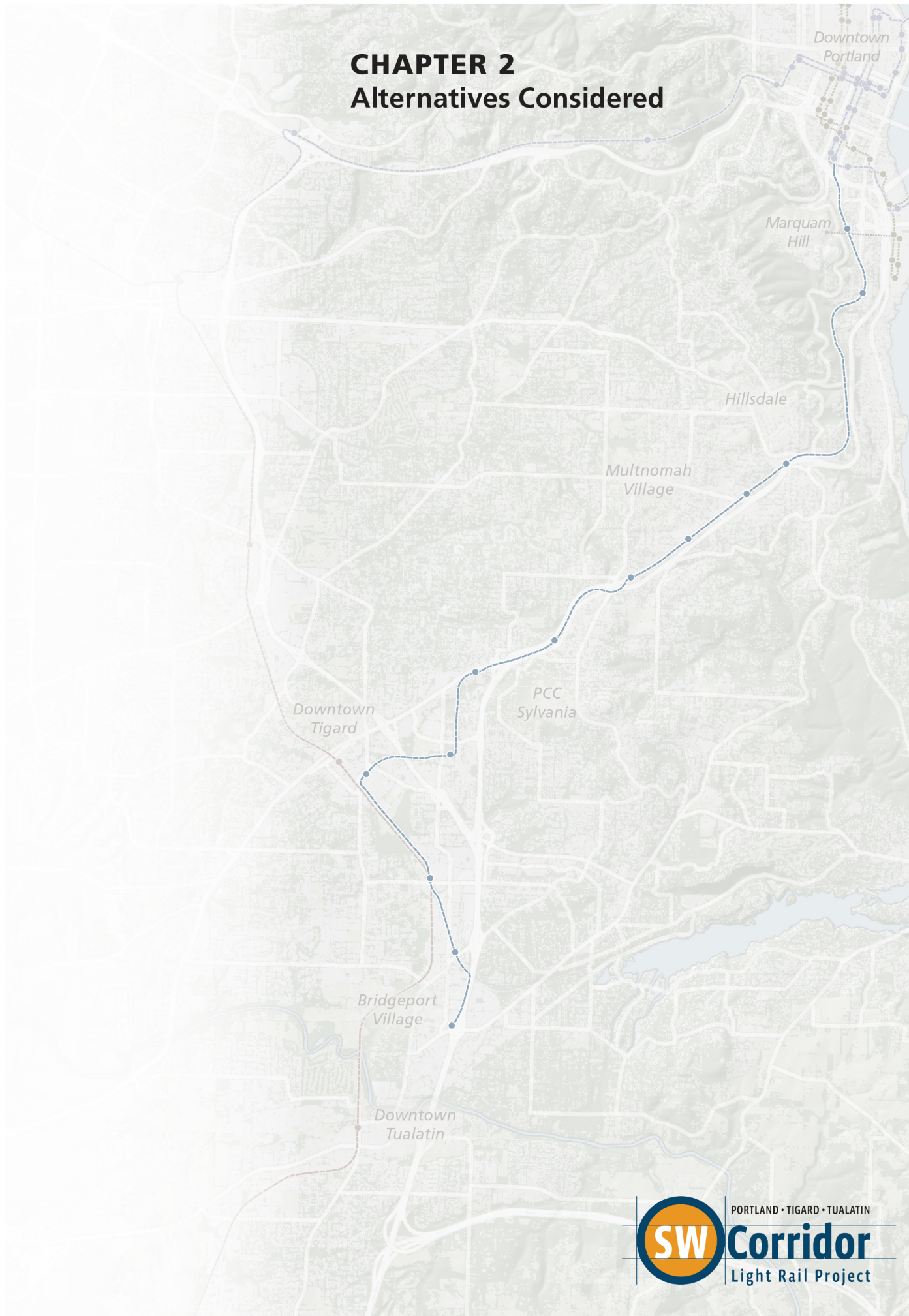


# CHAPTER 2

## Alternatives Considered



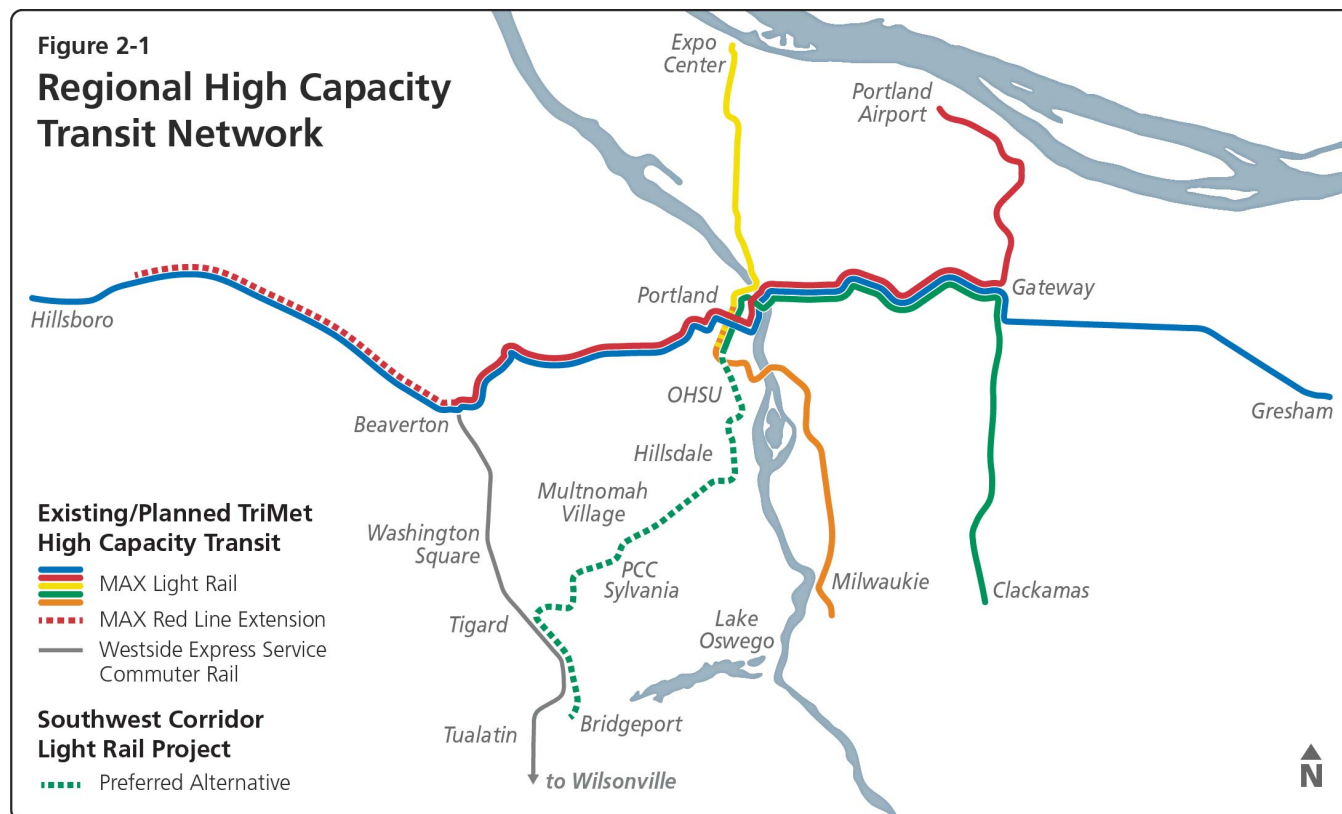
## 2. ALTERNATIVES CONSIDERED

This Final Environmental Impact Statement (EIS) evaluates the impacts of the Southwest Corridor Light Rail Project (Project) and of the No-Build Alternative, which represents future conditions without the Project. The Project consists of a light rail investment and related transportation improvements (i.e., options for additional access and mobility improvements) to serve the southwestern portion of the Portland metropolitan area.

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2.3 Draft EIS Alternatives and Subsequent Refinements .....	2-25

The Draft EIS, published in June 2018, considered a range of alternatives for the Project. The Draft EIS analysis and public comments informed the selection of a Preferred Alternative for the light rail investment in December 2018, which is the lead agencies' favored course of action to meet the Project's Purpose and Need. The Preferred Alternative is the focus of this Final EIS. The environmental impacts of the other alternatives considered in the Draft EIS are incorporated by reference in this Final EIS. Section 2.3 summarizes the alternatives considered in the Draft EIS, the selection of the Preferred Alternative, and further refinements to the Project since the Draft EIS.

The Preferred Alternative would extend the Metropolitan Area Express (MAX) system of the Tri-County Metropolitan Transportation District of Oregon (TriMet) by constructing a new 11-mile light rail line extending from downtown Portland through southwest Portland and Tigard, terminating near Bridgeport Village in Tualatin. Figure 2-1 illustrates how the new line would relate to the existing and planned regional high capacity transit network. Section 2.2 describes the Preferred Alternative and related transportation improvements in more detail.





## 2.1. No-Build Alternative

The No-Build Alternative is the baseline for evaluating the benefits and impacts of the Project. The No-Build Alternative represents transportation and environmental conditions without light rail connecting Portland, Tigard and Tualatin, and without the roadway, bicycle and pedestrian improvements associated with the proposed light rail line or studied in this Final EIS as related transportation improvements. It assumes the regionally adopted forecast for population and employment growth through the year 2035 (Metro Council Resolution 13-4428; see Appendix 1.3 of the *Regional Transportation Plan* [Metro, 2014]).

The No-Build Alternative includes planned projects in the *Regional Transportation Plan*, which is the currently adopted transportation system plan for the greater Portland metropolitan region. See Appendix A, Detailed Maps and Descriptions of the Alternatives, for a list of notable projects included in the traffic and transit demand modeling for the No-Build Alternative; the modeling assumes that these projects are constructed by 2035. The anticipated regional transit network for 2035, informed by the *Regional Transportation Plan* and the *Southwest Service Enhancement Plan* (TriMet, 2015), is also described in Appendix A.

## 2.2. Southwest Corridor Light Rail Project

The Project consists of a light rail investment and related transportation improvements. The Preferred Alternative for the light rail investment would extend the existing MAX network with a new 11-mile light rail line serving southwest Portland, Tigard and Tualatin (see Figure 2.2-1). The light rail alignment would generally be either center-running within existing or new streets, or adjacent to roadways or railroads, and would serve up to 13 new stations with up to 2,020 park and ride spaces. The Preferred Alternative would also include connections to medical and educational facilities and a new light rail O&M facility. This Final EIS also evaluates two terminus options, which are portions of the Preferred Alternative that could be constructed if there is insufficient funding for the full-length alignment. The related transportation improvements are options for additional access and mobility improvements that would address topographical challenges, connectivity barriers, and limited existing walking and bicycling infrastructure. The related transportation improvements could be phased to be built before, with or after the light rail investment, depending on funding availability, including other federal grants or local funding initiatives. Table 2.2-1 summarizes the elements of the Project.

The Project assumes the same regionally adopted forecast for future population and employment growth as the No-Build Alternative. It also has the same planned investments from the *Regional Transportation Plan*. The 2035 transit network used for transportation forecast models for the Project is similar to what is used for modeling the No-Build Alternative, but with select modifications to bus service in the corridor to complement the added light rail service. The bus network changes are described in more detail in Appendix A.

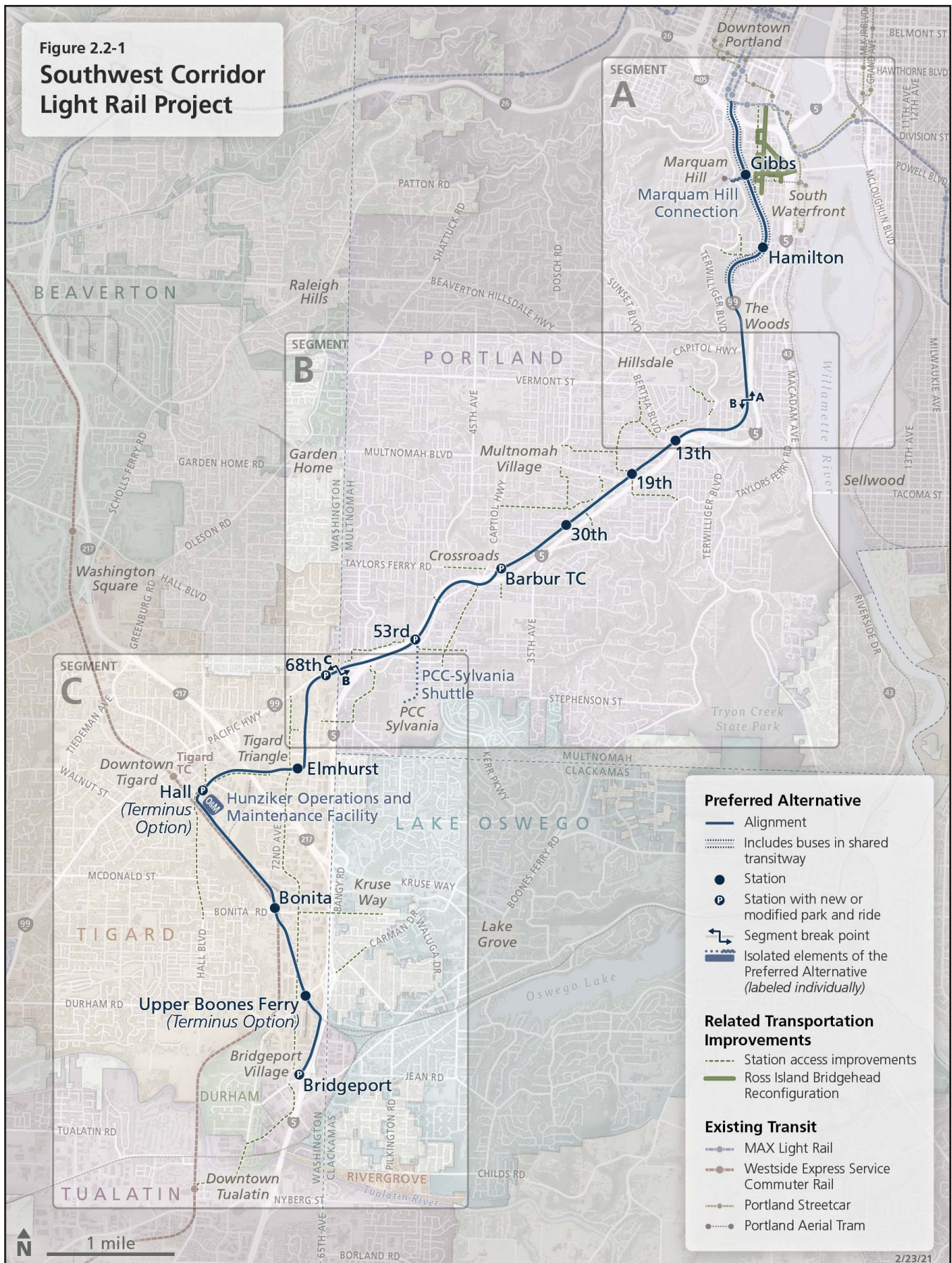
### 2.2.1. Project Terminology

#### Final EIS Terminology

This section provides an overview of the terminology used to describe the Project in this Final EIS and how the Project is structured for the purpose of analysis. As shown in Figure 2.2-1, the project area is divided geographically into three segments for analysis purposes: Segment A, Inner Portland; Segment B, Outer Portland; and Segment C, Tigard and Tualatin.

Figure 2.2-1

## Southwest Corridor Light Rail Project





**Table 2.2-1. Elements of the Southwest Corridor Light Rail Project**

<b>Light Rail Investment</b>
<b>Preferred Alternative<sup>1</sup></b>
<ul style="list-style-type: none"> <li>• <b>Light rail alignment:</b> an 11-mile light rail line between downtown Portland and Tualatin via Tigard, which would primarily run at grade, with approximately 2.3 miles of elevated trackway or bridges and one cut-and-cover undercrossing</li> <li>• <b>Stations and park and rides:</b> 13 light rail stations with platforms up to 200 feet long, including five new or modified park and rides with up to 2,020 spaces total, one reconfigured transit center, third tracks at some stations to allow vehicles to dwell (similar to operations with tail tracks), and one pedestrian bridge connecting a station and park and ride</li> <li>• <b>Light rail vehicles:</b> purchase of 32 light rail vehicles (including spare vehicles) to add to the TriMet fleet, which would operate in two-car train sets</li> <li>• <b>Light rail service:</b> service frequencies ranging from 7 to 15 minutes in the forecast year 2035, depending on the location along the alignment and the time of day (see Chapter 3, