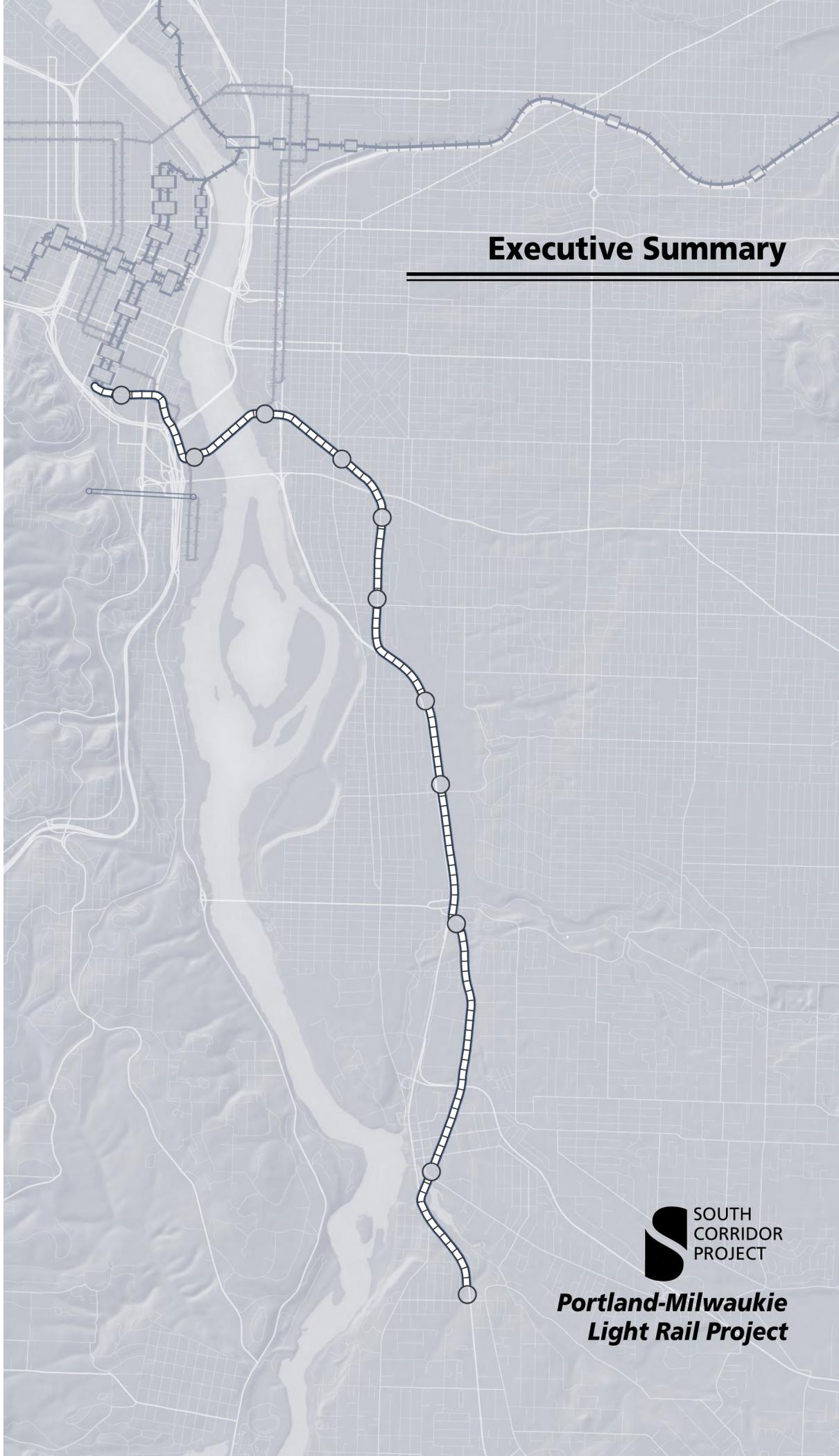


Executive Summary



SOUTH
CORRIDOR
PROJECT

**Portland-Milwaukie
Light Rail Project**

S. EXECUTIVE SUMMARY

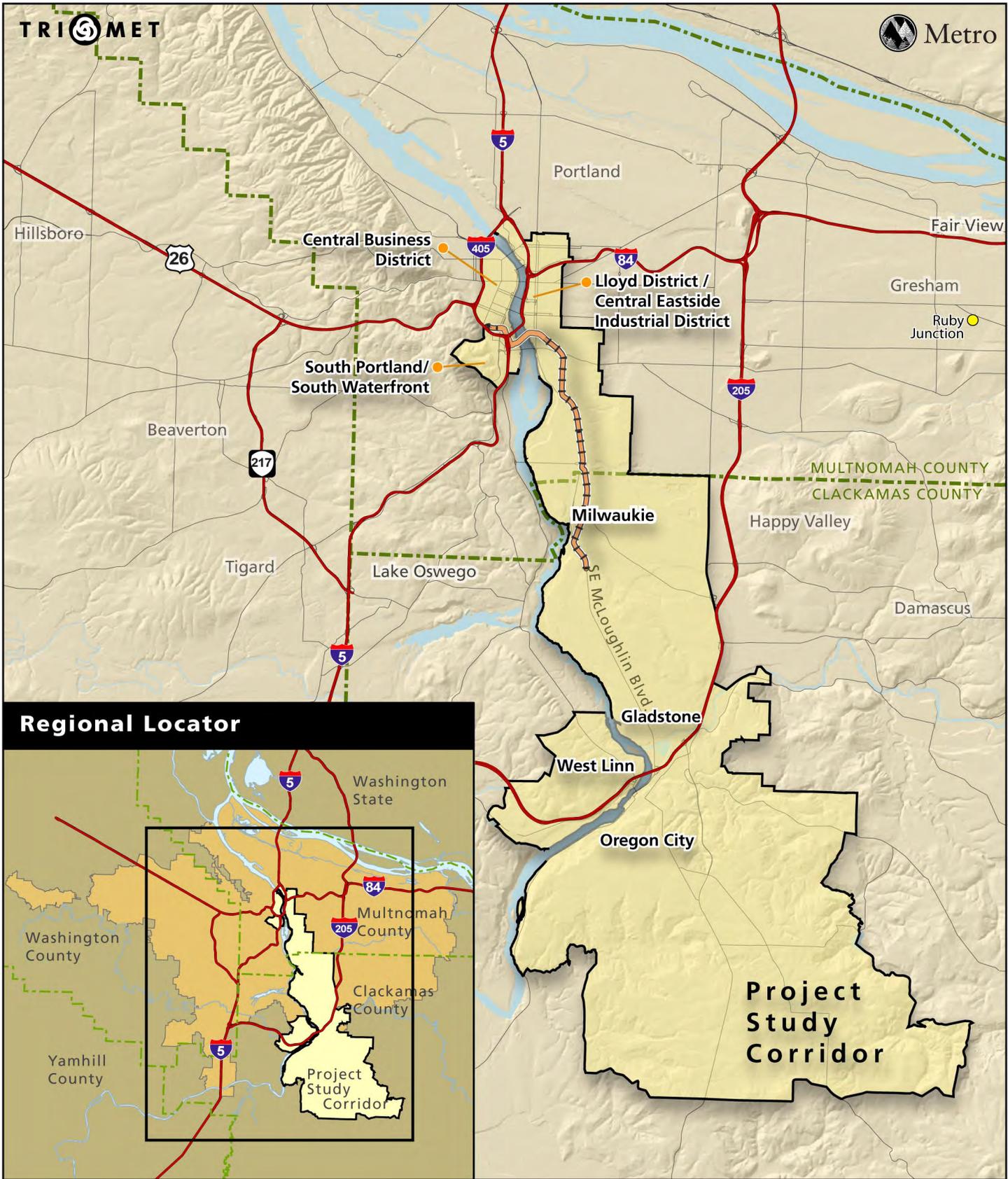
The Portland-Milwaukie Light Rail Project Final Environmental Impact Statement (FEIS) examines a proposal to develop a light rail transit extension to connect downtown Portland, Oregon, the City of Milwaukie, and north Clackamas County. Figure S-1 shows the regional setting for the proposed project.

The project is part of a larger high-capacity transit corridor known as the South/North Corridor, which extends from Clackamas County to downtown Portland and north to the Columbia River and Vancouver, Washington. Figure S-2 shows the regional high-capacity transit system serving this area. In 1998, the Federal Transit Administration (FTA), Metro, and the Tri-County Metropolitan Transportation District (TriMet) released the *South/North Corridor Project Draft Environmental Impact Statement* (DEIS). The Supplemental DEIS (SDEIS) prepared for this project in May 2008 augmented the *South/North DEIS* by updating information on the purpose and need, alternatives considered, affected environment, and anticipated environmental impacts for the Portland-Milwaukie Corridor to reflect the changed conditions since the *South/North DEIS* was published. It also incorporated findings developed through the *South Corridor Supplemental Draft Environmental Impact Statement*, issued in December 2002. This FEIS presents the proposed light rail project and updated estimates of impacts compared to a No-Build Alternative, and presents and responds to the public and agency comments received by the project.

