructure and structural work required, which translates to higher construction energy and GHG emissions.

Table 4.17-2. Summary of Direct Impacts from Energy Expenditure and GHG Emissions (2035)

Resource Indicator, Topic, or Measurement	No Action Alternative	Alternative 1	Alternative 2[a]
Number of Train Trips/Day (Eugene – Portland / Portland – Vancouver)	3/7	7/7	7/7
Number of Bus Trips/Day (Eugene – Portland)	7	1[b]	1[b]
One-way Trip Track Miles (Bus Miles)	135.7 (122.3)	135.7 (122.3)	130.7 (122.3)
Daily Fuel Use from Train and Bus Operations (gallons)[c]	1,361	2,424	2,337
Annual GHG Emissions from Train and Bus Operations (MT CO2e)[d]	5,017	8,936	8,614
Total GHG Emissions from Construction (Materials and Operations) (MT CO2e)[d]	0	178,500	1,253,600

[a] The Alternative 2 with Central Albany Option differs from Alternative 2 as follows: trains would travel an additional 2.5 track miles for each trip, resulting in additional 44 gallons of diesel used daily and emission of 161 additional MT CO2e annually; construction would generate 5,300 less MT CO2e than Alternative 2. Although operational energy use would be higher because of longer distance traveled for the option, the construction energy use would be lower, because fewer construction materials would be required (for example, no new station in Albany would mean fewer new grade-separated crossings).

[b] Alternatives 1 and 2 would also include a daily supplemental Thruway bus route between Salem and Portland. The energy use from that service is included in this analysis. However, there were no plans to extend this Salem to Portland route south to Eugene when this analysis was done and energy use for that extension is not included.

[c] Daily fuel use assumes 0.8 mile per gallon (mpg) for passenger train trips and 7 mpg for bus trips for all alternatives. Both modes use diesel fuel. Train mpg reflect future anticipated improvements in fuel efficiency. Source: WSDOT, 2009. Fuel use calculations

were based on total daily distances (track or roadway miles for train and bus calculations, respectively). If DMU technology was used for the corridor, fuel use would be less (1% to 10% less, according to the estimate published by the International Union of Railways [UIC, 2003]).

[d] MT CO2e = metric tons of carbon dioxide equivalent (1 gallon diesel contains 22.2 pounds carbon dioxide equivalent [USEPA, 2009, with additional resources at USEPA, 2014]).

4.17.6 Potential Mitigation

No mitigation for operational energy use is currently proposed. Both build alternatives would shift some trips from less fuel-efficient trips (automobile, airplane, bus) to the more efficient trains. Thus, some energy-related benefits would likely be associated with the mode shift, in the form of reduced vehicle miles traveled and fuel consumption.

The OPR Project could be vulnerable to future effects related to climate change based on projections of increased storm intensity and duration, increased flood risks, and increased risk of landslides. FRA and ODOT acknowledge that the future climate change effects could alter the function, sizing, and operations of proposed OPR Project infrastructure. For the proposed facilities to function as intended for their planned lifespans, ODOT would design the proposed facilities to perform under the variable conditions expected as a result of climate change. For example, drainage culverts might need to be sized larger than warranted by existing conditions to accommodate more intense rainfall events and increased seasonal flows of surface water. Subsequent Tier 2 environmental studies would consider and implement climate change adaptation strategies, as appropriate.

4.18 Cumulative Impacts

This section presents an evaluation of the potential cumulative impacts of implementing the OPR Project in combination with other past, present, and reasonably foreseeable future actions that could result in environmental impacts.

4.18.1 Legal Requirements

The CEQ's NEPA implementing regulations (40 CFR Parts 1508.7 and 1508.25(a)(2) and (c)) require proposed major Federal actions to consider potential cumulative impacts associated with the range of alternatives. The CEQ NEPA regulations define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."(40 CFR 1508.7). In addition, Section 14(n) of FRA's environmental procedures (64 FR 28545) advises that EIS analyses should consider potentially significant cumulative impacts resulting from the proposed FRA action.

4.18.2 Methods

This qualitative evaluation was performed to assess the potential cumulative impacts that could be associated with the construction and operation of the OPR Project. To be commensurate with the service level of detail associated with this Tier 1 EIS, consideration of past, present, and reasonably foreseeable future actions generally considers broader categories of actions and regional-level projects rather than local, site-specific projects.

Information from multiple sources were reviewed to identify applicable past, present, and reasonably foreseeable future actions that could contribute potential cumulative effects to the built and natural environment along with the OPR Project. These sources included technical documents prepared for the OPR Project and other referenced sources in this Tier 1 DEIS, state, regional, and local long-range land use and transportation plans, and state transportation improvement plans.

4.18.2.1 Tier 2 Analysis

Future Tier 2 environmental studies for individual rail improvement projects proposed subsequent to this Tier 1 service level analysis could include additional analyses regarding potential cumulative impacts.

4.18.3 Study Area

For this evaluation, the cumulative impacts study area is broadly defined as the Willamette Valley between the Eugene-Springfield and Portland metropolitan areas. The study area includes highly developed urban areas, cities, areas outside of urban growth boundaries, low-density suburbs, rural areas, and land that is primarily agricultural.

4.18.4 Past, Present, and Reasonably Foreseeable Future Actions

Development of transportation networks, along with population growth, land use changes, and urban development have resulted in cumulative environmental impacts over time within the study area. The following two sections summarize past actions, and present and reasonably foreseeable future actions that serve as the primary context for the OPR Project cumulative impacts evaluation.

4.18.4.1 Past Actions

Numerous bands of indigenous Chinook and Kalapuyans occupied the western part of Oregon including the study area from the late Pleistocene epoch, circa 11,000 years ago, up to the time of Euroamerican contact in the early 1800s. While Native Americans occupied and traveled through the study area for thousands of years, those activities had a relatively minor effect on current conditions.

Based on the historic record of European-American settlement that shaped the built environment in the study area, the past time frame begins in the early 1800’s with the settlement of populated communities and establishment of major transportation routes that linked communities and developed into the primary north-south “spine” that evolved from Native American paths along the Siskiyou Trail that connected Pacific Northwest tribes to California’s Central Valley, and became more developed over the decades for movement of people and goods by wagon, stagecoach, ferry, automobile, bus, truck, and train through the study area.

The Lewis and Clark Expedition, which lasted from 1804 to 1806, radically increased the nation’s sense of accessible geography and initiated the rapid Euroamerican migration and settlement of the Pacific Northwest by explorers, trappers, traders, hunters, prospectors, homesteaders, ranchers, businessmen, and missionaries. Through the early portion of the nineteenth century, fur trappers, including those operating out of the Hudson’s Bay Company in Fort Vancouver, adopted the Siskiyou Trail as a major trade corridor between the Northern Oregon Territory and California, and established settlements that developed into the communities and cities through the study area.

In 1843, the Willamette Valley settlers drafted a constitution that organized the land claim process in the territory. The Donation Land Claim Act of 1850 granted 320 acres (half a section) of land to single adult white males and 640 acres (a section) of land to married couples at no cost to encourage settlement (City of Albany, 2014). This free land opportunity gave many people from east of Oregon motivation to settle there. From 1842 to 1852, approximately 18,000 emigrants, including many who started at Independence, Missouri, traveled west over the Oregon Trail and other routes to Oregon (ODOT, 2017).

In 1851, the Oregon house passed created the Territorial Road Act. The first Federal aid came in 1856. By the coming of statehood, about 100 roads, each separately authorized, had been established in Territorial Oregon. In the Willamette Valley, then two-thirds of settled Oregon, Territorial Roads had been established to the California border, Puget Sound, The Dalles, and the mouth of the Columbia River. Some of these routes were only partly finished and some were only mapped. Territorial roads, state roads, and county roads established by the Oregon Territorial Legislature or by County Commissioners were declared legal roads by the State of Oregon when Oregon entered the Union on June 4, 1859. Immigration over these trails and roads continued through the Civil War, but declined after the (east-west) transcontinental railroad was completed in 1869.

In the late 1800's, many short line stage coaches operated in Oregon. The first continuous line between Portland and Sacramento, California began in 1860 when previously built roads, including one that extended south of Portland through the Willamette Valley, were connected. This line made travel between Portland and Sacramento using one stagecoach company. The trip covered 700 miles and took seven days - the second longest continuous stage route in the United States at the time. The California Stage Company operated this line until 1865. Other shorter stagecoach lines continued to operate between Oregon and California until 1887, when the railroad was completed. (ODOT, 2017).

Railroads were key to developing the agricultural and natural resources of the Willamette Valley and Portland Basin. On July 25, 1866, Congress agreed to award 20 segments of public land for each completed mile of construction for a railroad project that would connect northern California and Portland, Oregon (Walker, 2011). The law provided for the California and Oregon land grants to be conveyed to the California & Oregon Railroad Company of California and to a company to be designated by the Oregon Legislature to build the railroad line. The California & Oregon Railroad Company incorporated June 30, 1865, to build north from California. Two competing companies incorporated in Oregon in 1867, both called the Oregon Central Railroad. One was on the east side of the Willamette River and the other was on the west side. The Oregon Central Railroad – East Side Company broke ground in East Portland on April 16, 1868. In 1870, the Oregon Central Railroad – West Side Company sold out to the East Side Company, which then reorganized as the Oregon and California Railroad (O&C; Heath, 1944).

The O&C was the first to establish a link between Portland and California from north to south throughout the Willamette Valley replacing steamboats. Construction began in Portland in 1868, and by 1872, the O&C line had been extended to Roseburg in the southern Willamette Valley. The O&C reached the California border in late 1887. Passenger rail service began in 1887 as the Oregon Express (northbound) and the California Express (southbound). In that same year, the Southern Pacific Railroad (SP) gained control of the O&C and, in 1927, purchased it outright (Ganoe, 1924; Ellis, 1948). In 1912, the Oregon Electric Railway managed 122 miles of track that connected Portland and Eugene and ran nearly parallel to the O&C mainline (Beckham, 2014). A rail bridge over the Columbia River, completed in 1910, allowed increased freight and passenger transport and increased the viability of the Ports of Portland and Vancouver for interstate trade. Industrialized farming, irrigation and water impoundment, and grain shipping increased.

Highway construction starting in the 1920s, including Highway 99E that runs from Eugene to Portland, and the rapid rise of the automobile during the early 20th century led to the decline of the region's reliance on the O&C mainline and electric railway passenger services. The Federal-Aid Highway Act provided the funds to construct I-5, which runs north-south through the Willamette Valley and was completed in 1966. Later, other highways were built to provide connections to the interstate, including I-205 which runs north-south from Tualatin, OR, to Vancouver, WA (constructed between 1968 and 1983).

In 1969, the Oregon Legislature enabled the creation of transit districts and authorized them to raise revenue through a payroll tax. This legislation led to development and growth of regional transit districts and bus service providers of various scales in and between cities throughout the study area.

A joint partnership by the Northern Pacific, Great Northern, and Union Pacific railroads operated the Cascades passenger train route until the mid-1960's. Amtrak took over intercity passenger rail operations from private railroads on May 1, 1971. Initial service consisted of three Seattle-Portland round trips. In 1975, the Oregon Legislature approved the first Willamette Valley Passenger Rail Study, and in 1980, Oregon conducted an 18-month-long Willamette Valley Passenger Rail demonstration project. In 1992, the FRA designated Eugene, Oregon to Vancouver, British Columbia, as one of ten nationwide "High-Speed Rail" corridors. In that same year, Oregon completed the Oregon Rail Passenger Policy and Plan, as the legislature required.

Present and Reasonably Foreseeable Future Actions

Current conditions for land use and urbanization were largely established beginning in the 1970's with enactment and implementation of Oregon's State Land Use Law, including the comprehensive State Goals that protect farm, forest and other resource lands, and establish rules guiding the planning and development of urban and urbanizing land within designated Urban Growth Boundary (UGB) areas. The UGB separates urban land uses from rural land uses with the intent of protecting farm and forest lands, while making sure that there is adequate space to meet the needs of growing urban areas. Every city in Oregon must have a UGB that must contain enough land for housing, employment, parks and schools for the next 20 years of population growth.

Population growth within the study area and the associated demand for housing, employment, and services has led to UGB expansions in the study area in the past 20-30 years. The UGB expansions have narrowed the distances between urban and urbanizing communities in the study area, thus increasing the likelihood of more continuous urban development along the existing rail and road alignments once build-out occurs. Within the study area, the cities of Eugene and Springfield have shared a UGB since 1982, and Eugene is scheduled to adopt a city-specific UGB in 2017 that includes some expansion areas for employment, parks and schools at the northern edges of the city.

Present transportation conditions in the study area were largely established through completion of the national Interstate System, including I-5, I-105, I-205, and I-405 in the 1980's, and establishment of Amtrak intercity passenger rail service, particularly the Oregon portion of the Amtrak Cascades route that started service in 1994 to Eugene-Albany-Salem-Oregon City-Portland, with a second round trip train added in 2000.

In addition to Amtrak passenger rail service, multiple intercity bus lines provide connections to urban areas across the state. Some of the bus lines are contracted and subsidized by the state, while others are privately operated.

Since 1994, ODOT has invested in intercity bus services, and Amtrak manages the *Thruway* intercity bus service that operates on highways parallel to the Amtrak Cascades passenger rail route, with six daily round trips between Eugene and Portland and intermediate stops in Albany, Salem, Woodburn, and Oregon City.

Greyhound intercity buses are scheduled for four daily round trips between Eugene and Portland, with intermediate stops in Corvallis, Salem, and Woodburn.

BoltBus, a Greyhound subsidiary, operates two to three round trips a day between Eugene and Portland four days a week (travel days between Thursday and Monday), with one intermediate stop in Albany.

Since 2011, the North by Northwest CONNECTOR system has provided coordinated transit service across five counties in northwestern Oregon: Lincoln, Columbia, Tillamook, Benton and Clatsop, and provides intercity transit connections between communities in neighboring counties.

The Linn-Benton Loop Bus links the Cities of Albany and Corvallis.

Urban transit systems that operate within the study area include:

- The Lane Transit District (LTD), in Eugene-Springfield,
- The City of Albany's Albany Transit System,
- The Salem-Keizer Transit "Cherriots",
- The City of Wilsonville's South Metro Area Regional Transit (SMART),
- The Portland metropolitan area's Tri-County Metropolitan District of Oregon (Tri-Met), and
- The Clark County Public Transit Benefit Area Authority (C-Tran) that serves the greater Vancouver, Washington area and also connects into Portland.

Each of these urban transit providers listed above operate traditional bus service. In addition, as described below, LTD operates a Bus Rapid Transit (BRT) service and Tri-Met operates Light Rail Transit (LRT) and commuter rail services.

LTD began service in 1970, and it has expanded to serve the growing Eugene-Springfield area with a bus transit system centered on an east-west BRT line branded as the Emerald Express (EmX) service that started in 2007.