This FEIS has been prepared in compliance with the National Environmental Policy Act (NEPA). The FTA is the federal lead agency for this FEIS, and Metro is the project's local lead agency, working in cooperation with TriMet. The purpose of this FEIS is to present details of the Locally Preferred Alternative (LPA) and its environmental and transportation performance. When the LPA was adopted in 2008, it included a recommendation for a Minimum Operable Segment (MOS) if funding could not be secured to construct the full LPA alignment to SE Park Avenue. In addition, the FEIS evaluates a phasing option (the LPA Phasing Option) that allows the project to be completed to SE Park Avenue at a lower cost by deferring or modifying some features of the LPA. The FEIS also addresses an expansion of the Ruby Junction maintenance facility in Gresham, Oregon. Streetcar and roadway facilities in and around the Willamette River bridge crossing that are associated with, but not funded by, the project are also included in this FEIS. These related projects complement the Portland-Milwaukie Light Rail Project, but they are each independent.

CHAPTER CONTENTS

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Regional Locator

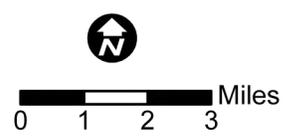


Portland-Milwaukie Light Rail Project

Figure S-1

Regional Setting

- Project Study Corridor
- Urban Growth Boundary
- County Line
- Freeway
- Portland-Milwaukie Light Rail Project



S.1 PORTLAND-MILWAUKIE CORRIDOR

The Portland-Milwaukie Corridor, part of the larger South/North Corridor and a subset of the South Corridor, is located in the Portland, Oregon metropolitan region, the population and economic center of an extensive area that includes southern Washington and much of Oregon. The Portland-Vancouver metropolitan area incorporates the urban portion of three Oregon counties (Multnomah, Clackamas, and Washington) and the urban portion of Clark County, Washington.

Figure S-2 shows other planned high-capacity transit projects in addition to the Portland-Milwaukie Light Rail Project. This figure includes the Columbia River Crossing Project that would extend light rail to Vancouver, Washington.

The Portland-Milwaukie Corridor includes the city of Milwaukie and much of southeast Portland and the Portland Central City, including the Portland Central Business District, the South Waterfront District, and the Central Eastside Industrial District (CEID). These areas have some of the region's highest concentrations of population and employment, and they include many of the region's major educational, health services, government/civic, and entertainment facilities.

Travelers within the corridor use a variety of local, regional, state, and interstate facilities. TriMet is the provider of public transportation, operating light rail, commuter rail, fixed-route transit buses, and on-demand vans and small bus service for the elderly and disabled.

S.2 PROJECT HISTORY AND DECISION-MAKING PROCESS

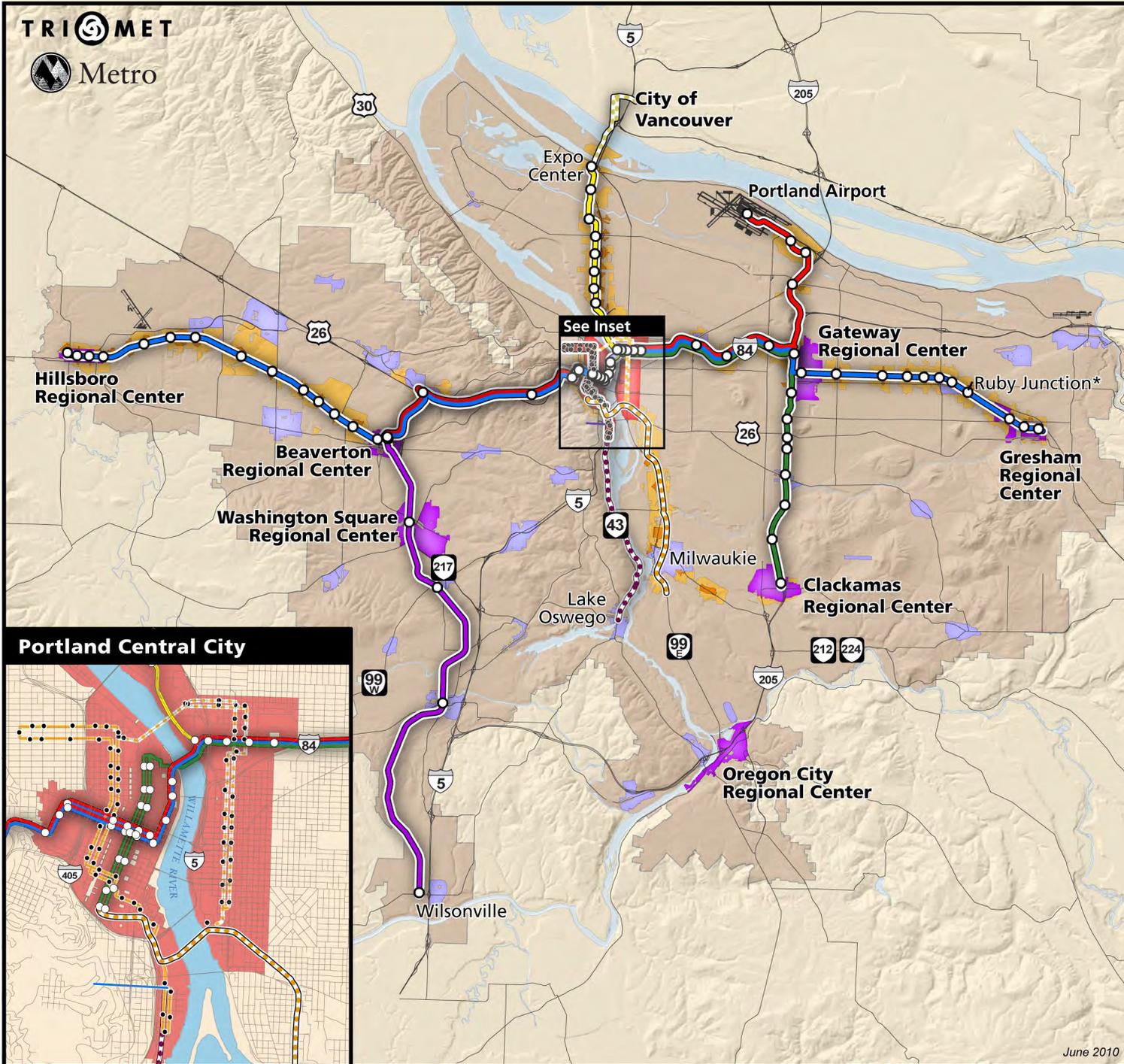
The Metro Council approved the current LPA for the project in July 2008, following the publication and public comment period for the 2008 *Portland-Milwaukie Light Rail Project SDEIS* in May 2008. Previously, in 2003, the Metro Council approved an LPA for the South Corridor, calling for two phases of light rail investment between downtown Portland and Clackamas County. The earlier 2003 LPA selection followed the publication of the *South Corridor Project SDEIS* in December 2002. Phase I of the South Corridor LPA was the I-205/Portland Mall Project, which released an FEIS in November 2004 and is now in operation. Phase II is the light rail segment between downtown Portland and Milwaukie, and it would connect directly to Phase I's Downtown Portland Transit Mall segment at Portland State University (PSU).

The region's decision to select light rail for the South Corridor and move forward in two phases of investment is documented in the *South Corridor Project LPA Report* (Metro 2003). The *I-205/Portland Mall Light Rail Project Final Environmental Impact Statement* of 2004 further confirmed the LPA's selection of light rail for the Portland-Milwaukie Corridor.

Portland - Milwaukie Light Rail Project

Regional Setting with Regional Rail System

Figure S-2



High Capacity Transit

- MAX Blue Line
- MAX Red Line
- MAX Yellow Line
- MAX Green Line
- WES Commuter Rail

- Portland Streetcar
- Portland Aerial Tram

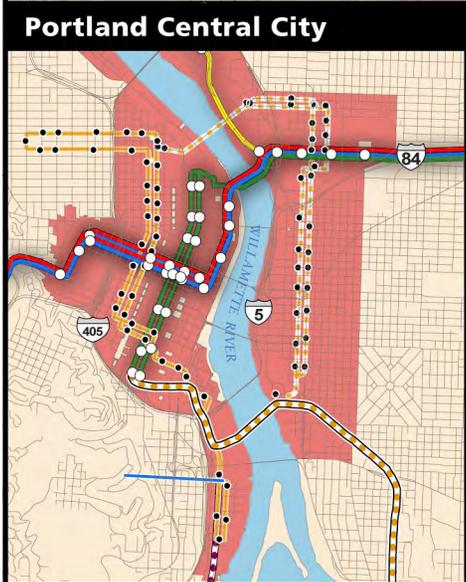
Transit Projects

- Columbia River Crossing
- Portland-Milwaukie LRT
- Lake Oswego to Portland
- Portland Streetcar Loop Project

2040 Growth Concept

- Central City
- Regional Center
- Town Center
- Station Community
- Station Community Core
- Urban Growth Boundary

* Ruby Junction is an operations and maintenance facility located in Gresham near SE 199th Avenue and SE Burnside Street. For more information see Appendix H: Conceptual Design Information.



Other planning and environmental studies that have guided the development of light rail in the South Corridor include:

- 1993 South/North Alternatives Analysis Tier I and Tier II (1993 South/North Alternatives Analysis)
- 1998 South/North Corridor Project Draft Environmental Impact Statement (1998 South/North DEIS)
- 2000 South Corridor Transportation Alternatives Study (2000 SCTAS)
- 2002 South Corridor Supplemental Draft Environmental Impact Statement (2002 South Corridor SDEIS)
- 2003 Downtown Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement (2003 Downtown Amendment)

A more detailed description of the history and decision-making process for light rail may be found in Section 2.3, Background on Alternatives Development and Appendix L of this FEIS. A summary of public and agency comments received on the 2008 SDEIS is presented in Chapter 7, Public Comment Summary. A full documentation of comments received and responses is included in Appendix P, Public Comments and Responses.

S.3 PURPOSE AND NEED

The purpose and need for this project was originally defined by the *South/North Corridor Project DEIS* in 1998. The purpose and need was updated with the *South Corridor SDEIS* in December 2002 and the subsequent South Corridor LPA decision in 2003. The purpose is:

To implement a major transit improvement in the South Corridor that maintains livability in the metropolitan region, supports land use goals, optimizes the transportation system, is environmentally sensitive, reflects community values, and is fiscally responsive.

Since the Phase I investment for the South Corridor, involving the I-205 and Portland Mall light rail investments, is now completed, this project focuses on the remaining need to develop light rail within the Portland-Milwaukie Corridor as Phase II of the South Corridor.

The *need* for a major transit investment in the Portland-Milwaukie Corridor is identified as:

- Historic and projected rapid population and employment growth in the corridor, which creates an unmet demand for increased travel choices and transit capacity
- High levels of existing traffic congestion and travel delay in the corridor and deteriorating travel conditions in the future
- The need for high-quality transit service in the corridor to achieve regional and local land use objectives

S.3.1 Project Goals and Objectives

The goals and objectives established for the Portland-Milwaukie Light Rail Project derive from the purpose and need analysis summarized above and as originally defined for the South/North Corridor Study and reaffirmed through the *South Corridor SDEIS*.

The goals and objectives of the Portland-Milwaukie Light Rail Project (in its capacity as the south segment of the South/North Corridor) are to:

- Provide high-quality transit service in the corridor
- Ensure effective transit system operations in the corridor
- Maximize the ability of the transit system to accommodate future growth in travel demand in the corridor
- Minimize traffic congestion and traffic infiltration through neighborhoods in the corridor
- Promote regionally agreed-upon land use patterns and development in the corridor
- Provide for a fiscally stable and financially efficient transit system
- Maximize the efficiency and environmental sensitivity of the engineering design of the proposed project

S.4 ALTERNATIVES

This FEIS examines a No-Build Alternative and a Locally Preferred Alternative and related options and facilities for the Portland-Milwaukie Corridor. The No-Build Alternative is required under NEPA and represents future conditions without the Portland-Milwaukie Light Rail Project. The No-Build analysis assumes the same levels of growth in population and employment through the year 2030 as the Portland-Milwaukie Light Rail Project, but depicts the region's future transportation system without the light rail project. This FEIS examines the selected LPA and a Minimum Operable Segment, compared to the No-Build Alternative.

The Locally Preferred Alternative to Park Avenue (LPA to Park Avenue) and Minimum Operable Segment to Lake Road (MOS to Lake Road) are shown in Figures S-3 and S-4 and are described below.

S.4.1 Locally Preferred Alternative (LPA) to Park Avenue

The LPA to Park Avenue includes approximately 7.3 miles of light rail, ten stations (plus one deferred from the Portland Mall Transit Project at SW Jackson Street and one planned for the future at SE Harold Street), five shelters deferred from the Portland Mall Transit Project, two park-and-rides, and a new bridge across the Willamette River. The route would begin near PSU, at the southern end of downtown Portland, connecting with the Downtown Portland Transit Mall light rail that opened in 2009 at SW 5th and 6th avenues. The LPA to Park Avenue would end in unincorporated Clackamas County at SE Park Avenue. In addition, the LPA Phasing Option describes how some elements of the LPA to Park Avenue could be deferred or modified in the project's initial construction and operation.

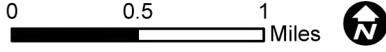
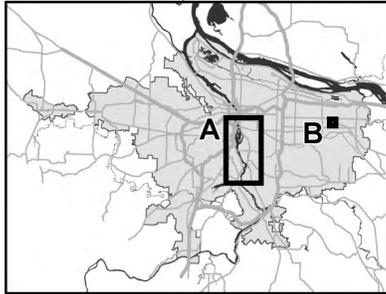
Portland-Milwaukie Light Rail Project

Locally Preferred Alternative and Minimum Operable Segment

Figure S-3

-  Light Rail
-  Shared Transitway
-  Station
-  Future Station
-  Park-and-Ride
-  MOS Park-and-Ride
-  Existing Light Rail
-  Existing Streetcar
-  Under Construction, Streetcar
-  Portland Aerial Tram
-  Railroad
-  County Line

Note: For details on Park-and-Ride capacity please see Table 2.1-1



A: Light Rail Alternative



B: Ruby Junction



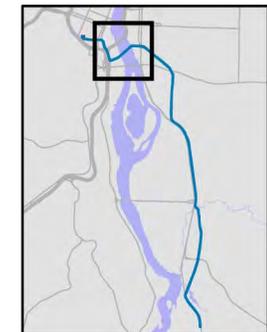
Portland - Milwaukie Light Rail Project

Willamette River Bridge Area and Related Transportation Facilities

Figure S-4

1. Streetcar connections to bridge
2. Relocated SE Water Avenue
3. Oregon Rail Heritage Foundation
4. OPR Switching Yard

-  Shared Transitway
-  Street Improvements/Relocation
-  Proposed Streetcar
-  Existing/Under Construction Streetcar



December 2009



Downtown Portland to SE Tacoma Street

Starting at the Downtown Portland Transit Mall near PSU, the LPA to Park Avenue alignment would turn east and cross SW 5th Avenue, the I-405 on-ramp, SW Grant Street, and SW 4th Avenue at grade, and continue east on SW Lincoln Street. The alignment would follow SW Lincoln Street in a center median, with an extension of SW Lincoln Street to a new intersection at SW Naito Parkway. This one-block extension would be exclusively for use by light rail trains, buses, pedestrians, and bicycles.

The shared transitway would cross on structures over the SW Harrison Street connector and SW Harbor Drive, turn southward, and remain on structures to travel under the I-405 ramp and over SW Sheridan Street. It would continue south along the west side of SW Moody Avenue into the South Waterfront District on retained fill. At the intersection of SW Moody Avenue and SW Porter Street, the alignment would turn toward the river, return to grade, and cross the Portland Streetcar tracks and SW Moody Avenue at grade.

A South Waterfront transit station would be located between SW Moody Avenue and the planned location of SW Bond Street. The station would be configured to accommodate light rail and buses, and adjacent streetcar platforms would be located on SW Moody Avenue.

Leaving the station, the alignment would begin to climb as it approaches the new bridge crossing the Willamette River. The alignment would cross the planned SW Bond Street on retained fill, and then be elevated on structure to cross over the proposed future Willamette River Greenway Trail.

The Willamette River bridge would be a cable-stayed structure that would accommodate light rail trains, streetcars, buses, pedestrians, bicycles, and emergency vehicles. Buses, light rail trains, and streetcars would share a set of paved tracks in the center of the bridge. Two 14-foot multi-use paths would be on the sides of the bridge, separated from the transit vehicles and tracks by barriers.

The bridge would touch down south of the existing Oregon Museum of Science and Industry (OMSI) building. A station would be located east of OMSI and would have separate platforms for buses and light rail vehicles. Streetcars would leave the alignment prior to the station by turning north. Buses would depart the shared transitway at SE 7th Avenue.

Several related street improvements as well as facilities for connecting the streetcar to the Willamette River bridge are also planned. These improvements are discussed in more detail in Sections S.4.3 and 2.1.1.6, Related Bridge Area Transportation Facilities, but they include:

- Completion of streetcar facilities connecting to the Portland Streetcar Loop Project on the east side at OMSI and the Portland Streetcar in the South Waterfront at SW Moody Avenue, allowing streetcars to operate across the new Willamette River bridge
- The relocation of SW Water Avenue to a new alignment approximately one block east
- The reconstruction of SW Moody Avenue and the Portland Streetcar tracks between SW River Parkway and SW Gibbs Street

The light rail alignment then would continue east, crossing the Oregon Pacific Railroad (OPR) at grade and then continuing underneath the SE Martin Luther King Jr. Boulevard viaduct before turning southeast and running along the south and west side of Union Pacific Railroad (UPRR) right-of-way. From near SE 7th Avenue and SE Powell Boulevard, the LPA to Park Avenue would continue south and west of the UPRR tracks. An existing railroad spur, the Darigold Spur, would be closed. The OPR switching yard, which the light rail tracks would otherwise cross, would be relocated to the north of its existing location. Three at-grade street crossings of the UPRR tracks would be consolidated into one crossing of the UPRR and light rail tracks. The consolidated crossing would occur at a realigned SE 8th Avenue. SE Division Place and SE 9th Avenue would also be realigned to provide access to the consolidated crossing. The reconfigured intersections would have sidewalks and a combination of medians and crossing gates.

A station would be located on SE Gideon Street southwest of the SE 12th Avenue and SE Clinton Street intersection. To improve station access and traffic operations, several modifications to the surrounding street network would occur in the station area, including signalization, rerouting of traffic, and replacement of an existing pedestrian overpass, as described in Chapter 2.

The crossing of SE Powell Boulevard at SE 17th Avenue would be on a replacement structure adjacent to the existing UPRR bridge. South of SE Powell Boulevard, the light rail alignment would then transition to the center of SE 17th Avenue and continue to run in the center of SE 17th Avenue to south of SE Schiller Street to just north of SE McLoughlin Boulevard (OR 99E). To accommodate light rail, SE 17th Avenue would be realigned to the west, and widened to provide sidewalk, landscaping, stormwater swales, and other improvements. A center platform station would be located north of the SE 17th Avenue and SE Rhine Street intersection. The existing pedestrian overpass of the UPRR tracks at SE Lafayette Street would be replaced with a reconfigured overcrossing to better facilitate connections between the neighborhoods and the station at SE Rhine Street. Under the LPA Phasing Option, the construction of this overpass may be initially deferred. An island station would be located in a median of SE 17th Avenue, just north of SE Holgate Boulevard.

South of SE Schiller Street, immediately north of SE McLoughlin Boulevard, the alignment leaves SE 17th Avenue and transitions to a structure that allows an elevated overcrossing of SE Harold Street, and the future Harold Station would be located to the south. The construction of the station is accommodated in the design, but is not planned as part of the initial development of the LPA to Park Avenue. In addition, the LPA Phasing Option defers construction of some of the future station's structural facilities. After descending from the elevated structure at SE Harold Street, the light rail alignment to SE Tacoma Street is located between SE McLoughlin Boulevard and the UPRR tracks.

Along this section within the UPRR right-of-way, a bridge would be constructed for the light rail tracks to cross over Crystal Springs Creek, which is currently in a culvert that continues under the UPRR tracks. Constructing the bridge over the culvert would allow the culvert to be removed in the future. Wetlands would be filled in this area, which would require mitigation. Wetlands mitigation requirements are anticipated to be met through partial funding of the City of Portland's Westmoreland Park Restoration Project.

As the light rail line proceeds south, the tracks would rise on fill and be on structure over the northbound SE McLoughlin Boulevard ramp and then would cross under SE Tacoma Street

before crossing Johnson Creek on a new structure. A station and park-and-ride would be located south of Johnson Creek. As the alignment approaches the Tacoma Station, it would turn toward the southeast.

SE Tacoma Street to SE Lake Road

The Tacoma Station would be located south of SE Tacoma Street and Johnson Creek, between SE McLoughlin Boulevard and the UPRR main line tracks. The station platform would be toward the north side of the station site. The station would include a 800-space parking garage. The LPA Phasing Option would defer construction of the parking garage and would provide initially for 320 surface park-and-ride spaces. A new pathway would be constructed that would connect to the Springwater Corridor trail to the south of the site.

South of the station, the light rail line would cross under the existing Springwater Corridor trail bridge, which spans over the UPRR tracks. The light rail line would then rise on retained fill and cross over the Tillamook Branch line railroad tracks on an elevated structure. The Tillamook Branch line and the Anderson spur would be realigned to accommodate the required 25-foot track offset from freight sidings and the Tillamook main line. The light rail tracks would then cross under Highway 224.

The alignment remains along the east side of the Tillamook Branch line, separated by a 25-foot offset, through Milwaukie. A station in downtown Milwaukie would be located at SE Lake Road and SE 21st Avenue. The City of Milwaukie is planning transit-oriented development adjacent to the station at SE Lake Road.

SE Lake Road to SE Park Avenue

The tracks would cross over SE Lake Road and Kellogg Lake on a new bridge along the east side of the existing freight rail trestle within the railroad right-of-way. The alignment would cross over SE McLoughlin Boulevard to run along the west side of the roadway, and would continue on an elevated structure to cross over SE 22nd Street, SE Bluebird Street, and SE River Road. Along the west side of SE McLoughlin Boulevard in this area, the light rail project would use a portion of an old streetcar right-of-way that was purchased by Metro and the North Clackamas Parks and Recreation for the development of the Trolley Trail, a six-mile regional multi-use path that is to extend from downtown Milwaukie to Gladstone. A section of trail between SE River Road and SE Park Avenue would be constructed along with the light rail project. Light rail would operate between the trail and SE McLoughlin Boulevard. As the light rail project and the trail approach SE Park Avenue and a new station, light rail leaves the Trolley Trail alignment to stay along SE McLoughlin Boulevard, while the trail continues to follow the old streetcar right-of-way to the west and continues south to Gladstone. The tracks would terminate at a station on the north side of SE Park Avenue, and a 600-space park-and-ride structure would be located south of SE Park Avenue. The LPA Phasing Option would provide for development of a 355-space structure.

LPA Phasing Option

The LPA Phasing Option differs from the LPA by eliminating or deferring the elements of the LPA noted above in order to reduce the project cost. TriMet is seeking additional funding for the project to proceed with the LPA, but may need to implement some of the cost-reduction elements identified in the LPA Phasing Option. In this Final EIS, TriMet, Metro and FTA fully evaluate the environmental and community impacts of all of these elements as part of the LPA, and also consider the impacts of their deletion from the project as part of the LPA Phasing Option. If after the environmental Record of Decision has been issued by FTA, TriMet's financial plan requires additional deferral or elimination of project elements not identified in the ROD, TriMet, Metro and FTA will follow the environmental procedures defined in 23 CFR Part 771.129, and FTA may issue an amended ROD to identify the modified elements and any additional commitments to mitigate environmental and community impacts for such amended project.

S.4.2 Minimum Operating Segment (MOS) to Lake Road

The MOS to Lake Road would be the same as the LPA to Park Avenue except that it would have an initial southern terminus at SE Lake Road. The MOS to Lake Road would allow the project to be developed in phases if there is not sufficient funding to fully extend the project to SE Park Avenue. The MOS would still be designed to accommodate a future extension to the south. A downtown Milwaukie station would be located at SE Lake Road, similar to the LPA to Park Avenue, but there would be a third track at the terminus and a park-and-ride with 275 parking spaces located north of Kellogg Lake between SE Washington Street and SE McLoughlin Boulevard. In addition, the capacity of the Tacoma Park-and-Ride would increase to accommodate up to 1,000 spaces.

S.4.3 Related Facilities

Ruby Junction

The Portland-Milwaukie Light Rail Project would also require expanding the existing Ruby Junction Operations and Maintenance Facility in Gresham to store and service the additional light rail vehicles and supporting maintenance activities associated with the project.

Related Bridge Area Transportation Facilities

This FEIS also evaluates streetcar facility improvements designed to connect with the shared transitway over the Willamette River bridge, as well as related street modifications. On the west side, this would involve raising and reconstructing a portion of SW Moody Avenue to include double tracks in the median for the existing Portland Streetcar line serving the South Waterfront. On the east side, the improvements would complete the streetcar connection between the shared transitway and the Portland Streetcar Loop Project streetcar line (now under construction) at OMSI, which would also involve realigning a portion of SE Water Avenue.

S.4.4 Stations and Park-and-Rides

The FEIS examines station and park-and-ride options for the project. The LPA to Park Avenue would have ten stations, with a future station at SE Harold Street to be developed when land uses and ridership support its development, and the Jackson Station, deferred from a previous light rail project. The MOS would have one fewer station, with its terminus at SE Lake Road. Major elements that would be incorporated on the platform include shelters, ticket machines, lighting, furniture, and fencing and railings. All stations would include Americans With Disabilities Act (ADA)-accessible connections to the local street network and sidewalks.

From PSU and heading south, the stations include:

- Jackson (deferred from Portland Mall Transit Project)
- Lincoln
- South Waterfront (designed to accommodate bus and streetcar)
- OMSI (with adjacent OMSI streetcar station)
- Clinton
- Rhine
- Holgate
- Harold (future)
- Bybee
- Tacoma
- Lake Road
- Park Avenue (LPA to Park Avenue only)

There are options for park-and-rides at the following stations (although the LPA Phasing Option identifies smaller initial capacities):

- Tacoma Station (800 spaces with LPA to Park Avenue, 320 spaces with the LPA Phasing Option, and 1,000 with MOS to Lake Road)
- Lake Road Station (park-and-ride developed only with MOS to Lake Road, 275 spaces)
- Park Avenue Station (600 spaces with the LPA to Park Avenue, 355 spaces with the LPA Phasing Option, and no park-and-ride with MOS to Lake Road)

The key characteristics of the light rail project and the No-Build Alternative are summarized in Table S-1 below, and discussed in more detail in Chapter 2.

**Table S-1
Summary of Transit and Roadway Improvements/Modifications**

Alternative	Transit	Roadway
No-Build	<p>Existing transit services and facilities, plus:</p> <ul style="list-style-type: none"> • Some increases in route frequency and/or run times to avoid peak overloads and/or to maintain schedule reliability. • Incremental increases in service hours and vehicle procurement, consistent with available revenue sources and consistent with the RTP's year 2025 financially constrained transit network. • A new #30 Johnson Creek bus route on SE Johnson Creek Boulevard that would connect the Clackamas Transit Center and downtown Milwaukie. • The South Corridor Project on the Downtown Portland Transit Mall and I-205. • A 100-space shared park-and-ride at Clackamas Community College. • Minor changes in transit operations and routing in the South Corridor. • Expansion of TriMet's Powell Garage facility to accommodate at least 50 additional buses. 	<p>Road improvements included in the Regional Transportation Plan (RTP) year 2025 financially constrained highway network. See Appendix B of the <i>Detailed Definition of Alternatives Report</i> (Metro 2010) for a detailed listing of the planned roadway projects within the Portland-Milwaukie project area.</p>
LPA to Park Ave.¹	<p>All transit improvements included within the No-Build Alternative, plus:</p> <ul style="list-style-type: none"> • A double-tracked light rail between downtown Portland and Milwaukie, terminating at SE Park Avenue, generally parallel to and east of SE McLoughlin Boulevard, with 10 light rail stations, (plus a previously deferred SW Jackson station and a future SE Harold station) and 20 additional light rail vehicles (17 to 20 vehicles with the phasing option). • Adjustments to the bus routing to eliminate or modify bus routes that would duplicate light rail service and adjustment of routes to connect to light rail stations or transit centers. • An 800-space park-and-ride structure at SE Tacoma Street (with as few as 320 spaces on a surface lot with the phasing option). • A 600-space park-and-ride structure at SE Park Avenue (or a structure with as few as 355 spaces with the phasing option). • Elevated structures and track over SW Harbor Dr., the Willamette River, SE Powell Blvd., SE Harold St., Crystal Springs Creek, SE Tacoma St. ramps, Johnson Creek, the Tillamook Branch line, SE Lake Road, Kellogg Lake, and SE McLoughlin Blvd. • A new Willamette River bridge that will accommodate light rail, buses, bicycles, pedestrians, and a future streetcar. • Access to the new Willamette River bridge and transitway for bus lines 9, 17, and 19, allowing rerouting of buses from congested streets. • Expansion of the Ruby Junction Maintenance Facility to accommodate 17 to 20 additional light rail vehicles (a smaller expansion size if phasing is used). • New and consolidated control center for light rail transit (LRT) operations located at TriMet's Center Street facility. 	<p>The following road improvements and modifications in addition to those in the 2004 Regional Transportation Plan (RTP) financially constrained highway network:</p> <ul style="list-style-type: none"> • Modifications to segments of roadways along SW Lincoln Street; SW Harbor Drive; SW Moody Avenue between SW River Parkway and SW Gibbs Street and SE Water Avenue from the north side of the OMSI parking lot to SE Caruthers; and SE 8th, SE 9th, and SE 17th avenues in Portland. • Reconfiguration of access to SE McLoughlin Boulevard at the Tacoma Station. • Reconfigurations that would close SE Adams Street and SE Sparrow Street to through traffic.

**Table S-1
Summary of Transit and Roadway Improvements/Modifications**

Alternative	Transit	Roadway
MOS to Lake Rd.	<p>All improvements included with the LPA to Park Avenue except:</p> <ul style="list-style-type: none"> • Light rail would terminate in Milwaukie at SE Lake Rd., with no structure from SE Lake Rd. to SE McLoughlin Blvd. and would include 16 additional light rail vehicles. • A 1,000-space park-and-ride facility at SE Tacoma St. and a 275-space facility at SE Lake Rd. There would be no park-and-ride at SE Park Ave. • Expansion of the Ruby Junction Maintenance Facility to accommodate 16 additional light rail vehicles. 	Improvements and modifications included in the LPA to Park Avenue, except SE Sparrow Street would not be closed.
Related Bridge Area Facilities	<ul style="list-style-type: none"> • New double track for the Portland Streetcar in South Waterfront, realigned to remain within median of SW Moody Ave. • Realigned streetcar tracks and station at OMSI connecting to shared transitway, 	Reconstruction of SW Moody Ave. between SW River Parkway and SW Gibbs St. and realignment of SE Water Ave.

[†] Includes features that could be modified by the LPA Phasing Option. .

S.4.5 Willamette River Bridge

The light rail project includes a new bridge for light rail across the Willamette River. The Willamette River bridge would be a two-tower cable-stayed structure. It would have two towers nearly 180 feet high, anchored in foundations in the river. The bridge would be nearly 1,720 feet long from abutment to abutment. The bridge would have a shared transitway designed to accommodate light rail, streetcars, and buses, and it would provide bicycle and pedestrian paths on each side. The structure would provide 77.52 feet vertical clearance (Columbia River Datum) for approximately 150 feet in the center space of the bridge, and a minimum of 75.41 feet for nearly 300 feet. The bridge design was selected based on the project’s navigational analysis, a river use survey, public outreach, landside land use and transportation needs, and a review of environmental constraints for both the human and natural environment.

S.4.6 Light Rail Operations and Maintenance Facilities

The project would require an additional 20 light rail vehicles (a phased approach for the LPA would require 17 to 20 new vehicles) compared to the No-Build Alternative. In addition, the proposed Columbia River Crossing Project is currently considering a proposal to extend the Yellow Line to Vancouver, Washington, which will also require additional light rail vehicles. Therefore, both projects are preparing FEIS documents that evaluate the expansion of TriMet’s existing Ruby Junction Operations and Maintenance Facility, located in the city of Gresham on NW Eleven Mile Avenue. The expansion could be conducted in phases to enlarge the existing maintenance facility site, including adding new structures and storage tracks to accommodate the maintenance needs. The existing operations control center at Ruby Junction would be relocated to TriMet’s Center Street offices on SE 17th Avenue in Portland. The FEIS evaluates an initial phase that expands the facility to meet the needs of the Portland-Milwaukie Light Rail Project, and then a full expansion that meets the needs of both projects.

S.5 TRANSPORTATION IMPACTS

This section summarizes the transit, highway, and freight impacts (by 2030) of the project, including the connection provided for the Portland Streetcar.

S.5.1 Transit Impacts

The project would offer benefits to transit riders by providing faster, more reliable service, improved access to stations, and more convenient connections to other destinations in the region. In addition to the improvements directly due to light rail operations, the new bridge will allow improved service and better connections for buses and the streetcar system, which will improve transit times and access for riders on those modes.

With the light rail project, total transit travel time savings from downtown Milwaukie would be from three to four minutes to Pioneer Square, 8 to 15 minutes to PSU, and between 23 to 32 minutes for transit trips between Milwaukie and the South Waterfront area, which is not currently a direct route. Transit travel times would be competitive with automobile trips throughout the corridor, and light rail would be faster than driving for a trip from the east side to the South Waterfront District area.

S.5.1.1 Transit Ridership

The project would increase transit trips at both corridor and system levels. Up to 25,570 daily trips on light rail would be expected in the Portland-Milwaukie Corridor by the year 2030. The most light rail trips would occur with the LPA to Park Avenue because the longer route allows more stations and more park-and-rides, providing greater accessibility to more people. The MOS to Lake Road would have slightly lower ridership at up to 24,810. The LPA Phasing Option would produce 22,700 projected trips. Completion of the streetcar loop provides the highest level of increased ridership systemwide. There are also travel time benefits provided by the Willamette River bridge and the shared transitway.

The light rail project would result in up to 547,000 average weekday systemwide trips on transit (all modes) in 2030, compared to approximately 532,500 trips with the No-Build Alternative. Rail trips systemwide would increase from 240,200 in 2030 with the No-Build Alternative to 262,500 with light rail and the new streetcar connection across the bridge.

S.5.2 Traffic Impacts

S.5.2.1 Regional Traffic Impacts

The project would benefit the regional transportation system by reducing vehicle use, as measured in changes in vehicle miles traveled (VMT), vehicle hours traveled (VHT), and vehicle hours of delay (VHD).¹

The project would reduce VMT by as much as 70,000 miles daily, VHT by up to 6,500 hours, and VHD by about 400 hours per average weekday compared to the No-Build Alternative.

¹ Vehicle hours of delay is the amount of delay on congested roadways (above 0.9 vehicle-to-capacity ratio).

S.5.2.2 Local Transportation Impacts

The analysis of the Portland-Milwaukie Light Rail Project considers effects on local transportation facilities and uses, including bicycle and pedestrian activity, parking, congestion and delays, and freight access.

S.5.2.3 Bicycle and Pedestrian Activities

The project offers connections to several regional trails, including via the new bridge, as well as by existing and planned regional trails near the Tacoma Station and downtown Milwaukie.

S.5.2.4 Parking

The project would affect over 300 existing parking spaces in the corridor, but would provide between 675 and 1,400 new spaces in park-and-rides. In most areas, the losses have low impacts considering available supply and project demand. Along SE 17th Avenue, the loss of on-street and off-street parking near TriMet's maintenance facility would result in an undersupply of parking, requiring a mitigation and management strategy, including the replacement of spaces. Light rail would also offset demand by offering an alternative to driving and parking.

S.5.2.5 Congestion and Delay

Without mitigation, the project would degrade intersection conditions below standards at up to 18 locations in Portland, Milwaukie, and Clackamas County. Most of these locations would be below standards even with the No-Build Alternative, but the light rail project would increase delays. The major affected intersections are on streets in the South Waterfront, along SE 17th Avenue, and along SE McLoughlin Boulevard. Potential mitigation measures or design refinements are available to reduce the impacts of light rail, and will be further defined through work with local jurisdictions and the Oregon Department of Transportation.

S.5.2.6 Freight Access

Some of the delays listed above, as well as street modifications, could affect freight access and travel times, particularly in the CEID and in the McLoughlin Industrial District. Travel times for trucks could increase by approximately 30 seconds in the CEID, and up to 22 seconds in the McLoughlin Industrial District.

S.5.3 Navigational Impacts

The Portland-Milwaukie Light Rail Project proposes a new bridge over the Willamette River between the Marquam and Ross Island bridges (shown on Figure S-2). The proposed bridge provides a vertical navigational clearance of 77.52 feet, with river levels as measured by Columbia River Datum.

Both the Ross Island and Marquam bridges have maximum vertical clearances of 120 feet. The lowest existing vertical clearance in this part of the river is 75 feet at the Sellwood Bridge. A survey of river users (including commercial and recreational users) found that most uses would be accommodated with a 65- to 72-foot clearance and the majority of the river's commercial navigational use is located downstream of the proposed bridge. Some ships arriving for the Rose

Festival have higher clearance requirements than are proposed. Several industrial users may be affected because their operations periodically use crane barges that require higher clearances at high water. The U.S. Coast Guard will make the final decision. It appears that most users can be accommodated with 77.52-foot clearance and the proposed bridge will be adequate for river traffic, accommodating the majority of users without restrictions.

S.6 ENVIRONMENTAL CONSEQUENCES

Table S-2 summarizes environmental impacts that would occur with the No-Build Alternative, the LPA to Park Avenue, the MOS to Lake Road, the streetcar and Related Bridge Area Transportation Facilities, and Ruby Junction, followed by a discussion of major effects by area by environmental topic.

**Table S-2
Summary of Environmental Impacts**

Measures	No-Build	LPA to Park Ave.*	MOS to Lake Rd.	Related Bridge Area Facilities	Ruby Junction*
Displacements and Acquisitions					
Full Acquisitions	0	93-95	77-78	0	9-14
Partial Acquisitions	0	112-120	107	6	1
Permanent Easements	0	2	2	0	0
Displaced Residences; Businesses; Vacant Buildings; Other	0	11; 56-58; 3	1; 52-53; 4	0;0	5-9; 6-9
Land Use and Economic					
Compatibility with Local Land Use Plans	Low	High	High	High	High
Construction: Potential Temporary Increase in Personal Income (millions) direct and indirect	0	\$532-573	\$513	Included in LPA and MOS	Included in LPA and MOS
Construction: Estimated Increase in Employment (jobs)	0	13,500-14,500	13,000	Included in LPA and MOS	Included in LPA and MOS
Estimated Jobs Displaced	0	675-850	651-726	0	79
Tax Revenue Impact Due to Full Property Acquisition	0	\$1.14-1.15 million	\$1.08 million	0	\$19,400-41,905
Community Impact Assessment					
Neighborhood Benefits	Low	High	High	High	Low
Neighborhood Impacts	Low	Low	Low	Low	Low-Medium
Visual Resources Impacts	Low	Low-High	Low-High	Medium-High	Low
Historic and Archaeological Resources					
Properties with Identified Historic Resources	0	53	44	2	0
Historic Resources with Expected Adverse Effects	0	3	3	0	0
Recorded Sites in APE; Sites or Potential Probability Areas for Encountering Archaeological Resources	7; 0	6; 26	2; 22	1; 2 (overlap with LPA;MOS)	1;1
Parks and Recreational Resources					
Number of Existing Parks Impacted	0	4	3	0	0
Number of Planned Parks Impacted	0	2	1	0	0
Geology and Soils Impacts	None	None	None	None	None

**Table S-2
Summary of Environmental Impacts**

Measures	No-Build	LPA to Park Ave.*	MOS to Lake Rd.	Related Bridge Area Facilities	Ruby Junction*
Ecosystems					
Wetland Filled; Spanned (acres)	0	1.11	1.11	0	0
Permanent Footprint of Project Area Stream Crossings (ft ²)	0	122,785	114,785	0	0
Impervious Surface Area (acres)	0	18.5 - 20.3	15.7	4.7	0.4 - 0.7
Vegetation Impacts Excluding Open Water (acres)	0	16.2	11.4	0	0
Impacts to Threatened or Endangered Fish-Bearing Streams (lineal feet)	0	222	182	0	0
Water Quality; Hydrology					
Combined Acreage in Floodplain	0	5.3	5.2	2.3	<0.01
Noise and Vibration					
Noise Impacts without Mitigation	0	51	40	0	0-1
Vibration Impacts without Mitigation	0	40	32	0	0
Regional Air Quality (tons per day) and Greenhouse Gas					
Carbon Monoxide	584.5	584.0	583.9	Included in LPA	Included in LPA
Nitrogen Oxides	15.9	15.9	15.9	Included in LPA	Included in LPA
Volatile Organic Compounds	18.0	18.0	18.0	Included in LPA	Included in LPA
Carbon Dioxide	36,292	36,255	36,253	Included in LPA	Included in LPA
Energy Consumption					
Regional Daily Vehicle (10 ⁹ BTU)	495.458	494.945	494.912	Included in LPA	Included in LPA
Hazardous Materials					
Acquired Sites of Concern; Sites of Highest Concern	0	65; 32	65; 33	Included in LPA; MOS	1
Public Services Impacts	None	Minor	Minor	Minor	Minor

* Ranges indicate the LPA to Park Avenue and LPA Phasing Option and phased development of the Ruby Junction Facility. When no range is shown, effects for the LPA Phasing Option are similar to the LPA to Park Avenue.

S.6.1 Acquisitions and Displacements

The light rail project would acquire from 77 to 95 full properties, displacing 1 to 11 residences and 52 to 58 businesses, depending on the length of the project to be built and how it is phased. The expansion of the Ruby Junction Maintenance Facility would fully acquire from 9 to 14 additional parcels, displacing 6 to 9 residences and 5 to 9 businesses. The project will provide compensation and relocation assistance consistent with the requirements of applicable state and federal law and TriMet policy, which will minimize impacts to property owners, businesses, and residents.

S.6.2 Land Use and Economics

The project would be more supportive of statewide planning goals and regional and local plans and policies than the No-Build Alternative. The project serves major regional employment and commercial and residential areas, and it supports statewide planning goals by providing a transportation service that reduces reliance on the automobile.

The project supports the regional *2040 Growth Concept*, which directs most new development to mixed-use urban centers and along major transportation corridors. The proposed project also supports local jurisdiction land use plans and policies. For example, the project would serve the South Waterfront area, an area targeted for major development by the City of Portland, and it would support revitalization plans for downtown Milwaukie.

Sixty-one to 67 businesses with up to 929 jobs could be affected by property acquisition and business displacement and relocation actions. The project's mitigation measures include compensation and relocation for property owners and businesses, which would minimize the effects. If businesses are able to relocate within the area or region, job losses would be lower. Construction of light rail would also provide near-term economic benefits by providing employment, with direct, indirect, and induced effects projected to include up to 14,500 additional person-year jobs and up to \$573 million more in additional personal income, compared to the No-Build Alternative.

S.6.3 Communities

The project would have generally positive effects on local communities, including low-income and minority populations within the corridor, because it would increase access and mobility within the corridor and to areas throughout the region. Most of the project is located along existing transportation corridors, thus avoiding the division of neighborhoods and limiting property impacts, and there are no significant impacts to public or community facilities. Indirect impacts to neighborhood quality, such as severe noise and vibration impacts, would be mitigated. Stations are expected to support neighborhood commercial centers and provide improved access to nearby residents.

Since the light rail project would include stations to serve minority and/or low-income populations, and has limited other impacts such as displacements, noise, and vibration that cannot be mitigated, the light rail project would result in a net benefit to minority and/or low-income neighborhoods, compared to the No-Build Alternative. At the Ruby Junction Maintenance Facility, where the project will displace residents and businesses, the project's mitigation commitments including compensation and relocation assistance will mitigate impacts to avoid adverse and disproportionate impacts.

S.6.4 Visual Resources

The project would be largely within established transportation corridors in urbanized areas. Visual impacts vary in the corridor from low to high. In many areas, visual impacts would be low. However, where there are major structures, localized impacts are often high. For example, a new bridge over the Willamette River would be the largest visual change created by the project. The cable-stayed bridge would have a high visual impact but also is an opportunity to create visual interest. In a few other locations, structures required for the project would affect localized views, including near South Waterfront and in sections with elevated structures that are needed for the alignment, such as at SW Harbor Drive, along the UPRR near the Ardenwald neighborhood, and SE McLoughlin Boulevard near SE River Road. At SE Harold Street, the elevated structure and future elevated station would be visible to parts of three adjacent neighborhoods, but would be located in the Brooklyn Yard. Park-and-rides would also introduce new multi-story parking structures at SE Tacoma Street (or a surface facility with the LPA

Phasing Option), at SE Lake Road (only with the MOS to Lake Road), and at SE Park Avenue (with LPA to Park Avenue, and a smaller facility with the LPA Phasing Option).

S.6.5 Historical and Cultural Resources

The project (either the LPA to Park Avenue or the MOS to Lake Road, including the Ruby Junction Facility and the Related Bridge Area Transportation Facilities) would adversely impact three historic resources, requiring mitigation. Construction activities could affect 22 to 26 areas with the potential to contain archaeological resources. Most of these potential areas are small and related to individual properties that are being acquired where previous historic period activities had occurred. The three historic resources are the Royal Foods Warehouse at SE 8th Avenue in Portland (project would require the full acquisition of the property and partial to full demolition of the building), Westmoreland Park at 7605 SE McLoughlin Boulevard (mitigation for the project at that site will turn a duck pond into a riparian wetland), and the R. Derwey House at 2206 SE Washington Street in Milwaukie (the project would require the acquisition of land along the west side to within approximately 10 feet of the historic house).

S.6.6 Parks and Recreation

The project would affect up to four existing park or recreational resources and two planned parks or recreational resources. Most of these effects involve the light rail crossing over or near a resource. The light rail project would cross two regional trails: the Eastside Willamette River Greenway and the Springwater Corridor. The Eastside Willamette River Greenway trail would be modified during construction and a section of the trail would be closed with a detour provided. The project has also coordinated the design of light rail in conjunction with the planned Trolley Trail project, allowing both facilities to develop within a shared right-of-way. The light rail project also involves developing natural resource mitigation within Westmoreland Park, in partnership with a City of Portland project that is seeking to restore natural stream and wetland functions along Crystal Creek, where a constructed duck pond currently exists. The project also will temporarily use a portion of Robert Kronberg Park for construction staging.

S.6.7 Geology and Soils

The project would not have adverse impacts on geology or soil resources.

S.6.8 Ecosystems

The project would have impacts to one acre of wetlands. The project would cross the Willamette River and up to six streams. There are species protected under the Endangered Species Act that are likely to occur in the project area. This includes seven aquatic species, including salmon, which are likely to be present in the Willamette River and tributary streams. The project would involve alteration of their habitats, and construction could also involve activities that could harm fish. The light rail project would cross the Willamette River and six streams, with 123,000 square feet crossing above a stream (115,000 square feet for the MOS to Lake Road). However, most of this area would involve structures spanning over the streams, and only the Willamette River and possibly Kellogg Creek would have structures below flood levels. These waterways are critical habitat to endangered species, but the expected long-term impact to habitat and channel integrity is low, particularly after project mitigation measures are included.

S.6.9 Water Quality, Hydrology, and Floodplain

The project would place up to 7.6 acres of facilities and related fill in floodplains, (5.3 acres for the light rail elements and 2.3 acres with the Related Bridge Area Transportation Facilities). It would encroach upon the floodplains of Crystal Springs Creek, Johnson Creek, and the Willamette River. Under the LPA to Park Avenue, the project also would encroach on the Kellogg Lake floodplain. The acreage of light rail and other transportation facilities located in a floodplain was used to provide rough estimates of floodplain impacts. With the Ruby Junction Facility, there would be less than 0.01 acre of new impervious surface within a mapped floodplain, and the phasing option would avoid the mapped floodplain area. With the LPA Phasing Option, surface parking at the Tacoma Station would increase impervious surface compared to the LPA to Park Avenue.

The project would also place structures and fill within the Willamette River floodway, resulting in a 0.6-inch net rise in peak flood levels, which would require a Conditional Letter of Map Revision from the Federal Emergency Management Agency (FEMA). Impacts due to new impervious surface are relatively low due to the size of the watershed and because the light rail project would adhere to all applicable stormwater management regulations.

S.6.10 Noise and Vibration

The project would result in 40 to 52 adverse noise impacts without mitigation; three of the impacts are severe due to noise from warning bells at crossing gates. All of the impacts can be mitigated. Without mitigation, the light rail project would have 32 to 40 vibration impacts, most of which occur in areas south of the Tacoma Station. Mitigation measures are available to eliminate these impacts.

S.6.11 Air Quality and Greenhouse Gas Emissions

Federal regulations require states to prepare State Implementation Plans that identify emission reduction strategies for non-attainment and maintenance areas. As part of these plans, federal regulations also call for federal review of the air quality effects of transportation-related investment required for regional transportation plans. A light rail line connecting Portland to Milwaukie is included in the RTP financially constrained network and in the Portland area Metropolitan Transportation Improvement Program (MTIP). Both the RTP financially constrained network and the MTIP have been determined to conform to the State Implementation Plan for controlling emissions.

Regional vehicle emissions are expected to decrease for all future conditions relative to existing conditions, and the light rail project would further support state and regional plans by providing an alternative to automobile use. The project would help reduce regional emissions for carbon monoxide, supporting federal air quality conformity requirements for the region. Greenhouse gas production due to regional travel would also be lower for the light rail project compared to the No-Build Alternative, which helps support regional reductions in greenhouse gases.

S.6.12 Energy

Compared to the No-Build Alternative, the project would reduce total regional energy consumption, with a reduction of up to 0.261×10^9 Btu per average weekday.

S.6.13 Hazardous Materials

The project would involve construction in areas with hazardous materials releases, but the risk of exposure to people or the environment would be low, and contamination of affected sites would be reduced or managed. Hazardous materials can increase the complexity of construction and increase costs. The Willamette River bridge would encounter two contaminated sites of high concern. During bridge construction, the project would also encounter contaminated in-water sediments, requiring special measures to minimize impacts.

S.6.14 Utilities and Public Services

The project will require the relocation of public and private utilities along the alignment, including water, sewer, power, and telecommunication utilities. Through coordination with the utility owners, protection of adjacent utilities and other best practices for construction, disruption of services can be minimized or avoided. Public services including emergency services could also be affected during construction, particularly where the alignment is within public street right-of-way; through coordination with service providers and effective construction traffic controls, impacts would be minimized.

S.6.15 Construction Impacts

The construction of the project is a major activity that will involve both temporary and permanent changes along the project alignment, with the potential to affect natural resources and the adjacent communities. Construction is planned to begin in summer 2011 and extend through summer of 2015. Although overall project construction is assumed to require four years, the major activities usually occur over about a two-year period. In order to minimize disruption to businesses and residences, construction that would affect access would be planned, staged, and completed in a manner that would minimize disruption. The duration of heavy civil construction in front of any particular property would typically not exceed six to twelve months, with some exceptions possible.

The most complex structure being developed for the project is the Willamette River bridge, which would likely take the full four years of construction to complete. It involves the construction of in-water structures to support the two towers of the bridge, and the placement of rock on the river bottom to prevent erosion or “scour” of river sediments due to changes in currents around bridge piers.

Other major construction activities include:

- Transport of workers, materials, and equipment
- Demolition (buildings, pavement and structures, other obstructions)
- Relocation and possible disruption of utilities, including fiber optic, gas, sewer, water, and communication
- Clearing, grubbing, excavation, fill, and grading
- Construction or reconstruction of structures, including bridges, overpasses, or retaining walls

- Pile driving or drilling
- Concrete casting
- Roadway construction, including intersections, signal systems, sidewalks, bicycle facilities, or trails
- Trackway and roadway construction
- Station construction
- Parking garage and maintenance facility construction
- Landscaping and replanting

These activities would be a major source of jobs and economic activity, but they are also potential sources for impacts such as localized increases in traffic and delays, loss of parking, reduced access, increased noise, increased dust and dirt, and visual impacts. The removal of natural or built features from the existing landscape would also have the potential to impact ecosystems habitat, expose soils to erosion, and affect stormwater runoff with impacts to water quality, fish, and wildlife. Some of the removed soils or buildings could contain hazardous materials, requiring treatment and handling consistent with state and federal laws. Project construction would also consume energy, and the use of combustible fuels would be a source of pollutants and greenhouse gases. The FEIS environmental and transportation chapters provide more details on these and other construction impacts and then identify best practices and mitigation commitments that the project will employ to minimize impacts and reduce their severity and duration.

S.7 EVALUATION OF THE ALTERNATIVES

This section summarizes the financial analysis in Chapter 5, which also examines the ability of the project to meet the purpose and need and related performance objectives.

S.7.1 Financial Feasibility Analysis

This section assesses the financial feasibility of the alternatives, given the costs of the alternatives and the current, anticipated, and potential sources of revenue. The financial feasibility analysis is divided into two elements, because each element would have a different financing plan:

- **Project Capital Financial Feasibility Analysis** focuses on whether there are adequate project capital resources currently available to construct light rail and, if not, the options for resolving the project capital need for additional resources.

- **System Fiscal Feasibility Analysis** focuses on whether there are adequate resources to operate and maintain the entire transit system, including operations of the Portland-Milwaukie Light Rail Project, between now and the year 2030 and, if not, the options for resolving the system’s financial needs. System costs include all transit operation and maintenance (O&M) costs and all transit capital expenditures to the year 2030, except for the capital costs of the Portland-Milwaukie Light Rail Project accounted for in the Project Capital Financial Feasibility Analysis.

S.7.2 Costs

S.7.2.1 Project Capital Costs

As shown in Table S-3, LPA to Park Avenue is estimated to cost about \$1.548 billion in YOE dollars, about \$57 million more than the LPA Phasing Option and almost \$167 million more than the MOS to Lake Road. The LPA Phasing Option is estimated to cost about \$109 million (YOE dollars) more than the MOS to Lake Road.

Table S-3
Capital Costs of Portland-Milwaukie Light Rail Project
In Millions of 2010 and Year-of-Expenditure (YOE) Dollars

	LPA to Park Ave	LPA Phasing Option	MOS to Lake Rd
Insurance, Special Condition	\$49.6	\$49.3	\$44.3
Utilities/street construction	\$76.5	\$76.8	\$69.6
Track Grade, Structures, Installation	\$274.1	\$270.2	\$247.7
Stations/Park and Rides	\$50.1	\$34.8	\$48.6
System	\$69.9	\$69.1	\$64.9
Operations/Maintenance Facility	\$8.1	\$5.1	\$7.8
Right-of-Way ³	\$204.0	\$203.6	\$196.8
Vehicles ¹	\$87.1	\$77.3	\$69.9
Professional Services	\$173.5	\$166.3	\$154.8
Unallocated Contingency	\$161.0	\$159.6	\$139.3
Sub-Total (2010 Dollars)	\$1,153.9	\$1,112.1	\$1,043.7
Escalation to Year-of-Expenditure on Sub-Total	\$120.6	\$116.2	\$111.1
Finance Charges ²	\$273.4	\$262.1	\$226.4
Total in Year-of-Expenditure Dollars	\$1,547.9	\$1,490.4	\$1,381.2

Source: TriMet, 2010; numbers may not add due to rounding.

¹ LPA to Park Avenue cost incorporates 20 vehicles; LPA Phasing Option incorporates 18 vehicles, and MOS to Lake Road cost incorporates 16 vehicles.

² Includes interest payments for interim borrowing and net finance costs during the construction period on bonds issued to provide local match. Finance costs are based on assumption that annual appropriations of New Start funds for the project would not exceed \$100 million in any one year. Finance costs and, therefore, total project costs would change if assumption regarding annual appropriation levels change during Final Design.

³ Includes Land and right-of-way purchased plus value of land and right-of-way donated to project.

S.7.2.2 Capital Funding Conclusions

Table S-4 illustrates the proposed capital funding plans for the LPA to Park Avenue, the LPA Phasing Option, and the MOS to Lake Road.

Table S-4
Capital Funding Plan for Portland-Milwaukie Light Rail project by Funding Scenario
In Millions of Year-of-Expenditure Dollars

	LPA to Park Ave.	LPA Phasing Option	MOS to Lake Rd.
Capital Cost in YOE Dollars	\$1,547.9	\$1,490.4	\$1,381.2
Capital Revenues			
U New Starts	\$773.9	\$745.2	\$690.6
A State Lottery Bond Proceeds	\$250.0	\$250.0	\$250.0
A MTIP-GARVEEs	\$99.8	\$99.8	\$99.8
A/U In-Kind Property Contributions	\$56.7	\$56.7	\$56.7
A Milwaukie	\$5.0	\$5.0	\$5.0
A Portland	\$30.0	\$30.0	\$30.0
A Clackamas County	\$25.0	\$25.0	
A/U TriMet	\$40.0	\$40.0	\$40.0
A Metro Grant	\$0.3	\$0.3	
U Additional Local	\$80.6	\$54.2	\$46.2
A ODOT CMAQ Grant	\$10.0	\$10.0	\$10.0
A/U Local Funds for Net Finance Costs for Local Match	\$176.6	\$174.2	\$153.0
Total Revenues	\$1,547.9	\$1,490.4	\$1,381.2

Source: TriMet 2010

U = Unavailable Currently (subject to future approvals); A = Available, A/U = Partially currently available.

Even with a Full Funding Grant Agreement (FFGA), a project must have New Starts funds appropriated to it by Congress on an annual basis to actually receive such funds. The amount of New Starts Funds appropriated to the project is subject to a variety of variables and the demand for appropriations from other projects. The amount of New Starts funds appropriated to a project in a given year may be less than the Portland-Milwaukie Light Rail Project requires that year.

In years when fewer New Starts funds are appropriated for the project than are needed by the project, the finance plan must use interim borrowing to maintain its optimum construction schedule. Interim-borrowed funds would be repaid with later-appropriated New Starts funds, but the Portland-Milwaukie Light Rail Project would incur interest costs during that interim. The cost estimates shown in Table 5.1-1 in Chapter 5 include the finance costs associated with the interim-borrowing program.

S.7.2.3 Operating and System Costs

Transit operating and maintenance costs for the No-Build Alternative in this corridor are estimated to be \$28.73 million in 2010 dollars. Operations and maintenance for the light rail project would cost \$9.02 to \$7.62 million (2010) a year more than the No-Build Alternative

(costs for LPA to Park Avenue and MOS to Lake Road respectively, with the LPA Phasing Option costs slightly lower than the LPA to Park Avenue), due to higher service levels associated with the project.

The *total system cost* of an alternative is the sum of *system capital costs* and *system operating costs*. The *total system costs* for the build alternatives during the planning period are about \$257 - \$283 million higher than for the No Build alternative. Over the planning period, *total systems costs* for the LPA to Park Avenue would be about \$16 million more than for the LPA Phasing Option and about \$26 million more than for the MOS to Lake Road.

S.7.2.4 System Feasibility

A transit system cash flow analysis of the project has found that there are sufficient beginning cash amounts to meet transit system needs to implement the project.

S.8 SOCIAL EQUITY CONSIDERATIONS

Social equity is measured in this FEIS by comparing impacts and benefits of the light rail project to conditions with the No-Build Alternative in order to ensure that there are not unfairly distributed adverse impacts or benefits occurring across population sub-groups. Project benefits are primarily the improved transit access that would be provided, and project impacts are those effects that would affect the function and livability of neighborhoods. This analysis focuses on corridor neighborhoods that have a higher-than-average minority and/or low-income population (i.e., based on the Portland metropolitan area average). Definitions for minority (i.e., non-white and/or of Hispanic or Latino origin—referred to in this FEIS as Hispanic) and low-income (below the federal poverty level) neighborhoods are based on U.S. Census definitions and 2000 U.S. Census data. Additional information is available in Section 3.3, Community Impact Assessment.

As summarized in Table 3.3-2, the proposed light rail project would pass through 11 neighborhoods: seven in the City of Portland, four in the City of Milwaukie, and one in unincorporated Clackamas County (Ardenwald neighborhood is in both Portland and Milwaukie). Two neighborhoods have minority and/or Hispanic populations greater than the regional average of 17.1 and 8.0 percent, respectively (2000 U.S. Census). In alphabetical order, these neighborhoods are: Downtown Portland (23.7 percent minority) and north Milwaukie (23.5 percent minority and 15.7 percent Hispanic). Several also have a percentage of low-income residents that is greater than the regional average of 8.7 percent: Downtown Portland (32.1 percent); Brooklyn (11.9 percent); Hosford-Abernethy (12.9 percent); Sellwood-Moreland (10.8 percent); and Ardenwald (13.9 percent). The Ruby Junction Facility expansion would occur in the Rockwood neighborhood in Gresham.

The expansion of the Ruby Junction Facility will displace residences and businesses in an area that has a higher proportion of low-income residents compared to the region as a whole. The LPA Phasing Option would reduce the level of displacements at Ruby Junction, but would still affect businesses and residences. With the project's commitments to fulfill applicable federal and state requirements for property acquisition and the treatment of displaced residences and businesses, including providing suitable replacement housing, compensation, and relocation assistance, the impacts are mitigated and would not be adverse.

The light rail project would include stations to serve minority and/or low-income neighborhoods along the alignment where most of the project impacts occur, except for at the Ruby Junction facility. However, the project mitigates impacts such as displacements, noise, and vibration, and it aligns along existing streets and right-of-way. Considering the low level of impacts after mitigation and the mobility improvements offered, the light rail project would result in a net benefit to minority and/or low-income neighborhoods, compared to the No-Build Alternative.

S.9 PROJECT IMPLEMENTATION

This section addresses some of the more important and immediate landmarks accomplished since the publication of the SDEIS and decision points or project actions moving forward.

S.9.1 Selection of a New Locally Preferred Alternative (LPA)

The publication of the SDEIS initiated a 45-day public comment period, which included a public hearing. The SDEIS, related technical documents, and comments received during the public review period provided a basis for local jurisdictions to recommend and adopt the LPA presented in the FEIS.

To organize groups and input regarding the project, the Portland-Milwaukie Light Rail Project established a steering committee and, with the help of participating jurisdictions and the general public, developed and presented independent recommendations on project elements to be included in the LPA. The project also established a Citizen Advisory Committee and a working group focused on river crossing issues. Public comments are summarized in the *Public Comment Report*, published by Metro in June 2008. After the close of the public comment period, the Metro Council considered public comments, including recommendations from the steering committee, the Citizen Advisory Committee and other jurisdictions. The Metro Council also considered recommendations by the TriMet Board of Directors, and the Joint Policy Advisory Committee on Transportation (JPACT). The selection of the new LPA and option(s) is summarized in the *Locally Preferred Alternative Report*, published by Metro in July 2008.

S.9.2 Publication of the Final Environmental Impact Statement

FTA is releasing this FEIS and advertising its availability with a notice in the Federal Register. TriMet and Metro are also making the FEIS available in a variety of formats, and is notifying agencies and all parties who have commented previously. Publication of this FEIS initiates a 30-day public review period.

S.9.2.1 Record of Decision

Following the 30-day public review period following publication of this FEIS, the FTA will issue a Record of Decision (ROD) documenting its findings on the environmental effects and mitigation commitments, including whether the project has satisfied the requirements of all applicable federal regulations. The U.S. Coast Guard and the U.S. Army Corps of Engineers are cooperating agencies and must also provide approvals for the new bridge prior to its construction. Chapter 6 provides an extended list of the permits and approvals that would be required. Appendix M contains the Mitigation Plan for the project. With the ROD, the project

would be eligible for additional federal funding, allowing final design, right-of-way acquisition, permitting, and construction activities to be initiated.

S.9.3 Implementation of the Finance Plan

The financial analysis presented in the FEIS shows that the Portland-Milwaukie Light Rail Project will require, in varying degrees, significant revenue that is currently not available. The financial analysis also identified required new levels, and proposed sources, of revenue. New federal funds will need to be secured through the Federal Section 5309 New Starts authorization and appropriations cycles and through the FTA grant process. New local funds will also need to be secured through one or more local intergovernmental agreements.

Implementation of the finance plan depends on successfully obtaining:

- Issuance of the ROD by FTA
- Formal commitments of the remaining donations of right-of-way and construction staging areas, to be used as in-kind local match
- A sufficient New Starts rating to be eligible for New Starts funding
- FTA approval to begin Final Design
- FTA approval of an FFGA that provides Section 5309 New Starts funds in the amount required by the finance plan, and annual appropriations of the New Starts Funds by Congress

S.9.4 Project Timeline

The release of the FEIS and its following 30-day public review period allows the FTA to prepare and publish an ROD on the project. Other key dates in the project's anticipated schedule include:

- Final Design and Construction Planning: 2010 to 2011
- Project Construction and Testing: 2011 to 2015
- Revenue Operations: as early as 2015