TriMet, in operation since 1969, serves a tri-county district that includes major portions of Multnomah, Washington, and Clackamas counties with an extensive bus system, plus multiple “MAX” LRT routes, and contracts with PNWR to operate the Westside Express Service (WES) commuter rail line that serves Beaverton-Tigard-Tualatin-Wilsonville. Beginning in 1986 with the opening of the “Banfield” Blue Line between Portland and Gresham, TriMet's light rail and commuter rail lines have evolved over the past 30 years. The Tri-Met MAX LRT consists of the following routes:

- Blue Line: Hillsboro – Beaverton – City Center – Gresham
- Green Line: Portland State University – City Center – Clackamas
- Orange Line: Union Station – City Center – Milwaukie
- Red Line: Beaverton – City Center – Portland International Airport
- Yellow Line: Expo Center – City Center – Portland State University

The foreseeable future for this cumulative impacts evaluation extends from the present time to 2035, which was the year that ODOT and FRA identified as the 20-year planning horizon for the OPR EIS. 2035 is also the planning horizon year used in most relevant and adopted county and metropolitan planning organization (MPO) planning documents when preparation of this Tier 1 EIS commenced. The context for the cumulative analyses is primarily based upon the population growth, and land use and transportation infrastructure development that has occurred within the OPR Project study area through the present time, and which is forecast to occur based on regional and local adopted comprehensive plans.

The No Action Alternative includes a list of committed and funded transportation projects (Section 3.1.5) that are including in the State of Oregon’s adopted 2015-2018 Statewide Transportation Improvement Program (STIP). Reasonable and foreseeable future actions include these projects, and may also include other projects that are listed in adopted metropolitan areas’ comprehensive plans and transportation system plans.

While not funded at this time, four planned freeway capacity and safety enhancement projects are likely to be to completed by 2035. These include projects to add a vehicle lane in each direction and reconstruct interchanges along sections of I-5 in the Albany-Millersburg and Salem-Keizer areas, and on a section of I-205 south of Oregon City. Also included is a project to reconstruct the I-5 interchange in the Donald-Aurora area north of Woodburn.

LTD plans to expand their EmX BRT or enhanced bus service with five potential extensions currently in the planning process. These extensions would radiate outward from downtown Eugene to the north, south, northeast, and southeast.

Metro and Tri-Met are planning to expand the MAX LRT system with a new Southwest Corridor route from downtown Portland through Tigard to Tualatin.

The Port of Portland plans to upgrade the UPRR (east-west) Kenton Rail Line to add a second mainline track from Peninsula Junction to I-205 and increase track speeds between North Portland, Peninsula Junction, and Reynolds on this mainline track. The Port of Portland also plans the following port terminal projects:

- At Terminal 5, construct fourth rail loop, improvements on south side of roadway, and rail crossing improvements

- Grade separate Rivergate Lead at Rivergate Boulevard
- Construct a rail overcrossing on Marine Drive

As noted in Section 3.2.1.4, “Additional Projects,” three projects in Oregon are being developed under separate NEPA analyses. These projects are illustrated on Figure 3-1 and summarized below:

- Willbridge Crossovers: The project will replace the two main line crossovers with larger turnouts to reduce freight train congestion and allow passenger trains to cross over at a higher speed. Trains using the Willbridge Crossovers will be able to travel at speeds up to 40 miles per hour (mph), faster than the existing 10 mph for passenger trains.
- North Portland/Penn Junction: The project involves realignment of track predominantly within existing rail right-of-way (ROW) and on an active rail line. The Project proposes to upgrade the existing restrictive turnouts with larger turnouts and broaden the curves to allow trains to travel at increased speeds in this section of the railway (25 mph instead of the existing 10 mph).
- Eugene Stub Tracks: Provides additional storage track with provisions for power service at Eugene Station to allow the overnighting of Amtrak trains.

Each of these projects has independent utility and separate NEPA clearance documentation. Generally, the projects have minimal environmental impacts, because they are all minor improvements to existing rail infrastructure. Brief summaries of the associated environmental impacts follow.

- Willbridge Crossovers: All construction will occur within existing railroad ROW. There are no buildings, structures, parks, wetlands, or known cultural resources in the project area. The potential for encountering contaminated soils is low, because minimal excavations are planned for the project (no extensive and deep excavations that extend into native soils and/or below the groundwater table), and because there are no known hazardous materials sites within the project area. Appropriate local, state and Federal permits will be obtained prior to construction.
- North Portland/Penn Junction: The project would require the acquisition of approximately 0.10 acre of public ROW and would result in a wetland impact of approximately 0.27 acre due to placement of fill and construction of a retaining wall. The potential for encountering contaminated soils is low, because minimal excavations are planned for the project (no extensive and deep excavations that extend into native soils and/or below the groundwater table), and because there are no known hazardous materials sites within the project area. Appropriate local, state and Federal permits will be obtained prior to construction. The wetland impact will need to be mitigated, either on-site or via payment in lieu of replacement mitigation. ODOT has not yet determined the approach to mitigation, but will finalize an approach prior to construction.
- Eugene Stub Tracks: The project would close Lincoln Street in Eugene to facilitate crossover track, require acquisition of approximately 0.68 acres of private ROW, and result in some noise increase to receptors in the station area (due to start-up activities occurring at station instead of in rail yard). No impacts to buried archaeological resources are anticipated. A Phase II environmental site assessment is recommended during final design due to the potential for encountering hazardous materials during construction. Appropriate local, state and Federal permits will be obtained prior to construction.

4.18.5 Environmental Consequences

While the context of the OPR Project cumulative effects analysis is transportation-oriented, the past and anticipated future actions have a cumulative effect on most aspects of the natural, built, and socioeconomic environments. This cumulative effects analysis evaluates those resources that would experience potential effects from the build alternatives, and are presented in the same order in this analysis as they are previously in Chapter 4. In general, cumulative effects are linked to population growth, planned land development, and transportation system development including roadway and rail projects.

For multiple resources, cumulative effects are most likely to occur in areas where these conditions intersect with a build alternative with a new alignment outside of existing transportation corridors.

4.18.5.1 Impacts of No Action Alternative

Under the No Action Alternative, the OPR Project would not be built, and therefore cumulative impacts are not anticipated beyond those that could occur because of other public and private projects. The No Action Alternative would not provide the same level of intercity passenger rail service as the build alternatives, and would not result in transportation-related benefits in the study area between Eugene-Springfield and Portland that the build alternatives would provide. Without the increased capacity that the additional passenger rail service would provide under the build alternatives, a substantial portion of people who could use passenger rail would instead travel by using personal vehicles, private buses, airplanes, and Amtrak Thruway buses under the No Action Alternative. Each of these modes contribute to higher amounts of air pollution, GHG emissions, and energy use per capita when compared to intercity passenger rail travel within and through the OPR Project study area.

4.18.5.2 Impacts of Alternative 1 and Alternative 2

Due to the scale of analysis conducted for this Tier 1 EIS, unless otherwise noted, the potential cumulative impacts would be common to both Alternative 1 and Alternative 2, including the Alternative 2 with Central Albany Option.

Alternative 1 would be expected to contribute less to cumulative effects than Alternative 2, because the entire Alternative 1 route would remain within or immediately adjacent to an existing railroad alignment, predominantly using existing railroad tracks and portions of existing infrastructure. Alternative 2, with higher speed rail service on sections of new “greenfield” ROW and track would contribute more to cumulative effects because it would include construction of new facilities including stations, grade separations, and roadway modifications, and would be constructed in new alignments outside of existing transportation corridors.

The majority of impacts for both OPR Project build alternatives would be within or adjacent to existing transportation ROWs and in previously disturbed areas. Alternative 1 would utilize existing track, and improvements would be made within or adjacent to the existing Amtrak route on the UPRR alignment. Alternative 2, including Alternative 2 with Central Albany Option, would have a greater potential for cumulative impacts because of its new rail route. However, because much of the Alternative 2 alignment would be adjacent to existing transportation infrastructure, the potential for cumulative impacts would, in effect, be minimized. The Alternative 2 alignment would be constructed adjacent to the existing I-5 and I-205 freeways and adjacent to the existing PNWR line between Keizer and Wilsonville. North of Oregon City, improvements would be made to the existing UPRR alignment. Both build alternatives would also increase Amtrak Cascades passenger rail service from two to six daily round trips between Eugene and Portland.

Specific cumulative impacts, and therefore mitigation strategies to address the cumulative impacts, are not discernable at the level of analysis conducted for this Tier 1 EIS. Specific mitigation strategies would be considered during Tier 2 environmental studies.

The following subsections summarize the OPR Project’s potential cumulative impacts to each of the discipline and resource elements addressed in this Tier 1 EIS.

Transportation

Both OPR Project build alternatives would increase passenger rail services and reliability, and therefore some intercity trips would be expected to shift from other transportation modes to passenger rail. While this mode shift could slightly reduce congestion on study area roads and highways, such reductions would not be sufficient to accommodate all the estimated future intercity travel demands in the study area.

Table 3-3 in Chapter 3, Section 3.1.5 of this DEIS, as well as the Reasonably Foreseeable Actions narrative above, identify other transportation-related actions proposed for implementation within the study area over the next 20 years. These proposed projects and programs, when combined with the OPR Project, are likely to have a greater influence on the intercity movement of people and goods than the OPR Project could achieve on its own. Collectively, these transportation projects and programs are anticipated to result in cumulatively beneficial effects to intercity travel as a result of increased transportation options and capacity, strengthened transportation network resiliency, and improvements to transit services within the study area.

Near existing and proposed new stations, both build alternatives could result in increased vehicular and pedestrian traffic, which could contribute to local cumulative traffic impacts.

Land Use/Farmland

Past private and public actions have shaped where development has occurred in the study area and resulted in the conversion of undeveloped areas to urban uses. Since 1973, Oregon State Land Use Goal 3 has protected agricultural lands outside of UGBs by limiting what types of uses (non-farm uses) can occur on agricultural lands. However, the construction of reasonable build design alternatives for railroad mainline and branch lines on EFU-zoned land is an allowable transportation improvement consistent with Goal 3.

Where Alternatives 1 and 2 would be constructed within or adjacent to existing transportation ROWs, minimal adverse cumulative land use impacts are anticipated. OPR Project improvements constructed outside of existing transportation ROWs could result in cumulative impacts due to the bisection and/or isolation of farmlands. Proposed improvements outside existing ROW include most of Alternative 2 between Springfield and Salem.

Social/Environmental Justice

This Tier 1 EIS analysis does not include any quantitative analysis to determine whether any of the alternatives result in adverse impacts that are potentially disproportionately high and adverse to EJ populations. Alternative 1 improvements would be built within or adjacent to existing transportation ROWs and would use existing stations; therefore, no adverse cumulative impacts to social resources or EJ populations is anticipated. Because Alternative 2 would involve the construction of up to four new stations and some new railroad track outside of existing transportation ROWs, it has a relatively greater potential than Alternative 1 to adversely impact local social resources and EJ populations. However, on the whole, the majority of potential cumulative impacts to social resources and EJ populations would be considered to be beneficial rather than adverse for both build alternatives.

Economics

Historic population growth, along with the development of cities and economic activity areas, have established Class 1 railroads, interstates, and other major roads and transit systems as critical components of the Pacific Northwest region and the state of Oregon's economy. Potential cumulative effects on economic conditions would be expected to correspond to reasonably foreseeable land use development associated with the OPR Project. If a build alternative is not constructed, economic development planned for the study area could occur more slowly as development and activity near existing stations and proposed new stations would follow current trends associated with existing intercity passenger rail service between Eugene and Portland, along with planned development and transportation projects in the communities where station are located. Construction of either OPR Project build alternative, in combination with other future actions, is anticipated to result in economic growth through construction jobs and increased economic activities associated with improved passenger rail service.

Section 4(f) and Section 6(f) Resources

Section 4(f) of the USDOT Act of 1966 helps to minimize the adverse effects of transportation projects on resource lands and amenities, including impacts such as disruptions to access, and quality of the resources and their users' experiences from transportation projects. This protection reduces the potential for cumulative effects on public parks, recreation areas, wildlife and waterfowl refuges, and historic sites. Similarly, Section 6(f) protects parks and recreational areas acquired or developed with Land and Water Conservation Act funds from conversion to non-recreational uses.

Because most new railroad track for both build alternatives would be built within or adjacent to existing transportation ROWs, construction of new railroad track is not expected to adversely impact the features, attributes, or activities that qualify the resources for Section 4(f) projection. However, it is possible that Alternative 2 could contribute to cumulative Section 4(f) impacts through demolition of existing historic structures on or adjacent to sites of potential new stations. Because Section 6(f) requires replacement lands to be provided as mitigation for conversion of protected parks and recreational areas, neither build alternative would contribute to cumulative Section 6(f) impacts.

Visual Resources

Intrusions from existing and planned transportation infrastructure can gradually erode the views of distant mountain ranges, local topography, surface water, native prairies, and other notable features across the landscape. The OPR Project would be within or adjacent to developed transportation ROWs and in areas with occasional elevated structures and bridges. Alternative 1 is not anticipated to result in adverse cumulative impacts to visual resources because most of the proposed new track would be at-grade and the existing passenger rail stations would continue to be used.

Alternative 2, however, has the potential to result in adverse cumulative visual impacts. This alternative would require extensive new rail and supporting infrastructure parallel to large portions of I-5 and I-205, including new elevated bridge and viaduct structures, retaining walls, and reconstructed interchanges that would affect the visual setting beyond the extent of reasonably foreseeable actions in the study area. New stations associated with Alternative 2 and associated development that would potentially occur around them could dramatically alter the visual character of the affected areas.

Noise and Vibration

Because the OPR Project would be operated within or adjacent to existing transportation ROWs and mitigation would be required for noise and vibration impacts that exceed Federal standards, no adverse cumulative noise impacts are anticipated.

Hazardous Materials

Any hazardous material contamination sites that could be affected by infrastructure construction, including currently unknown sites discovered during construction, would be addressed and potentially remediated during Tier 2 of the OPR Project. Such remediation would have a beneficial cumulative effect by reducing local hazardous material contamination.

Cultural Resources

Land-disturbing actions have the potential to adversely affect archaeological sites and historic (built) properties, which could contribute to a cumulative loss of cultural resources. In particular, private developments on lands where cultural resources are relatively unprotected pose the greatest threat to these resources. Federally funded actions such as the OPR Project are subject to Section 106 of the NHPA and Section 4(f) of the 1966 DOT Act, and thus potentially affected cultural resources would be subject to avoidance, minimization of harm, data collection or other mitigation strategies. It is therefore unlikely that Alternative 1 would contribute to adverse cumulative impacts to cultural resources. However, Alternative 2 could contribute to adverse cumulative impacts to the existing NRHP-listed and NRHP-eligible historic (built) stations by removing these stations for passenger rail use.

Geology and Soils

Past and existing development has altered geologic and soil conditions within the OPR Project study area, especially in the urbanized areas. Alternative 1 would be constructed primarily within an existing railroad ROW and along relatively flat terrain; therefore, minimal cumulative impacts related to geology and soils are anticipated. Alternative 2 would be subject to greater geologic risks to new infrastructure because this it would include the construction of new bridges, elevated viaducts, cuts and fills through the hills south of Salem, and a cut-and-cover tunnel in Portland. However, this type of transportation project must be constructed to meet Federal, state, and local requirements regarding geologic and soil hazards. Therefore, adverse cumulative impacts concerning geology and soils are not anticipated.

Biological Resources

The cumulative effects of past human activities including deforestation, agriculture, over-fishing, urbanization and associated infrastructure, and hydroelectric, irrigation and flood control projects have contributed to substantial loss of biological habitat and a dramatic reduction in fish and wildlife throughout the Pacific Northwest, including the OPR study area. Land development, plus construction of roads, railroads, and highways have resulted in significant habitat destruction, changes in natural hydrologic flow patterns, and degradation of water, soil, vegetation, and air quality. Since the introduction of natural resources protection legislation in the 1960's, Federal, state, and local agencies have implemented conservation and protection measures to reduce further loss of critical habitat through requirements to avoid and minimize impacts, and to mitigate for unavoidable impacts to habitats and the species that depend upon them to survive.

Current Federal and state permit requirements are protective of biological resources through enforcement of standards for stormwater treatment and site development. While reasonably foreseeable future actions could result in unavoidable adverse impacts to biological habitats and species, they could also provide some beneficial effects through required mitigation. Alternative 2 would have the potential for greater cumulative biological resources impacts than Alternative 1, because its alignment would include at least six new river crossings, and it would convert more undeveloped land to new railroad infrastructure. Alternative 2 would also result in development of up to four new station areas (Alternative 2 with Central Albany Option would require three new station areas), with additional development in the vicinity of the new stations that could result in even greater potential impacts to biological resources.

Floodplains/Waterways

Past construction of transportation facilities within the central Willamette Valley has adversely affected floodplains and waterways within the OPR Project study area. These previous cumulative effects include, but are not limited to, floodplain encroachment, flood control systems, and realignment of waterways. Both build alternatives could result in further cumulative impacts to floodplains and waterways where new OPR Project infrastructure and other proposed developments are constructed. However, EO 11988 requires Federal actions to avoid and minimize floodplain impacts unless there is a practicable alternative. Alternative 2 would have the potential for greater cumulative floodplain and waterway impacts than Alternative 1, because its alignment would include at least six new river crossings.

Water Quality/Stormwater

Construction of the OPR Project, in conjunction with other proposed transportation projects, would not likely contribute to additional long-term cumulative impacts on water quality, because construction best management practices (required by the Clean Water Act) would be followed, and additional stormwater facilities would be constructed, as appropriate. Operation of the OPR Project is not anticipated to result in adverse cumulative impacts to water quality, and could actually result in beneficial improvements within the study area due to enhanced stormwater runoff control and current water quality treatment standards.

Wetlands

Past actions and developments have resulted in cumulative impacts to wetlands in the central Willamette Valley, including draining and conversion to farmland as well as other land uses. Early settlers drained the Willamette River floodplain wetlands for agriculture, and flood control modifications (including those to protect urban areas) have fundamentally altered the natural hydrologic dynamics of the river system and floodplain wetlands. Section 404 of the Clean Water Act requires that potential harm to wetlands be avoided and/or minimized, which reduces the potential for cumulative impacts to wetlands. Alternative 1 would be constructed within or adjacent to existing railroad ROW and thus would result in minimal cumulative impacts to wetlands. Due to its scope and the location of proposed new infrastructure, Alternative 2 poses a greater potential for further adverse cumulative impacts to wetlands than Alternative 1.

Air Quality

Construction of the OPR Project would have negligible air quality impacts due to best management practices that would be employed to minimize adverse impacts (e.g., emissions from heavy equipment and fugitive dust). In general, pollution emissions from road vehicles are trending downward as a result of more stringent air quality regulations and increasing use of electric, hybrid-fuel/electric, and other lower emissions vehicles at a national scale. Compared to gasoline and diesel road vehicles, passenger trains emit less air pollution per capita. Based on the combination of adding passenger rail service and current ridership projections that would shift some trips from road vehicles to rail, it is expected that implementation and operation of the OPR Project would result in slightly lower regional air emissions than the No Action Alternative, though the cumulative effect on air quality would not likely be discernable.

Energy/Climate Change

Construction of the OPR Project would cumulatively contribute to the consumption of non-renewable energy and the release of GHG emissions during construction. Because operation of the OPR Project would result increased passenger rail ridership (versus other travel modes with greater fuel consumption per passenger), the OPR Project would in effect create a long-term net energy benefit and reduced GHG emissions compared to the No Action Alternative. However, the combined energy consumption and GHG emission contributions of other future transportation projects would likely offset the beneficial cumulative effects attributable to the OPR Project.

4.19 Irreversible and Irretrievable Commitments of Resources

An assessment of the potential irreversible and irretrievable commitment of resources resulting from OPR Project implementation was conducted in accordance with the NEPA statute (42 USC 4332(C)(v)), CEQ's NEPA implementing procedures (40 CFR 1502.16), and FRA's Procedures for Considering Environmental Impacts (64 Federal Register 28585, Section 14, (n)(11) and (o)[26]).

Irreversible effects result primarily from the use or destruction of nonrenewable resources (e.g., fossil fuels, minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments typically involve the loss in availability or value of an affected resource that cannot be restored as a result of the action (e.g., use of renewable construction materials, expense of human labor).

4.19.1 Methods

Data gathered from the review of all applicable resources analyzed in this Tier 1 EIS were reviewed, notably the consumption of energy and construction materials, and disturbance of resources (including cultural

[26] Due to the conceptual design basis of this Tier 1 EIS, a summary of specific unavoidable adverse impacts and associated mitigation measures cannot be determined at this time and would be addressed in subsequent Tier 2 environmental studies.

resources, water resources, geology and soils, natural habitats and wildlife, wetlands, and threatened and endangered species). In addition, land uses anticipated to be converted to transportation improvements (i.e., railroad track and stations) were reviewed.

4.19.2 Affected Environment

Chapter 4 provides information on the built and natural elements within the respective study areas that the OPR Project could impact, temporarily and permanently, including farmland, commercial property, air quality and noise levels, parks, cultural resources, and biological resources such as wetlands and wildlife habitat. Materials and resources required for construction (for example, petroleum, concrete, ballast rock, and steel rails) are currently not in short supply and would likely be acquired from outside the OPR Project study area. The precise locations of these resources are not ascertainable at this time, but would be considered during subsequent Tier 2 environmental studies.

4.19.3 Impacts of No Action Alternative

No improvements would occur, and any new commitments of resources would not occur beyond those related to operation and maintenance of the Amtrak Cascades service and other planned transportation projects in the Willamette Valley. If passengers using the expanded rail service are using rail as a substitute for travel with other modes, future energy usage for automobiles, buses, and airplanes traveling between Eugene and Vancouver, WA, would be consumed at a slightly higher rate under the No Action Alternative relative to the build alternatives.

4.19.4 Impacts of Build Alternatives

4.19.4.1 Impacts Common to Build Alternatives

Construction of the build alternatives would result in the irretrievable commitment of land where new passenger rail infrastructure would convert existing land uses (including some agricultural lands, parklands, wetlands, and wildlife habitat) to a transportation-related use. The use of construction materials (for example, concrete, ballast rock, and wood) would constitute another irretrievable use of resources. Construction, operation, and maintenance of new passenger rail infrastructure would result in the irretrievable use of human labor as well as the irreversible commitment of mineral and energy resources (such as steel, fossil fuel, and electricity).

4.19.4.2 Alternative 1

No additional impacts are anticipated beyond those described above under “Impacts Common to All Build Alternatives.” The construction of Alternative 1 would be accomplished in incremental phases, therefore irreversible and irretrievable commitments of resources would occur more gradually than for Alternative 2.

4.19.4.3 Alternative 2

In addition to the “common impacts” described above, construction of Alternative 2 would involve a greater amount of passenger rail infrastructure (such as new stations, elevated structures, and bridges) and more lengthy sections of new railroad track outside of existing railroad rights-of-way than for Alternative 1. In addition, the improvements associated with Alternative 2 would present fewer opportunities for construction phasing and would require substantially more Federal and state funding as compared to Alternative 1. For these reasons, implementation of Alternative 2 would result in a considerably greater commitment of irreversible and irretrievable resources than would Alternative 1.

4.20 Short-Term Use vs. Long-Term Productivity of the Environment

An assessment of short-term uses of the environment versus maintenance and enhancement of long-term environmental productivity was conducted in accordance with the NEPA statute (42 USC 4332(C)(iv)), CEQ's NEPA implementing procedures (40 CFR 1502.16), and FRA's Procedures for Considering Environmental Impacts (64 Federal Register 28585, Section 14, (p)).

4.20.1 Methods

Short-term uses of the environment are generally associated with the construction phase(s) of a project, and could include local disturbances to the human and natural environment. Potential OPR Project construction impacts were reviewed for all applicable resources analyzed in this Tier 1 EIS. The short-term environmental uses were qualitatively assessed relative to long-term environmental productivity and transportation system benefits.

4.20.2 Affected Environment

The affected environment for this assessment is the same as described in section 4.20.2, above.

4.20.3 Impacts of No Action Alternative

The No Action Alternative would not increase short-term uses of the environment associated with the existing operation and maintenance of the Amtrak Cascades service. However, the No Action Alternative could have long-term adverse effects to the Willamette Valley transportation system because the forecast passenger rail travel demand would not be met. Fuel for transportation modes between Eugene and Portland would be consumed at a slightly higher rate than with implementation of the OPR Project, and there would be less transportation resiliency along this travel corridor.

4.20.4 Impacts of Build Alternatives

4.20.4.1 Impacts Common to Build Alternatives

Implementation of either build alternative would contribute to the attainment of long-term transportation and safety objectives at the expense of some short- and long-term environmental uses.

Short-term environmental uses would vary in degree and severity for each build alternative, but would generally be similar. These short-term impacts would include access and travel inconveniences, as well as temporary adverse construction impacts related to water and air quality, noise levels, visual quality, land use changes, and temporary disturbance of biological resources.

Short-term benefits to the human environment could include temporary local jobs and increased local revenue generated during construction activities.

The two build alternatives would be likely to adversely affect long-term environmental productivity as a result of wetland and floodplain impacts, increased noise and vibration levels, reduction of useable farmland and open spaces, cultural resources impacts, permanent visual effects, and the irrevocable use of concrete, steel, and energy.

The OPR Project is based in part on state and local comprehensive transportation planning efforts, which consider the need for near- and long-term mobility requirements within the context of present and future land use development. Accordingly, the two build alternatives would result in long-term benefits to the human environment by providing more frequent and reliable passenger rail service for the Oregon segment of the Pacific Northwest Rail Corridor as well as increased transportation system resiliency and safety for the Willamette Valley transportation system.

4.20.4.2 Alternative 1

No additional short-term environmental uses or impacts to long-term environmental productivity are anticipated beyond those described above under “Impacts Common to All Build Alternatives.” Alternative 1 construction activities would be conducted on a smaller overall scale and more incrementally with smaller and shorter-term durations than Alternative 2. Compared to Alternative 2, Alternative 1 would result in reduced short-term use vs. long-term effects for usable farmlands and open space, community and cultural resources, noise and vibration levels, visual effects, and impacts to floodplains, water quality/stormwater, and wetlands. Therefore, short-term environmental uses and adverse impacts to long-term environmental productivity would generally be less severe and would occur more gradually than for Alternative 2.

4.20.4.3 Alternative 2

Alternative 2 would involve a greater amount of passenger rail infrastructure (such as new stations, elevated structures, and bridges) and more lengthy sections of new railroad track outside of existing railroad rights-of-way than for Alternative 1. As a result, construction of Alternative 2 would create more short-term uses of the natural environment and more short-term benefits to the human environment compared to Alternative 1. Limited construction phasing opportunities for Alternative 2 would intensify these short-term effects. Implementation of Alternative 2 would also cause more severe adverse impacts to long-term environmental productivity relative to Alternative 1.

Compared to Alternative 1, Alternative 2 would provide a greater long-term transportation benefit in the context of progress towards a future dedicated passenger rail alignment that could potentially accommodate higher train speeds and more frequent trips.

4.21 Permits and Approvals

Transportation projects must comply with Federal, state, and local environmental laws and regulations, permits, reviews, notifications, consultation, and other approvals. Table 4.21-1 lists the permits that may be required for the Oregon Passenger Rail Project, based on the Tier 1 EIS conceptual level of design. A refined list of permits and approvals would need to be developed for any Tier 2 NEPA processes to implement design-level projects that may emerge subsequent to completion of Tier 1 NEPA.

Table 4.21-1. Permits Potentially Required for Construction of the Oregon Passenger Rail Project

Agency	Permit
FEDERAL	
Federal Emergency Management Agency (FEMA)	Conditional Letter of Map Revision or Letter of Map Revision for changes in flood elevation
National Marine Fisheries Service	ESA Section 7 Consultation
National Surface Transportation Board	NEPA Consultation
U.S. Army Corps of Engineers	• Clean Water Act, Section 401 Water Quality Certification • Clean Water Act, Section 402 Water Quality Certification • Clean Water Act, Section 404 • Rivers and Harbors Act, Section 10
U.S. Coast Guard	General Bridge Act Section 9 permit
U.S. Environmental Protection Agency	• Review of environmental justice conclusions • General air quality conformity conclusions
U.S. Department of Transportation/Federal Railroad Administration	U.S. Department of Transportation Act Section 4(f) evaluation and approval

Agency	Permit
U.S. Fish and Wildlife Services	ESA Section 7 Consultation
STATE	
Oregon Department of Environmental Quality	NPDES 1200-C / 1200-CA; a CWA 401 Certification
Oregon Department of Fish and Wildlife	ODFW Fish Passage Permit.
Oregon Department of State Lands	Oregon Department of State Lands Removal/Fill Permit.
ODOT Motor Carrier Division	Oversize/overweight vehicle authorization
Oregon State Historic Preservation Office	• National Historic Preservation Act Section 106 Consultation • Archeological excavation approval
LOCAL	
Lane County	Indirect Source Construction Permit (ISCP)
Various Affected Local Agencies	• NPDES MS4 permits • Rights of Entry to private property • Statewide Planning Goal Exceptions (Goal 3; Goal 5, Goal 15) • Floodplain permits • Stormwater permits • Historic review approvals

4.22 Preferred Alternative

During the OPR Project scoping process, ODOT conducted an open, interactive process (see Chapter 5) to develop the Project Purpose and Need as well as high-level goals and objectives (see Chapter 2). The OPR Project goals and objectives were then used to develop an evaluation framework, which served as the basis for the analysis of corridor concepts and preliminary alternatives, as well as the identification of the Preferred Alternative. Based on the analysis conducted to date, ODOT has identified Alternative 1 as the Preferred Alternative. The key differentiating factors for this recommendation are listed below.

Chapter 4, sections 4.1 through 4.22, describes the potential environmental consequences of the No Action Alternative and the build alternatives. Based on analysis of the performance of the build alternatives for each of the goals and objectives established for the OPR Project and the potential environmental consequences, ODOT found the following differentiators between the alternatives for each relevant evaluation criteria:

- **Provide a viable alternative to auto, air and bus travel between Eugene, OR, and Vancouver, WA:** Alternative 2 would provide an 18-minute travel time savings compared to Alternative 1 and a 33-minute travel time savings compared to the No Action Alternative. However, as noted below, this travel time savings does not result in higher ridership for Alternative 2. Reliability would substantially increase from current conditions under both build alternatives. Both build alternatives would align schedules with the state of Washington passenger rail.
- **Provide reliable and frequent passenger rail service:** The build alternatives greatly outperform the No Action Alternative in terms of ridership, and Alternative 1 shows slightly higher projected ridership than Alternative 2 (approximately 6.25 percent), despite slower anticipated travel times. 2035 annual ridership is projected at 390,000 for the No Action Alternative, 739,000 for Alternative 1, and 723,000 for Alternative 2. Both build alternatives provide the capacity to serve six round trip trains per day between Eugene and Portland.
- **Support multimodal integration at each potential passenger rail station:** More people and jobs are potentially served with Alternative 1, because the existing stations are located in existing urban and employment centers. These station locations are currently connected to the community via pedestrian

and bike facilities, and existing transit services. Alternative 2 stations near I-5 would exhibit lower ridership due to lack of development at the station areas and a reliance on park-and-ride trips. In addition, new pedestrian and bike facilities, and new transit services would presumably be required to be extended to these new stations to increase multimodal integration. The Central Albany Option would increase the potential of Alternative 2 potential to support multimodal integration.

- **Allow for future passenger rail improvements, including higher speeds:** Alternative 2 (120 mph maximum) could support higher maximum speeds than Alternative 1 (79 mph maximum) on portions of the new alignment. Both build alternatives allow for future passenger rail improvements.
- **Do not increase conflicts between passenger rail and/or freight rail and vehicles:** Neither build alternative increases conflicts between passenger/freight rail and vehicles. However, Alternative 2 would have far fewer existing at-grade crossings (up to 33 existing crossings) than Alternative 1 (148 existing crossings). ODOT and UPRR plan to close two of the 148 existing at-grade crossings for Alternative 1.
- **Phasing of improvements:** Alternative 1 could be built in phases, potentially in reasonably fundable segments. Alternative 2 would have to be built in large sections. In addition, Alternative 2 improvements would have to be made on the current No Action Alternative/Alternative 1 alignment to allow additional round trips if the full Alternative 2 alignment was not ready for operation. Those improvements would benefit freight rail, but would not benefit passenger service after Alternative 2 is completed.
- **Construction costs:** The cost of Alternative 2 is estimated to be more than four times higher than Alternative 1. Capital costs for Alternative 1 would be $870 million to $1,025 million, and capital costs for Alternative 2 would be $3.622 billion to $4.442 billion.
- **Serve the maximum number of people with every dollar invested:** The capital cost per new rider would be five times higher for Alternative 2 than for Alternative 1. The annual O&M costs would be $48 million for Alternative 1 and $51.5 million for Alternative 2.
- **Environmental Justice (EJ) impacts:** Alternative 2 could have greater impacts to EJ populations than Alternative 1. With Alternative 2, much of the new railroad alignment would be constructed through rural agricultural areas with lower overall populations, but containing EJ populations, and in a few urban areas along I-5. Although much of Alternative 2 would be built next to existing transportation corridors that already are barriers in the respective communities, it could further impact social cohesion through the addition of a new barrier in the community. Construction of proposed new stations in Alternative 2 could have negative EJ impacts related to potential business and residential displacements, and reduced mobility around proposed station areas that exhibit higher concentrations of minority and low-income groups. Because the double-track portions of Alternative 1 would be constructed adjacent to an existing railroad alignment, social cohesion issues related to community resources used by EJ or LEP populations are not anticipated, because the communities have historically adapted and built around the existing UPRR and BNSF rail lines. However, these rail lines would continue to be a barrier in communities along the alignment.
- **Benefit communities within the corridor:** Alternative 1 would have more employment density and development near the station locations. Alternative 1 would use existing Amtrak stations, which generally are located in or near downtown areas. With the exception of Portland and Albany in the Alternative 2 with Central Albany Option, Alternative 2 would include new stations that are located outside downtown areas. Alternative 1 would provide access to 180,905 jobs and 74,385 people living near the station areas, while Alternative 2 would provide access to 123,145 jobs and 65,215 people living near the station areas.
- **Impacts to sensitive noise receptors along the corridor:** Overall, more potentially sensitive noise and vibration land uses are located within incorporated areas than within unincorporated areas. Because

the Alternative 1 noise study area contains more incorporated areas than Alternative 2, Alternative 1 would have a higher relative potential to impact noise and vibration sensitive land uses. A slightly higher proportion of lands in the Alternative 1 noise study area are designated for residential uses than in Alternative 2. Therefore, Alternative 1 would have a higher potential for residential noise impacts. Finally, substantially more institutional land uses (parks/open spaces, schools, libraries, places of worship, cemeteries, museums, hospitals, and community centers) were identified within the Alternative 1 noise study area than within the Alternative 2 noise study area.

- **Farmland impacts:** Alternative 1 would have less potential overall impact on farmland because of its reliance on existing right-of-way (ROW). Alternative 2 would have greater potential impact farmland, because it would create new rail ROW on farmland.
- **Impacts to the Willamette River Greenway:** Alternative 1 would not require new Willamette River crossings, while Alternative 2 would result in three new crossings of the Willamette River. Goal 15 of the Oregon Statewide Planning Goals aims to protect, conserve, enhance, and maintain the quality of land along the Willamette River. The Alternative 2 crossings would likely require an exception through a local plan amendment process.
- **Threatened and Endangered species impacts:** Overall, Alternative 1 would be expected to have less of an impact on threatened and endangered species than Alternative 2. Alternative 1 would have a smaller construction footprint and shorter construction duration than Alternative 2. The Alternative 1 study area has the highest number of known locations of special status species. There is, however, only one known location of a Federally listed species, Nelson’s sidalcea (*Sidalcea nelsoniana*) within the direct impacts study area. Alternative 1 has less potential than Alternative 2 to directly impact natural wildlife habitats generally and Oregon Conservation Strategy (OCS) habitats specifically. Alternative 1 has less potential to directly impact wildlife linkages than Alternative 2. Alternative 1 has approximately 1.8 acres of conservation easements, while Alternative 2 has approximately 2.8 acres, and Alternative 2 with Central Albany Option has no conservation easements. Using new stream crossings as an indicator for potential impacts to aquatic resources, Alternative 1 has less potential than Alternative 2 to directly impact streams, because Alternative 1 could impact 10 streams with protected fish and Alternative 2 could impact 22 streams.
- **Wetland impacts:** Alternative 1 would likely have considerably fewer impacts on wetlands and waterways than Alternative 2. Alternative 1 would have the lowest potential direct impacts, both in terms of overall wetland acreage and acres of high-value wetlands (32 acres and 7 acres, respectively, for Alternative 1, compared with 144 acres and 49 acres, respectively, for Alternative 2). The amount of hydric soils (excluding areas mapped as wetland) within the Alternative 1 direct impact study area is a little less than half that of Alternative 2 (378 and 818 acres, respectively). Therefore, Alternative 2 would have a notably larger potential direct impact on wetland and waterway resources.
- **Geology impacts:** Alternative 1 would have fewer geology-related impacts than Alternative 2. Alternative 1 would be constructed within and parallel to an existing rail alignment; therefore, limited earthwork is anticipated. No large fills would be required, so settlement because of compressible soil is expected to be minimal. Alternative 2 would require considerably more earthwork than Alternative 1. Fills placed in areas with compressible soil, historic landfills, or unconsolidated debris flow fans would need to be evaluated for settlement; mitigation could be required if the anticipated settlement could not be accommodated. Several rock cuts would be required along the alignment, and multiple cuts alternating with viaduct structures would be required between Turner and Salem.
- **Section 4(f) impacts:** Alternative 1 would likely have fewer impacts to Section 4(f) resources than Alternative 2. Alternative 1 would result in potential direct impacts on 10 Section 4(f) parks/recreation resources, whereas Alternative 2 would result in potential direct impacts on 18 (19) Section 4(f) parks/recreation resources. According to this high-level assessment, neither build alternative would

result in an impact upon a Section 4(f) park/recreation resource that would be greater than *de minimis* in nature.

- Alternative 1 has more historic properties (48 NRHP-listed or NRHP-eligible historic [built] properties adjacent to proposed new track than Alternative 2, which has 33 [37 for Alternative 2 with Central Albany Option] properties). However, with Alternative 1, most ROW acquisition from historic properties would consist of linear strips of unimproved property, although removal of historic properties is possible. Alternative 2 has a greater potential for demolition of historic (built) properties, particularly near proposed new stations and the cut-and-cover tunnel. Alternative 2 would also result in existing historic passenger rail stations (in Eugene, Albany [except the Central Albany Option], Salem, and Oregon City) being taken out of their historic and current use, and replaced with new stations in other locations.

- **Archaeological resources impacts:** Alternative 1 would likely have a slightly lesser impact related to archaeological resources. Eight known archaeological sites are within the No Action Alternative/ Alternative 1 APE, and 10 known sites are within the Alternative 2 APE.

CHAPTER 5

Public Involvement, Outreach, and Coordination

This chapter summarizes the public and agency involvement, outreach, and coordination that occurred for the Oregon Passenger Rail (OPR) Project (Project). Stakeholder outreach and input were key components of the Project. The Project included an extensive public involvement component to ensure that needs and concerns of interested parties and stakeholders informed project decisions. For more information on the public involvement program, see the *Oregon Passenger Rail Project Public Involvement and Communication Plan* (Oregon Department of Transportation [ODOT], 2016e).

5.1 Public Outreach Overview

The National Environmental Policy Act (NEPA) public involvement process for the Project was designed to solicit early and frequent coordination with interested parties, stakeholders, government agencies, and Tribes to facilitate their input on Project purpose and scope; alternatives development; screening, key issues, and concerns; and criteria for the decision-making process. Input received during the public involvement process helped to shape the development of the Project's purpose and need; goals and objectives; screening and evaluation framework; and alternatives development and screening process.

The purpose of the public involvement, outreach, and coordination component of the decision-making process was to share information and gather input on the needs and issues of the communities and stakeholders in the Project corridor. The public involvement process included the following goals:

- Communicate complete, accurate, understandable, and timely information to the public throughout the Project
- Actively seek public input throughout the Project
- Provide meaningful public involvement opportunities and demonstrate how input has influenced the process
- Seek participation of all potentially affected and/or interested individuals, communities, and organizations
- Seek participation of Civil Rights Act of 1964 Title VI/Environmental Justice groups, including disabled, low-income, limited English proficiency, minority or other underserved groups in the Project area.
- Ensure that the public involvement process is consistent with applicable state and Federal laws and requirements, and is sensitive to local policies, goals, and objectives

The public and agency involvement process for the Project has occurred in multiple phases, including scoping; alternatives development and screening; and the preferred alternative identification. Public involvement will continue through the Draft and Final Environmental Impact Statement (EIS) process and the Record of Decision. In addition, public meetings and an online open house associated with the publication of the Draft EIS will be held. Dates for the public meetings can be found on the project website, http://www.oregonpassengerrail.org.

5.2 Outreach Activities and Tools

The ODOT public involvement team implemented a number of communication tools and materials to make the information widely available to attain high levels of public participation and input during the planning process. The team updated the information regularly to ensure provision of the latest information on the

Project. ODOT ensured targeted outreach efforts to minority populations by providing key project information in Spanish, reaching out to community-based organizations, using ethnic news media sources, and having interpreters at meetings.

The public involvement team used the following activities and tools:

- **Stakeholder Database.** The stakeholder database included potentially impacted parties, interested parties, and past meeting attendees. The team regularly updated the database, and it served as the main contact list for all mailings and outreach materials.
- **Comment Database.** ODOT's public involvement team logged and analyzed all public comments and coordinated responses to comments using a comment collection database.
- **Community and Jurisdictional Briefings.** ODOT met with local jurisdictions and community groups to discuss the Project and collect input. These briefings provided an opportunity to meet with stakeholders and discuss issues specific to a region or community. ODOT has a list of these organizations and a summary of key outcomes from these briefings that are available upon request.
- **Individual Communications.** ODOT held briefings with stakeholders and officials upon request to share information and collect input. Examples of these communications included attending neighborhood association meetings and City Council meetings.
- **Fact Sheets/Newsletters.** To date, six fact sheets were prepared to support open houses, committee meetings, and community briefings in Summer 2012, Fall 2012, Summer 2013, Fall 2013, Summer 2014, and Summer 2015. The team produced and distributed a newsletter before each round of open houses to share information and invite participation. To date, the team developed and distributed four newsletters including in Summer 2012, Winter 2012, Fall 2013, and Fall 2015.
- **News Media.** ODOT sent out news releases before open houses and committee meetings and at other key milestones. ODOT purchased print and radio advertisements with English and Spanish language media outlets to promote open houses.
- **Open Houses/Online Open Houses.** ODOT used open houses to share information with the public in the Project corridor, and to gather feedback and opinions. ODOT posted materials and displays from the open houses on the Project website. Additionally, during each public open house, ODOT conducted an online open house to engage individuals who might not attend in-person open houses. The online open houses included Project information and videos, and provided the same opportunities for comment as the in-person open houses. ODOT held one online open house that was not associated with an in-person open house from November 2 – 22, 2015 as additional public outreach.
- **Community Events.** ODOT hosted information booths at community events (such as farmers' markets, athletic events, and seasonal festivals) to provide one-on-one opportunities to talk about the Project and get feedback from the public. ODOT has a list of these community events that is available upon request.
- **Project Website/Social Media.** The Project website, www.OregonPassengerRail.org, was the primary portal for public information. The site included a Project description, copies of Project materials, and contact information for Project staff. ODOT announced upcoming meetings on the Project website, and posted materials in advance of each meeting. The Project website contained an online comment form where the public could share thoughts and ideas at any time. The Project used the ODOT Facebook page and Twitter feed. In addition, ODOT encouraged jurisdictions and community organizations in the Project area to post information about the Project on their own social media pages at key outreach points. ODOT produced a Project overview video in the early stages of the Project raised awareness of the Project. The video was featured on the Project website and was integrated into online open houses. Additional shorter videos were created to support the online open houses. In addition, some key Project committee meetings have been video-recorded.

5.3 Stakeholder Coordination Overview

The Federal Railroad Administration (FRA) and ODOT have coordinated interagency meetings and other activities to collect input from interested agencies. These meetings and activities have helped to inform the development of Project alternatives. Agency involvement was also encouraged during the scoping process. At the beginning of the environmental review process prior to scoping, FRA and ODOT invited agencies to participate, where appropriate, in the Project.

5.3.1 Cooperating Agencies

FRA and ODOT assessed agency interest in the Project through comments submitted to ODOT during the scoping period. They used the information to identify potential cooperating agencies, but no agencies participated as cooperating agencies for the OPR Project. The roles and responsibilities of cooperating agencies include, but are not limited to:

- Identifying, as early as practicable, any issues of concerns regarding the Project’s potential environmental or socioeconomic impacts
- Providing contemporary information relevant to the analysis of potential impacts on the built and natural environments
- Providing meaningful and timely input on unresolved issues
- Reviewing and providing comments on the Tier 1 Draft EIS and the preferred alternative

5.3.2 Regulatory Agencies

In the interest of efficiencies in Project development and coordination with regulatory agencies, in 2001 ODOT established a collaborative process and structure to work with state and Federal regulatory agencies. The Collaborative Environmental and Transportation Agreement for Streamlining (CETAS) established a working relationship between ODOT and 10 Federal and state transportation, natural resource, cultural resource, and land use planning agencies for Federal Highway Administration (FHWA) projects.

5.3.2.1 State Agencies

- Oregon Department of Land Conservation and Development (DLCD)
- Oregon Department of Environmental Quality (DEQ)
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Department of State Lands (DSL)
- Oregon Parks and Recreation Department’s State Historic Preservation Office (SHPO)

5.3.2.2 Federal Agencies

- Federal Highway Administration (FHWA)
- National Marine Fisheries Service (NMFS)
- United States Army Corps of Engineers (USACE)
- United States Environmental Protection Agency (EPA)
- United States Fish and Wildlife Services (USFWS)

Although FRA did not participate in the CETAS agreement, and the CETAS process has not applied to FRA-supported projects in Oregon, ODOT chose to use the CETAS meeting on October 12, 2012, to inform and seek OPR Project scoping comments from these Federal and state resource agency representatives.

After the meeting, CETAS representatives invited ODOT to continue to attend CETAS meetings periodically to inform and update Federal and state agencies related to the OPR Project.

5.3.2.3 Tribal Outreach and Coordination

At the beginning of the scoping process, ODOT identified the following Tribes with potential interest in the Project because of historic presence or treaty interest in the Project area:

- Cowlitz Indian Tribe
- Nez Perce Tribe
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Umatilla Reservation
- Confederated Tribes of the Grand Ronde Community
- Confederated Tribes of the Warm Springs Reservation
- Confederated Tribes of Siletz Indians

FRA sent letters to the Tribes initiating the government-to-government consultation. FRA and ODOT continue to consult with the Tribes throughout the Project to provide information related to any potential impacts that could affect the Tribes.

5.3.3 Committees

ODOT formed three committees that advised, and will continue to advise, ODOT throughout the Project. These committees played an important part in project development and included a Leadership Council, a Corridor Forum, and Community Advisory Groups.

5.3.3.1 Leadership Council

Governor John Kitzhaber established the Leadership Council to guide the Project and develop recommendations for ODOT to submit to FRA for FRA's consideration. The Leadership Council is a core advisory group composed mostly of elected officials from the Willamette Valley. ODOT requested this group's recommendations and input throughout the process.

5.3.3.2 Corridor Forum

ODOT created a Corridor Forum group to engage potentially affected jurisdictions within the Project. The Corridor Forum included 49 members composed of directors and elected representatives from 21 cities, 5 counties, 6 regional governments, 4 transit agencies, and representatives of other state and Federal agencies and statewide interest groups. The Corridor Forum identified and explored broad-level issues, opportunities, and viable options for balancing the broad range of interests in the corridor. This group provided input to the Leadership Council.

5.3.3.3 Community Advisory Groups

Community Advisory Groups considered local issues and provided input to the Corridor Forum and Leadership Council. The purpose of these geographically-based groups was to provide local stakeholders with an opportunity to identify issues that helped shape alignment options in their area of the Project. Community Advisory Groups were active in the six major communities in the Project study area:

- Portland metro
- South Portland metro
- Salem-Keizer

- Albany-Corvallis
- Eugene-Springfield
- Rural Project area

5.3.4 Title VI and Environmental Justice

Title VI and environmental justice populations include minority populations, low-income populations, elderly populations, persons with disabilities, and limited English proficiency (LEP) populations. Chapter 4, Section 4.5 provides information on Title VI and environmental justice populations.

Outreach has included means to ensure effective communication with LEP, minority, and low-income populations. These means included providing translated materials online, and at community meetings and gatherings; having interpreters available upon request at public meetings; advertising in ethnic media; relaying information through agencies; and hosting project information booths in the community at a variety of locations (including one that had a Spanish-language Interpreter). These methods allowed better reach within the different communities in the Project corridor to involve people. In addition, public meetings were noticed with standard Federal language regarding accommodations and access for people with disabilities, and were held in Americans with Disabilities Act (ADA)-accessible locations and, to the extent possible, transit-accessible locations.

5.3.5 Section 106 Coordination

Chapter 4, Section 4.11, discusses the Section 106 of the National Historic Preservation Act of 1966 (Section 106) process for reviewing and protecting historic and archaeological resources. The process requires the identification of "consulting parties." FRA and ODOT were required to reach out to and involve these consulting parties in the program development process. Consulting parties often include SHPOs, Tribal historic preservation officers (THPOs), Native American Tribes, representatives of local governments, and individuals and organizations with a demonstrated interest in the Project's effects on historic properties.

FRA invited Tribes with potential interest in the Project because of historic presence or treaty interest in the Project area to participate in government-to-government consultation, pursuant to Section 106. On September 20, 2012, FRA sent a letter to these Tribes that:

- Offered FRA and ODOT resources for formal government-to-government consultation at the request of the Tribes to ensure that Tribes are kept informed as the Project progresses and new information becomes available
- Requested concerns for locations of traditional or cultural significance to incorporate into the cultural resources survey work
- Provided an opportunity for participation in the process to identify cultural resources, effects of the Project on significant resources, and resolution of any adverse effects that might result from the proposed action
- Requested the primary contact information for Tribal consultation and the method of consultation with each Tribe for this Project

Tribal outreach will continue throughout the duration of the Project. As appropriate, ODOT will arrange meetings to discuss the Project with Tribal representatives and/or provide Project documentation pertaining to Tribal interests for review.

5.4 Agency and Public Scoping Process

The agency and public scoping process for the Project was initiated on August 17, 2012, with the publication of a Notice of Intent to prepare an EIS in the *Federal Register*. Agency outreach and coordination occurred throughout the development of this Draft EIS, beginning with agency scoping and followed by additional meetings with local and regulatory agencies. These activities are described in the following subsections. The scoping process followed for the project is detailed in the project's Scoping Report (ODOT and FRA, 2013).

5.4.1 Agency Scoping Meetings

ODOT and FRA held three agency scoping meetings in September 2012 (Table 5-1) for Federal and state regulation agencies, metropolitan planning organizations, counties, cities, transit districts, school districts, and police and fire districts. ODOT sent invitation letters by email. These email messages also included an attachment and links to the Project website with information related to the Project. A reminder email was sent about 2 weeks after the initial invitation. In addition to the agencies noted, ODOT sent a Tribal scoping invitation letter by email inviting the Tribes to one of the three agency scoping meetings or one of the six public scoping meetings. That invitation letter also invited the Tribes to request their own meeting with the ODOT Project team.

Table 5-1. Agency Scoping Meetings

Date/Time	Location
Tuesday, September 18, 2012 2:30 to 4:00 p.m.	Basement Training Room, Multnomah County Building 501 SE Hawthorne Boulevard Portland, Oregon
Wednesday, September 19, 2012 2:30 to 4:00 p.m.	McLane Conference Room, ODOT Springfield Office 644 A Street Springfield, Oregon
Wednesday, September 26, 2012 2:30 to 4:00 p.m.	Gail L. Achterman Commission Room, ODOT Transportation Building 355 Capitol Street NE Salem, Oregon

Twenty-eight agency representatives attended the meetings. No Tribal representatives attended the meetings. Attendees received a handout with materials related to the Project, and there were stations where attendees could provide input related to the Project. Each meeting had a 30-minute presentation about the Project that included information on the purpose and need, the Project overview and context, the Tier 1 EIS process and what was to be studied, and the next steps. A 60-minute session of questions, answers, and discussion followed the presentation. ODOT encouraged comments and suggestions at the meetings to ensure that key issues and concerns related to the proposed action were identified.

5.4.2 Other Stakeholder Scoping Meetings

ODOT conducted a number of other meetings during the scoping period to introduce agencies to the Project, receive input related to the scope of the Project, and answer questions.

5.4.2.1 CETAS Meetings

In addition to the agency meetings listed in Section 6.4.1, ODOT presented Project scoping information to seven Federal and state resource agency representatives at a CETAS meeting on October 16, 2012. The presentation was consistent with the material presented at the three previous agency scoping meetings.

5.4.2.2 Railroad Coordination

ODOT met with railroad stakeholders in the study area during the scoping period to inform these stakeholders of the process, key elements, schedule, and data input needed for the Project. These meetings also provided an opportunity for the railroad stakeholders to comment on the Project to assist in the development of the scope of the Project. The ODOT project team met with the following railroad stakeholders during the scoping period:

- Union Pacific Railroad (September 4, 2012);
- Port of Portland (September 11, 2012);
- BNSF Railway (September 12, 2012);
- Portland & Western Railroad (September 12, 2012);
- Albany & Eastern Railroad (October 1, 2012);
- Portland Terminal Railroad (October 2, 2012);
- Port of Coos Bay, owner of Coos Bay Rail Link (October 9, 2012);
- Port of Vancouver (October 12, 2012); and
- Amtrak (October 19, 2012). meetings

During the meetings, the railroad stakeholders identified the following:

- Issues, questions, and concerns about the Project related to their facilities or interests
- Railroad engineering and operation constraints that could affect the development of concepts and alternatives
- Limits on the type or amount of railroad information and data that can be shared
- Other railroad stakeholders, including existing shippers
- The decision-making process within their organizations and the process to request data
- Other existing or future planned major projects within the study area
- The potential need for operating agreements with ODOT in future phases of the Project
- The level of Project engagement and the primary contact for each railroad or railroad stakeholder for future Project coordination

Meeting minutes from the coordination meetings are included in the Scoping Report (ODOT and FRA, 2013). ODOT coordination with railroad stakeholders continued throughout the Project to assist in the development and screening of Project concepts and alternatives.

5.4.2.3 Eugene-Springfield Area Meeting

Local jurisdictions in the Eugene-Springfield area requested that ODOT conduct a second agency scoping meeting in the Eugene-Springfield area for the Project. At the request of these agencies, ODOT attended a regularly scheduled Lane Council of Governments (LCOG) Metropolitan Planning Organization (MPO) Transportation Advisory Subcommittee on October 18, 2012. Approximately eight agency representatives from the Eugene-Springfield area attended this meeting.

5.4.2.4 Corridor Forum

On September 25, 2012, ODOT held a Corridor Forum meeting at the Oregon State Fairgrounds. The Corridor Forum was composed of directors and elected representatives from cities, counties, and other key agencies and stakeholders in the Project study area. At this meeting, members provided feedback on the Draft Purpose and Need statement, and provided ideas on alignment alternatives.

5.4.2.5 Presentations

ODOT presented information about the Project to various organizations and jurisdictions during the scoping phase in Fall 2012, and provided these groups with an opportunity to ask questions and make comments about the Project. The groups included the following:

- Clackamas County Coordination Committee (September 6, 2012)
- Tigard Chamber of Commerce (September 6, 2012)
- Mid-Willamette Valley Area Commission on Transportation (October 4, 2012)
- Corvallis Area Metropolitan Planning Organization Policy Board (October 10, 2012)
- Eugene Chamber of Commerce, Local Government Affairs Council (October 19, 2012)
- Cascade West Area Commission on Transportation (October 25, 2012)
- Springfield Chamber of Commerce Gateway Development Committee (October 26, 2012)
- Portland Metro Transportation Policy Alternatives Committee (October 26, 2012)

5.4.3 Public Scoping Meetings, Outreach, and Coordination

ODOT sought input from stakeholders and the public related to the scoping process using open houses, an online open house, and community advisory group meetings. ODOT held six public scoping meetings for the Project (Table 5-2). The purpose of these scoping meetings was to:

- Introduce the Project and the Project development process
- Review preliminary Project information, including the Draft Purpose and Need statement
- Seek input on the scope of the Project, including potential rail alignment alternatives
- Solicit stakeholder issues, and ask for their input to assist with developing the Project goals and objectives

Table 5-2. Public Scoping Meetings

Date	Location	Approximate Number of Attendees
September 6, 2012 5:00 to 7:00 p.m.	ODOT Transportation Building 355 Capitol Street NE, Salem	55
September 11, 2012 5:00 to 7:00 p.m.	Clackamas Community College 19600 Molalla Avenue, Oregon City	35
September 12, 2012 5:00 to 7:00 p.m.	Albany Public Library 2450 14th Avenue SE, Albany	45
September 13, 2012 5:00 to 7:00 p.m.	Phoenix Inn 14905 Bangy Road, Lake Oswego	55
September 18, 2012 5:00 to 7:00 p.m.	Metro Council Chambers 600 NE Grand Avenue, Portland	60
September 19, 2012 5:00 to 7:00 p.m.	Atrium Building 99 West 10th Avenue, Eugene	75

The public scoping meetings were held in cities located throughout the study area and lasted 2 hours. Approximately 325 people attended the scoping meetings. Spanish-language interpretation services were available at each public scoping meeting; however, there were no requests for interpretation.

The public scoping meetings were drop-in-style open houses that included six stations to offer information on specific topics and provide opportunities for the public to get involved. Those who attended were provided with Project handouts and a comment form. The public was encouraged to participate by providing comments on the purpose and need and routes.

The public was notified about the meetings through various means: email messages and newsletters to those in the stakeholder database, information posted on the Project website, news releases and interviews with various newspapers and radio stations in the Project area, postings in the newsletters and online calendars of cities and jurisdictions, and newspaper advertisements.

During the scoping process, ODOT participated in eight community events during the summer and fall of 2012 as listed in Table 5-3. At these events, ODOT provided information about the Project, collected comments and concerns in the early scoping phase, and invited people to the open houses.

5.4.3.1 Online Scoping Meeting

In addition to the in-person public scoping meetings described above, ODOT hosted an online public scoping meeting, which allowed people to learn about the Project and provide their comments online at their convenience. Eighty-four members of the public visited the online public scoping meeting that ran from September 6 to 23, 2012. The online meeting included several videos that provided Project background and context, and that helped guide participants through the online open house tools. The meeting used the same stations and display board language as the in-person scoping meetings, and provided additional features to solicit feedback from participants, including the following:

- Online sticky wall. Participants were able to post short messages. This section received 64 comments.
- Online comment map. An interactive map featured Project options being considered at the time. Participants could use the map to provide location-specific comments and suggestions for additional concepts, to which other users could respond. This section received 49 comments.
- Online comment form. The online public scoping meeting used the same comment form that was available at the in-person public scoping meetings that could be completed and submitted online. Twenty-three comments were submitted using the online form.

5.4.4 Scoping Comment Summary

During the scoping phase, ODOT received approximately 800 public comments from outreach at community events, public scoping meetings, online public scoping meetings, email messages, and phone calls. One-hundred-fifty-nine (159) comment forms were completed and submitted at the public scoping meetings. See the OPR Project web site www.oregonpassengerrail.org for information on the public and agency comments received during Project scoping.

5.5 Alternatives Analysis Outreach and Coordination

The public involvement team has conducted public outreach and coordination for the public and stakeholders since the completion of the scoping process to collect input on the preliminary alternatives evaluation results. The outreach included a series of public open houses, stakeholder group meetings (including the Corridor Forum and Community Advisory Groups), and Leadership Council meetings. As listed in Table 5-3, ODOT held five open houses in November 2013, as well as an online open house that ran from November 5 to November 18, 2013. Three-hundred-ninety-four people attended the open houses, and 802 people visited the online open house.

Three-hundred-thirty-five comment forms were submitted (132 at the public open houses and 203 through the online open house). In addition, more than 100 comments were submitted via the comment form on the Project website, by email messages, by letters, and by phone calls.

Many of the comments received were detailed and specific to the various preliminary alternatives and to the communities in the Project corridor. However, the public comments did reveal some overall themes with respect to the preliminary alternatives and passenger rail in Oregon. For example:

- Most people expressed general support for improved passenger rail in Oregon, regardless of which alternative is selected.
- Many people suggested mixing and matching preliminary alternatives within the geographic sections.
- People indicated divided support for higher speeds versus serving more communities; although, generally, frequency and reliability appeared to be more important to people than high speeds.
- Many commenters stated that more frequent service will be key to increasing the demand for ridership.
- Some would like to see a vision for true high-speed rail, while others felt Oregon does not have the ridership or population to support such a substantial public expenditure.
- A number of people were concerned about freight and passenger rail conflicts along the corridor and would like to see more double-tracking or dedicated passenger rail tracks.
- Several people also commented on the need to serve existing stations to reduce costs, and stated that passenger rail must connect well to local transit to improve service and increase ridership.
- Finally, many participants in the Albany-Corvallis area open house expressed a desire for a station in Corvallis, while acknowledging that the technical evaluation did not support such a recommendation.

5.6 Draft Environmental Impact Statement

NEPA and FRA requirements were followed to provide notice regarding the circulation and availability of the Draft EIS. The Draft EIS was distributed, both electronically and in hard copies (as required), to agencies and stakeholders, and has been made available to the public for comment. With the release of the Draft EIS, ODOT notified the public about the availability and the public process, including information on how to submit comments—by email to the stakeholder database and through notification on the Project website. The Project website also included links to the Draft EIS for viewing and downloading.

FRA and ODOT will hold public meetings to provide information on the findings in the Draft EIS and to allow for public review and comment. The Draft EIS will be available to the public for at least 30 days prior to any public meetings, and it will be available for public review and comment for 60 days. In addition to providing information and answering questions, the public meetings include a public hearing. At the meetings, ODOT and FRA will accept comments in writing, transcribed by a court reporter, or received via email.

5.7 Final Environmental Impact Statement and Record of Decision

After ODOT and FRA review and consider all comments related to the Draft EIS, they will amend and revise the text of the document in the Final EIS. The Final EIS will analyze the impacts associated with the Preferred Alternative and the other alternatives, including the No Action Alternative. It will also respond to comments on the Draft EIS. FRA and ODOT intends to issue the Final EIS (FEIS) concurrent with a Federal Record of Decision (ROD) along with notices in local newspapers and on the Project website. In addition, ODOT and FRA will distribute the FEIS/ROD as required by NEPA. The combined FEIS/ROD will document the decision on the Project, discuss the Preferred Alternative and other alternatives, and explain the mitigation measures, if required. FRA and ODOT will make the FEIS/ROD available to the public and will publish it on the FRA and Project websites.

5.8 Coordination and Outreach Meetings

Outreach and coordination in the development of the Draft EIS has resulted in numerous agency, stakeholder, and public outreach meetings. Table 5-3 lists the meetings that have been held to date.

Table 5-3. Public, Agency, and Stakeholder Outreach Meetings Held to Date

Event/Meeting	Date
Leadership Council	2011 – October 21, November 29 2012 – March 15, June 6, October 30, December 11 2013 – January 31, March (email communication), October 29, December 17 2014 – December 15 2015 – December 8
Corridor Forum	2012 – September 25 2013 – January 24, April 16, October 8 (Online Briefing), December 3 2015 – November 17 (Online Briefing)
Community Advisory Groups[1]	2013 – April 24 (Albany-Corvallis), April 25 (Salem-Keizer), May 1 (Eugene-Springfield), May 2 (SW Metro), May 8 (Portland), October 14 (Portland), October 15 (Albany-Corvallis), October 16 (Salem-Keizer), October 23 (Eugene-Springfield), October 24 (South Portland Metro), October 29 (Jefferson - rural interests) 2015 – November 4 (Online Briefing)
Public Open Houses	2011 – 11 open houses between December 2010 and April 2011 at various locations 2012 – September 6 (Salem), September 11 (Oregon City), September 12 (Albany), September 13 (Lake Oswego-Tualatin), September 18 (Portland), September 19 (Eugene-Springfield) 2013 – January 8 (Eugene-Springfield), January 9 (Portland), January 10 (Tualatin), January 15 (Oregon City), January 16 (Albany-Corvallis), January 17 (Salem), January 23 (Milwaukie), October 30 (Milwaukie), November 5 (Salem-Keizer), November 6 (Eugene-Springfield), November 7 (Albany-Corvallis), November 12 (Oregon City), November 14 (Portland)
Online Open House	2012 – September 6 – 23 (Online open houses associated with in-person scoping meetings) 2013 – January 1-31 (Online open houses that ran concurrently with in-person open houses in January), November 5 – 18 (Online open houses to complement in-person open houses in October and November) 2015 – November 2 to 22 (Project update)

Event/Meeting	Date
Community Events/Information Booths	2012 – July 28 (Springfield Fiesta Latina), August 8 (Woodburn Fiesta Mexicana), August 25 to 26 (Eugene Celebration), August 25 (Salem Saturday Market), September 15 (Albany Farmers Market), September 15 (Eugene Farmers Market), October 12 (Springfield Farmers Market), October 26 (Portland Union Station 2013 – July 1 (Keizer Transit Center Grand Opening), July 17 (Corvallis Farmers Market), July 26 (Eugene Inaugural Event – New Talgo Train and New Northbound Amtrak trips), July 27 (Jefferson Mint Festival and Frog Jump), August 3 (Woodburn Fiesta Mexicana), August 10 (Keizer River Fair), August 17 (Eugene Saturday Market), August 25 (Portland Sunday Parkways), August 31 (Salem Saturday Market), August 31 (Albany Farmers Market) 2014 – July 25 (Springfield Sprout! Marketplace), July 27 (Portland Sunday Parkways – Northeast Portland), August 2 (Salem Farmers Market), August 2 (Woodburn Fiesta Mexicana), August 17 (Eugene Saturday Market), August 23 (Albany Farmers Market), August 24 (Portland Sunday Parkways – Southeast Portland) 2015 – June 20 (Albany Farmers Market), July 10 to 11 (Springfield Summer Fair), July 17 (Eugene Station), July 18 (Eugene Saturday Market), August 1 (Salem Saturday Market), August 6 (Portland Union Station), August 23 (Sunday Parkways)
University and College Outreach and Information Booths	2013 – June 10 (University of Oregon) 2015 – November 3 (Willamette University), November 4 (Linn Benton Community College), November 10 (University of Oregon, Portland Union Station)
Railroad Coordination	2012 – September 4 (Union Pacific Railroad), September 11 (Port of Portland), September 12 (BNSF Railway), September 12 (Portland & Western Railroad), October 1 (Albany & Eastern Railroad), October 2 (Portland Terminal Railroad), October 9 (Port of Coos Bay), October 12 (Port of Vancouver), October 19 (Amtrak)
Scoping Presentations	2012 – September 6 (Clackamas County Coordination Committee), September 6 (Tigard Chamber of Commerce Good Morning Tigard Networking Event), October 4 (Mid-Willamette Valley Area Commission on Transportation), October 10 (Corvallis Area Metropolitan Planning Organization Policy Board), October 19 (Eugene Chamber of Commerce, Local Government Affairs Council), October 25 (Cascade West Area Commission on Transportation), October 26 (Springfield Chamber of Commerce Gateway Development Committee), October 26 (Portland Metro Transportation Policy Alternatives Committee)
Tribal Meetings	2012 – April 17 (Confederated Tribes of the Grand Ronde Community of Oregon)

Next Steps

Public, resource agency, stakeholder, interested party and Native American Tribal input was considered in completing this Tier 1 process. This chapter describes the process, additional analysis required for Tier 2 studies, NEPA documentation, and design needed to advance to the project level.

6.1 Identification of a Preferred Alternative

During the OPR Project scoping process, ODOT conducted an open, interactive process (see Chapter 5) to develop the project Purpose and Need as well as high-level goals and objectives (see Chapter 2). In association with the technical analyses conducted for this Draft EIS, the performance attributes from the evaluation framework were used for a second time as a basis for comparing Alternative 1 and Alternative 2. Performance attributes for the No Action Alternative were also assessed, where relevant, to provide a baseline context. Based on this relative comparison of build alternatives, 12 performance attributes favored Alternative 1, 3 performance attributes favored Alternative 2, and 14 performance attributes were deemed to favor neither build alternative. Based on the comparison of performance attributes, ODOT and FRA identified Alternative 1 as the Preferred Alternative in this Draft EIS. As listed in Table 5-3, outreach activities including an online open house and online meetings with Community Advisory Group and Corridor Forum representatives were conducted during November 2015 to share this recommendation with stakeholders and interested parties. Feedback received during the outreach period was largely in support of the recommendation, and the Leadership Council supported the recommendation at their meeting held December 8, 2015.

6.2 Tier 1 Final EIS and ROD

This DEIS has been issued to solicit input on the alternatives from the public, stakeholders, interested parties, resource agencies, and Tribes. Comments received on this DEIS during the comment period will be addressed and used to prepare a Final Tier 1 EIS. FRA intends to issue a single document that consists of the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) pursuant to 49 U.S.C. 304a. The FEIS and ROD will document the agency's decision and identify the FRA selected alternative, the rationale for its selection, and potential mitigation measures that would be further studied in subsequent phases. Because this is a Tier 1 NEPA document, most mitigation measures represent commitments to further assess and refine mitigation requirements and coordinate with the public, resource and regulatory agencies, stakeholders and Tribes during Tier 2 analysis as a rail improvement project-level design is developed.

6.3 Tier 2 NEPA Process

The OPR Project Tier 1 EIS is the first of two potential environmental review tiers. If a build alternative is selected in the Tier 1 Record of Decision (ROD), subsequent Tier 2 environmental reviews would evaluate more detailed, site-specific proposals implementing the alternative selected in the Tier 1 ROD. The Tier 2 NEPA documents would address standalone projects with logical termini and independent utility. In other words, one or more corridor sections that together make up the complete passenger rail system could be developed as individual projects. Depending on the scope and potential environmental impacts of Tier 2 projects, the appropriate level of Tier 2 NEPA analyses may be an EIS, Environmental Assessment, and/or Categorical Exclusion. The specific class of NEPA document for more detailed analysis of any Tier 2 section has not yet been defined. Preliminary design and environmental studies would be conducted in support of a Tier 2 analysis. Finally, coordination and outreach would occur as appropriate during any Tier 2 analysis to engage the public and other stakeholders. Input from the outreach effort would be incorporated into the NEPA analysis and into the project design if warranted.

6.3.1 Additional Studies

Tier 2 NEPA analyses would focus on the preferred alternative or alternative section being implemented. The study area for each resource would be refined based on more detailed design. While this Tier 1 DEIS assesses potential impacts based on previously identified resources, Tier 2 analysis would also include field investigations to identify currently unknown resources. Detailed design developed for Tier 2 would support better definition of project impacts and the development of specific mitigation measures. The analyses would consider avoidance and minimization of impacts on sensitive environmental resources. For each Tier 2 NEPA analysis, the following project-level analyses may be required:

- Special status species surveys and wildlife movement studies
- Wetland delineations and identification of Section 404 permitting requirements;
- Cultural resource surveys and Section 106 consultation;
- Threatened and endangered species surveys and Section 7 consultation;
- Noise and vibration analysis;
- Section 4(f) evaluation;
- Section 6(f) analysis;
- Phase I Environmental Site Assessments;
- Air emissions analysis in nonattainment areas;
- Station-area traffic studies; and
- Engineering surveys.

6.4 Phased Implementation

ODOT and FRA anticipate that the project would be implemented in phases in response to growing demand and available funding. The two build alternatives have very different opportunities to phase their implementation over time. For either alternative, phasing could be structured to add one round trip in each phase. ODOT would replace Thruway bus trips with additional Amtrak Cascade train trips. Implementing either build alternative would require close coordination with the host railroads.

- Alternative 1 has a wide variety of phasing options. Because Alternative 1 follows the existing UPRR rail line, infrastructure investments could be broken up into relative small, lower-cost elements, so that ODOT could implement Alternative 1 incrementally as funding becomes available. ODOT could also implement the elements deemed most valuable to support expanded service, and expand service incrementally from two round trips to the six round trips that are considered full build-out for this alternative. This approach would allow ODOT to add round trips over time as the demand for additional passenger service grows.
- Phasing for Alternative 2 would need to be implemented in a few large phases in order to connect sections of new alignment to the existing UPRR rail line. Potential phases could be Springfield to Albany, Albany to Salem, Salem to Oregon City, and north of Oregon City. Even if implementation of Alternative 2 was broken into sections between these cities, each of the large phases could cost more than $1 billion. The most recent Federal transportation funding programs have required at least a 20 percent state and local match, so Oregon's local share would be at least $200 million per phase. In addition, adding round trips to the Amtrak Cascades service in Oregon before Alternative 2 is be

fully built out would require improvements to the UPRR line that would later be abandoned for passenger rail use. These improvements would incur environmental impacts in addition to those outlined in Chapter 4 of this document. These improvements would provide a lasting benefit to freight rail.

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CHAPTER 7

List of Preparers

Numerous professionals comprising the OPR Project team prepared and reviewed this Tier 1 EIS.

Name, Registration	Project Role	Years of Experience; Qualifications
Oregon Department of Transportation		
Jim Cox	Project Manager; Draft EIS reviewer	40 years of experience; B.S. Anthropology
Michael Holthoff	NEPA Lead; Draft EIS preparation and review	24 years of experience; M.S. Environmental Science, B.S. Geology
Jennie Armstrong (no longer works for ODOT)	Hazardous Materials reviewer	21 years of experience; M.S. Quaternary Geology, B.A. Geography & Geology
Chris Bell	Historic Resources, Section 4(f) reviewer	15 years of experience; M.S. Historic Preservation, B.A. Architectural History
Geoff Crook	Climate Change reviewer	20 years of experience; M.C.R.P. Community and Regional Planning, B.A. Environmental Studies
William Fletcher	Water Quality reviewer	31 years of experience; Cand. Real. Physical Geography; B.S. Geology
Becky Knudson	Ridership modeling reviewer	14 years of transportation modeling experience; M.S. Economics, B.S. Economics
Natalie Liljenwall, P.E.	Air Quality, GHG, Energy reviewer	18 years of experience; M.S Environmental Engineering, B.S Environmental Engineering
Brad Livingston	Wetlands reviewer	18 years of experience; B.S. Environmental Resource Management
Chris Maguire	Biological Resources reviewer	30 years of experience; Ph.D. Zoology, M.S. Zoology, B.A. Biology
Bob Melbo	Transportation reviewer	33 years of railroad operations management experience; B.A. Secondary Education
Curran Mohney, R.G., C.E.G.	Geology and Soils reviewer	26 years of experience, B.S., Geology
Carole Newvine	Noise and Vibration reviewer	32 years of experience; M.S. Environmental Science, B.A. Arts and Letters
Jill Pearson	Public Involvement	15 years of experience, B.A. Psychology, minor in Communications
Michael Rock	Land Use reviewer	15 years of experience; B.S. Geography
Kurt Roedel	Archaeological Resources reviewer; Tribal coordination	16 years of experience; M.A. Anthropology, B.A. Anthropology
Jessica Santiago (no longer works for ODOT)	Environmental Justice reviewer	2 years of experience; J.D., B.B.A International Business
John Schnaderbeck, P.E.	Conceptual Engineering, Operations reviewer	25 years of transportation engineering experience; B.S. Engineering
Alvin Shoblom, P.E.	Floodplains reviewer	21 years of experience; B.S. Civil Engineering
Mike Shippey (no longer works for ODOT)	Visual Quality reviewer	23 years of experience; M.A. Landscape Architecture, B.A. Landscape Architecture

Name, Registration	Project Role	Years of Experience; Qualifications
Jyll Smith	Public Involvement	20 years of experience; M.B.A./M.P.A. Marketing, Nonprofit & Public Sector Management, B.A. Marketing
Philip Smith	GIS mapping	21 years of experience; M.S. Geography, B.S. Environmental Studies
Dillon Tannler	Air Quality, Noise and Vibration reviewer	3 years of experience; B.S. Economics, Environmental Policy and Management
Melanie Ware	Draft EIS preparation and review	10 years of experience; B.A. English
Susan White	Socioeconomic Resources, Environmental Justice, Sections 4(f) and 6(f) reviewer	27 years of experience; B.S. Ecology
Denise Whitney-Dahlke	Economics reviewer	18 years of experience; B.S., Economics
Consultants		
Angelo Planning Group		
Frank Angelo	Reviewer, Land Use	36 years of experience; B.A., Urban Policy Studies
Darci Rudzinski, AICP	Land Use	19 years of experience; Masters of Urban Planning
Andrew Parish, AICP	Land Use	5 years of experience; Masters in Urban and Regional Planning
Cambridge Systematics, Inc.		
Paula Dowell	Reviewer, Economic Impacts	20 years of experience; B.B.A, Economics; M.S., Economics; Ph.D., Economics
Joshua Hoodin (no longer with Cambridge Systematics)	Economic Impacts	8 years of experience; B.A., Business Administration; M.A., Applied Economics
CH2M		
Richard Attanasio, PE	Reviewer, Water Quality/Surface Water/Stormwater; Reviewer, Floodplains	34 years of experience; M.S. Environmental Engineering, B.S. Civil Engineering
Louise Brown	Air Quality	17 years of experience; B.A., Liberal Arts, M.S., Environmental Science and Engineering
Scott Bucklin (no longer with CH2M)	DEIS contributing author	4 years of experience; B.A. Sustainable Urban Development, Certificate, Geographic Information Systems
Theresa Carr (no longer with CH2M)	NEPA Task Lead (prior to May 2016)	20 years of experience; B.A., Economics, Master of Urban and Regional Planning
Marisa DeMull (no longer with CH2M)	Environmental Justice	6 years of experience; B.A., Political Science, BS, Civil Engineering
Karin Fusetti (no longer with CH2M)	Noise and Vibration	15 years of experience; B.A., Planning and Design
Michael Hoffmann	Special Lands and DEIS contributing author	16 years of experience; M.U.R.P. Urban and Regional Planning; B.A., Geography and B.A., English
Jennifer John	Transportation	24 years of experience; B.S., Economics
Josephine Lee	Air Quality	22 years of experience; B.S., Chemistry

Name, Registration	Project Role	Years of Experience; Qualifications
Brenda Martin (no longer with CH2M)	Social Resources	7 years of experience; B.A., Political Science and Communications; M.U.R.P. Urban and Regional Planning
Robin McClintock	Archaeological Resources	27 years of experience; B.S. Anthropology
Darren Muldoon (no longer with CH2M)	NEPA Task Lead (prior to January 2016)	15 years of experience; B.S., Environmental Science and Geosciences, Master of Urban and Regional Planning
MaryNell Nolan-Wheatley	Historic (Built Environment) Properties	5 years of experience; B.A., Anthropology, M.P.S., Master of Preservation Studies
Kirsten Pennington (no longer with CH2M)	Environmental Justice; Social Resources; Reviewer, Special Lands	17 years of experience; M.P.P., Public Policy, M.E.M., Environmental Management, B.A., English
Lori Price	Reviewer, Historic (Built Environment) Properties	19 years of experience; B.A., English and Political Science, M.F.A., Historic Preservation and Architectural History
Scott Richman	Project Manager (prior to May 2016); NEPA Task Lead (May 2016 - present)	25 years of experience; B.A., Environmental Design, American Institute of Certified Planners, Project Management Professional
Rob Rodland	Reviewer, Environmental Justice; Reviewer, Social Resources	16 years of experience; B.A., Geography, American Institute of Certified Planners
Rachel Saunders	Noise and Vibration	4 years of experience; B.A. Environmental Design; Masters of Urban Planning
Jeffery Stallard, PE (no longer with CH2M)	Water Quality/Surface Water/Stormwater, Floodplains	13 years of experience; M.S. Environmental Engineering, B.S. Civil Engineering
Brandy Steffen (no longer with CH2M)	Environmental Justice	10 years of experience; B.A., Geography
Pamela Vanderbilt	Reviewer, Air Quality	30 years of experience; B.S., Biology; M.S. Chemistry
Anneke Van Der Mast (no longer with CH2M)	Contributing author for multiple reports and DEIS	10 years of experience; B.A., History and Sociology, Certificate in Environmental Permitting and Compliance
Brett Weiland	Reviewer, Noise and Vibration	16 years of experience; B.S., Environmental Science
David Evans and Associates, Inc.		
Jim Ellerbroek	Engineering: Alternatives Development	25 years of experience; M.S., Civil Engineering (Hydrology and Hydraulics); B.S., Civil Engineering
Melissa Foltz	GIS and Graphics	17 years of experience; B.S., Horticulture Science/Landscape Design
Sara Gilbert	GIS Analyst	20 years of experience; M.S., Earth Sciences (GIS); B.S., Geography
Jon Gage, PLA	Reviewer, Visual Resources	17 years of experience, MLA, Landscape Architecture; B.S. Environmental Policy & Assessment
Brynn Guthrie, PLA	Visual Resources	14 years of experience; B.L.A., Landscape Architecture

Name, Registration	Project Role	Years of Experience; Qualifications
Mara Krinke	Project Manager; EIS author; Energy and Climate Change	20 years of experience; B.A. Botany, B.A. Economics; M.A., Public Affairs (Policy Analysis Focus)
John Macklin	Biological Resources - Aquatic	24 years of experience; M.S., Forestry
Kristine Marshall	Biological Resources	27 years of experience; B.S., Biology
Mary Moran	Engineering: Alternatives Development	30 years of experience; B.A., Resource Management, Environmental Science and Forestry
Andrew Mortensen	Reviewer, Transportation	33 years of experience; M.A., Geography (Focus on Transportation Planning); B.A., Geography
Phil Rickus	Biological Resources – Terrestrial; Reviewer, Wetlands	24 years of experience; B.S., Biology
Angela Rogge	Energy and Climate Change	9 years of experience; H.B.S. in Civil Engineering
Ethan Rosenthal	Wetlands	19 years of experience; M.S., Environmental Science (Water Resources Emphasis); B.S., Agricultural Economics (Business Management and Marketing Emphasis)
Howell Consulting		
Leslie Howell, AICP	Senior Advisor	40 years of experience, B.A. Environmental Studies; B.A. Geography
Shannon & Wilson		
Adrian A. J. Holmes, CEG	Reviewer, Geology and Soils	12 years of experience; M.S., Geology; B.S., Marine Science
Aimee E. Holmes, PE, CEG	Geology and Soils	12 years of experience; M.S., Geological Sciences; B.S., Civil Engineering; B.A., Geology
Gary Peterson, CEG	Reviewer, Hazardous Materials and Waste Disposal	40 years of experience; B.S., Geology
Michael S. Reynolds, PE (no longer with S&W)	Hazardous Materials and Waste Disposal	8 years of experience; M.S., Civil & Environmental Engineering; B.S., Civil & Environmental Engineering; B.S., Business Administration
Peter J. Shingledecker, PE	Hazardous Materials and Waste Disposal	27 years of experience; B.S., Chemical Engineering

CHAPTER 8

Distribution List

The distribution of the Oregon Passenger Rail Project Draft Environmental Impact Statement (DEIS) emphasizes the use of electronic media to provide cost-effective access to the public and interested parties. This Tier 1 DEIS is available on the internet on the ODOT Oregon Passenger Rail Project web site (http://www.oregonpassengerrail.org) and on the FRA website (http://www.fra.dot.gov/).

All persons, agencies, and organizations listed in this chapter have been informed of the availability of, and locations to obtain, the DEIS, as well as the timing of the 60-day formal comment period. A Notice of Availability of the DEIS has been included in the Federal Register.

Federal agencies, Native American tribes, state agencies, regional and local agencies, and the other selected interested parties and organizations listed below were sent a link to the electronic copy of the DEIS via e-mail. Additional local elected officials and agency representatives, along with others on the mailing list (approximately 3,000 contacts), have been mailed a notification that includes information about how to access the DEIS, timing for the formal DEIS comment period, and public hearing dates, times, and locations.

8.1 Federal Agencies

- Department of the Army, Corps of Engineers
- Federal Aviation Administration
- Federal Emergency Management Agency
- Federal Highway Administration
- Federal Railroad Administration
- Federal Transit Administration
- Interstate Commerce Commission
- NOAA Fisheries
- US Coast Guard
- US Department of Agriculture
- US Department of Commerce
- US Department of Energy
- US Department of Interior
- US Environmental Protection Agency
- US Fish and Wildlife Service

8.2 Native American Tribes

- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Grande Ronde Community of Oregon
- Confederated Tribes of Siletz Indians
- Confederated Tribes of the Umatilla Reservation

- Confederated Tribes of Warm Springs Reservation of Oregon
- Cowlitz Indian Tribe

8.3 Oregon State Agencies

- Business Oregon
- Office of the Governor
- Oregon Department of Administrative Services
- Oregon Department of Agriculture
- Oregon Department of Energy
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Oregon Department of Geology and Mineral Industries
- Oregon Department of Land Conservation and Development
- Oregon Department of State Lands
- Oregon Department of Transportation
- Oregon Parks and Recreation Department
- Oregon State Historic Preservation Office
- Oregon Transportation Commission
- Oregon Water Resources Department
- Public Utilities Commission
- Travel Oregon

8.4 Regional and Local Agencies

Metropolitan Planning Organizations and Area Commissions on Transportation:

- Albany Area MPO
- Cascades West ACT
- Central Lane MPO
- Corvallis Area MPO
- Lane ACT
- Metro
- Mid-Willamette Valley ACT and COG

Counties/Cities:

- Benton County/Adair Village, Corvallis, Monroe
- Clackamas County/Canby, Gladstone, Johnson City, Lake Oswego, Milwaukie, Oregon City, Rivergrove, West Linn, Wilsonville

- Lane County/Coburg, Eugene, Junction City, Springfield
- Linn County/Albany, Brownsville, Halsey, Harrisburg, Lebanon, Millersburg, Tangent
- Marion County/Aumsville, Aurora, Donald, Gervais, Hubbard, Jefferson, Keizer, Mt. Angel, St. Paul, Salem, Silverton, Stayton, Sublimity, Turner, Woodburn
- Multnomah County/Fairview, Gresham, Maywood Park, Portland, Troutdale
- Polk County/Dallas, Independence, Monmouth
- Washington County/Durham, Hillsboro, King City, Sherwood, Tigard, Tualatin
- Yamhill County/Amity, Dayton, Dundee, Lafayette, McMinnville, Newberg

Other Agencies:

- Lane Transit District
- Northwest Oregon Transit Alliance
- Port of Portland
- Salem-Keizer Transit
- SMART Transit
- South Clackamas Transportation District
- TriMet
- Tualatin Valley Fire & Rescue

8.5 Railroad Owners/Operators

- Albany & Eastern Railroad Company
- Amtrak
- BNSF Railway
- Portland & Western Railroad
- Portland Terminal Railroad Company
- Union Pacific Railroad

8.6 Project Committees

- Community Advisory Groups:
  - Albany/Corvallis
  - Eugene/Springfield
  - Portland metro
  - Rural project area focus group
  - South Portland metro
- Corridor Forum
- Oregon Passenger Rail Leadership Council

8.7 School Districts

County/School Districts:

- Benton/Linn-Benton-Lincoln Education Service District, Corvallis, Monroe
- Clackamas/Canby, Clackamas Education Service District, Gladstone, Lake Oswego, North Clackamas, Oregon City, West Linn-Wilsonville
- Lane/Bethel, Crow-Applegate-Lorane, Eugene, Fern Ridge, Junction City, Lane Education Service District, Springfield
- Linn/Central Linn, Linn-Benton-Lincoln Education Service District, Greater Albany, Harrisburg, Lebanon, Millersburg, Tangent
- Marion/Cascade, Gervais, Jefferson, Mt. Angel, North Marion, North Santiam, St. Paul, Salem-Keizer, Silver Falls, Willamette Education Service District, Woodburn
- Multnomah/David Douglas, Multnomah Education Service District, Parkrose, Portland, RIverdale
- Polk/Central, Dallas, Perrydale, Willamette Education Service District
- Washington/ Northwest Regional Education Service District, Sherwood, Tigard-Tualatin
- Yamhill/Amity, Dayton, McMinnville, Newberg, Willamette Education Service District

8.8 Environmental Justice and Title VI Outreach

- Adelante Empresas/Adelante Mujeres (based out of Forest Grove)
- Alternative Work Concepts
- Amigos MSC
- Beaverton Family Resource Center
- Bienestar
- Big Brothers Big Sisters of Lane County
- CAUSA
- Center for Community Counseling
- Center for Intercultural Organizing
- Centro Cultural
- Centro Latino Americano
- Coalition for a Livable Future
- Coalition of Communities of Color
- Community Alliance of Lane County (CALC)
- Community Relations & Communications (Salem-Keizer Public Schools)
- Community Services Consortium
- El Hispanic News
- El Latino de Hoy

- Environmental Professionals of Color and Center for Diversity and the Environment
- Food for Lane County
- Housing and Community Services Agency of Lane County
- Immigrant and Refugee Community Organization (IRCO)
- Latino Network
- LCOG Senior & Disabled Services
- Linn-Benton Housing Authority
- Mano a Mano Family Center
- Marion County Housing Authority
- Metropolitan Affordable Housing Corporation
- Northwest Human Services
- Oregon Opportunity Network
- Salem Housing Authority
- Salem/Keizer Coalition for Equality
- ShelterCare
- Tigard-Tualatin Family Resource Center
- United Way of Lane County
- Virginia Garcia Clinic

8.9 Business Associations

- Albany Area Chamber of Commerce
- Corvallis Chamber of Commerce
- Eugene Chamber of Commerce
- Hillsboro Chamber of Commerce – Latino Business
- Hispanic Metropolitan Chamber (Portland)
- Keizer Chamber of Commerce and Visitor Center
- Lake Oswego Chamber of Commerce
- Oregon Business Council
- Oregon City Chamber of Commerce
- Oregon State Chamber of Commerce
- Portland Business Alliance
- Salem Area Chamber of Commerce
- Salem Latino Business Alliance
- Springfield Chamber of Commerce

- Tigard Area Chamber of Commerce
- Tri-County Chamber of Commerce (Junction City, Harrisburg, Monroe)
- Tualatin Chamber of Commerce
- West Linn Chamber of Commerce
- Wilsonville Area Chamber of Commerce
- Woodburn Chamber of Commerce

8.10 Other Interested Parties and Organizations

- Association of Oregon Rail and Transit Advocates (AORTA)
- Cascadia Center
- National Association of Railroad Passengers
- Oregon Farm Bureau
- Oregon Rail Heritage Center
- Oregon Travel Experience
- ORULE
- OSPIRG
- Travel Lane County

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Glossary of Terms

303(d) listed waterbodies – as defined by the Clean Water Act, Section 303(d), these are waterbodies that are impaired by pollutants and that are therefore not meeting the state's water quality standards; the list of these impaired waterbodies is referred to as the 303(d) list

Active crossing – an at-grade crossing of a railroad by a highway that has "active" warning and control devices, such as wayside bells or horns, flashing lights and crossing gates

Alighting – descending or disembarking from a train, bus, or other form of transport (in this document, ending a trip, or trip segment)

Airspace – in general terms, the air available to aircraft to fly in, especially the part subject to the jurisdiction of a particular country; specifically, as defined by the Federal Aviation Administration, "The two categories of airspace are: regulatory and nonregulatory. Within these two categories, there are four types: controlled, uncontrolled, special use, and other airspace."

Amenity value – the value associated with the existence of passenger rail

APE, or Area of Potential Effect – for cultural and historic resources, the APE is the area within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist

Aquatic trophic system – All organisms in the aquatic ecosystem can be placed in trophic levels depending on what energy source they rely upon and how they provide energy for other organisms in the food web

Aquifer – subsurface geologic unit (rock or sediment) that contains and transmits groundwater

At-grade – at ground surface level; used to describe the intersection of railroad track and a roadway at the same elevation

Attractors – destinations that draw visitors/travelers, such as residential and employment areas, schools, medical facilities and other services

Block group – block groups are statistical divisions of census tracts that generally cover a contiguous area, contain between 600 and 3,000 people, and are used to present data and control block numbering (U.S. Census Bureau, 2016)

BMPs, or Best Management Practices – methods designed to minimize adverse effects on the environment

Bottleneck – a localized constriction of traffic flow, specifically a section of roadway that experiences reduced speeds and inherent delays

BRT, or Bus Rapid Transit – a high-quality bus-based transit system that delivers fast and cost-effective service by using dedicated lanes, usually with stations aligned to the center of the road, off-board fare collection, and fast and frequent operations

Census tract – census tracts are small, relatively permanent statistical subdivisions of a county or equivalent entity that generally cover a contiguous area, follow visible and identifiable features, and have a population size between 1,200 and 8,000 people (U.S. Census Bureau, 2016)

Centralized Traffic Control – a form of railway signaling that consolidates train routing decisions, so that traffic is controlled and managed remotely by dispatchers in centralized locations; CTCs increase safety and capacity by allowing monitoring of multiple rail routes simultaneously

CO_2e, or carbon dioxide equivalent, emissions – represents the equivalent amount of CO_2 emissions created by all greenhouse gasses emitted (for example, nitrous oxide and methane associated with fuel use)

Committed improvements – transportation projects with committed funding

Community cohesion – the degree to which residents have a sense of belonging to their neighborhood, a level of commitment to the community, or an association with neighbors, groups and institutions, usually as a result of continued association over time

Commuter rail – passenger rail service in metropolitan and suburban areas usually having reduced fare, multiple ride, and commuter tickets and morning and evening peak period operations

Compressibility of soil – the property of soil due to which a decrease in volume occurs under compressive force is known as the compressibility of soil[iv]

Connectivity – the degree of "connectedness" of a transportation system, such as a transit network, and the ease with which passengers can move from one point to another within the network or points outside the network

Conservation easement – a legal agreement between a landowner and a land trust or governmental agency that permanently limits the uses of the land to protect its conservation values (Land Trust Alliance, 2014)

Crossover – track equipment that facilitates the movement of rail equipment onto parallel tracks via paired back-to-back switches[i]

Cumulative impact – the CEQ NEPA regulations define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes the action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7)

Cut-and-cover tunnel – in a cut-and-cover tunnel, the structure is built inside an excavation and covered over with backfill material when construction of the structure is complete[iii]

Cut and fill – construction technique involving excavation or grading followed by placement and compaction of fill material

***De minimis* (impact)** – impact 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)

Design speed – maximum safe operational speed along a segment of an alignment based on the design specification of the track infrastructure, the characteristics of the signaling system, and the maintenance specifications for that class of track

Dewatering – the process of removing water from an area or material, such as fill material

Diesel locomotive hauled train technology – train propulsion from one or more diesel-powered locomotive units

Diesel multiple unit (DMU) train technology – train technology that uses a set of diesel-powered self-propelling passenger rail vehicles that can be operated in multiple with other such sets

Displacement – the result of being required to vacate a place of residence or business because of an action taken by a Federal, state, or local government

Double track – two sets of main line track located side by side, most often used for travel in opposite directions

Dual Mode/Dual Power – locomotives that are able to operate under both diesel-electric and all-electric power; if electrification is provided on any portion of passenger rail right-of-way, dual power locomotives could be utilized

Enhanced bus service – for the OPR Project, enhanced bus service relates to improvements to existing intercity passenger bus service (e.g., existing Thruway motor coaches)

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

Freight rail carrying capability – the cargo load that can be transported by freight rail

GIS, or geographic information system – a computer system for capturing, storing, checking and displaying data related to positions on the earth's surface; GIS can show many different kinds of data on one map and can illustrate patterns and relationships

Grade-separated – at different elevations; on separate levels

Greenfield alignment – constructed in new alignments outside of existing rail corridors

Greenhouse gas emissions – emissions of gases that trap heat in the atmosphere, specifically carbon dioxide, methane, nitrous oxide and fluorinated gases; the largest source of greenhouse gas emissions from human activities in the United States is from burning fossil fuels for electricity, heat and transportation

Guideway – a track or riding surface that supports and physically guides transit vehicles specially designed to travel exclusively on it

High-value wetlands – wetlands that meet any of the following criteria: (1) overlap with critical habitat for endangered species; (2) are located in a protected area (such as a city park or USFWS refuge); (3) are locally significant wetlands (as determined by local planning code Local Wetland Inventory designations); (4) are wetlands that occur within areas designated as "wetland priority sites"; or (5) are in areas mapped as wetland mitigation banks and areas enrolled in the Wetland Reserve Program

Highway capacity improvements – infrastructure investments to expand motorized vehicle capacity on the highway system

Host railroad – a railroad that has effective operating control over a segment of track

Host-related delays – operating delays not attributable to the passenger rail service provider when operating on tracks of a host railroad, such as track- and signal-related delays, power failures, freight and commuter train interference, routing delays, etc.

Hydric soil – a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions (i.e., conditions under which molecular oxygen is virtually absent) in the upper part[v]

Hydrologic regime – the changes over time in the rates of flow of rivers and in the levels and volumes of water in water bodies that are regularly repeated, and that pass through phases (e.g., seasonal)

Independent utility – a project is considered to have independent utility if it would be constructed whether or not other projects in the area are constructed

Intelligent transportation systems – technology tools aimed at managing and improving the movement of people and freight, safely and economically, through diverse modes of travel

Intercity Passenger Rail – passenger rail service between cities; FRA defines intercity passenger rail service in the Federal Register (Vol 74, No 119) as: "a group of one or more scheduled trains (roundtrips) that provide Intercity Passenger Rail transportation between bona fide travel markets (not constrained by

State or jurisdictional boundaries), generally with similar quality and level-of-service specifications, within a common (but not necessarily exclusive or identical) set of identifiable geographic markets"

Isolates – isolated archaeological finds

Karst areas – areas of irregular limestone formations characterized by fissures, sinkholes, underground streams and caverns

LEP, or limited English proficiency, population – the number of people who have limited ability to speak English

Liquefiable soil – a soil that is saturated or partially saturated so that it loses its strength and stiffness in response to an applied stress, usually the shaking from an earthquake, that causes the soil to behave like a liquid

LQ, or location quotient – quantifies which industries in a region are unique or concentrated when compared to the nation; this comparison is made by dividing a region's employment share within a particular industry by the nation's employment share within the same industry

Magnetic levitation (Maglev) – an advanced transportation technology in which magnetic forces lift, propel and guide a vehicle over a specially designed guideway

Mainline – the principal railroad track that connects two points[i]

Maintenance areas – areas that were once nonattainment areas for air quality, but now meet the applicable ambient air quality standards

Mobile Source Air Toxics (MSATs) – those pollutants from mobile sources (such as locomotive engines) that are known or suspected to cause cancer, or other serious chronic or acute health effects

Mode share – the percentage of travelers using a particular type of transportation or number of trips using that particular type (or mode) of transportation

Multimodal – having the characteristics that provide for various modes of travel, such as walking, biking, driving and public transit

Nonattainment areas – areas where measured background concentrations for air pollutants are greater than the maximum allowable ambient concentrations defined in the National Ambient Air Quality Standards (NAAQS) or State Ambient Air Quality Standards (SAAQS)

Passive crossing – an at-grade crossing of a railroad by a highway that has only "passive" warning devices, such as crossbucks, yield or stop signs, and pavement markings, rather than "active" warning and control devices

Positive Train Control (PTC) – a system for monitoring and controlling train movements with the goal of increasing operational safety[ii]

Propulsion – the action of driving or pushing forward; for rail locomotives, several different means of propulsion are available

Queue – a line of stopped vehicles waiting their turn to proceed

Quiet Zone – a segment of a rail line, within which is situated one or a number of consecutive public highway-rail crossings at which locomotive horns are not routinely sounded (23 CFR 222.9)

Ridership – the number of people who ride a transportation system

Right-of-Way – a legal right of passage over a defined area of real property. In transit usage, the corridor along a roadway or railway alignment that is controlled by a transit or transportation agency/authority

Riparian – relating to, living, or located on the bank of a natural water course, lake, or tidewater

Rail corridor – for the OPR Project, the rail corridor is the reasonable and feasible rail alignment improvement alternatives from Eugene/Springfield, Oregon, to Vancouver, Washington

Rail Traffic Controller (RTC) – a computer program that simulates rail line operations

Recovery time – time built into the train service schedule to account for potential delays found along the route

Resiliency (of transportation system) – the ability of the transportation system to mitigate or recover from natural disasters and human-caused disruptions

Scarp – a line of cliffs produced by faulting or erosion

Scoping – an early and open process for identifying significant issues related to a proposed action and part of which is inviting agencies and the public to participate and provide comments

Screening – the evaluation of something as part of a methodical process to assess its suitability for a particular purpose

Sensitive noise receptor – an area where human activity could be adversely affected when noise levels exceed predefined levels of acceptability; can be indoors or outdoors

Short-haul travel – involving the transport of people or goods over relatively short distance

Siding – an additional track found adjacent to the mainline that allows for trains to "pull over" in order to allow another train to pass[i]

Special status species – for this Tier 1 EIS, these species include Federal and state listed, proposed and candidate species

Switch – (*noun*) track equipment that allows for rail cars to cross from one track to another[i]

Teleworking – using computers, telephones, etc. to work from home while maintaining contact with coworkers, clients and customers; telecommuting

Train interference – conflicts between trains operating over the same line

Train set – a group of rolling stock that is permanently or semipermanently coupled together to form a unified set of equipment, most often used in passenger train configurations[ii]

Turnout – another term for a railroad track switch[i]

Urban Growth Boundary – under Oregon law, a line that demarcates where urban and rural land uses are expected

Viewshed – the total area visible from a single observer position, or the total area visible from multiple observer positions; viewsheds include scenes from highways, trails, campgrounds, towns, cities, or other viewer locations

Wayside horn – a stationary horn located at a highway rail grade crossing, designed to provide, upon the approach of a locomotive or train, audible warning to oncoming motorists of the approach of a train (49 CFR 222.9)

Wildlife linkages – a belt of habitat that is essentially free of physical barriers such as fences, walls and development, and connects two or more larger areas of habitat, creating key movement areas for wildlife

[i] Source: www.americanrails.com

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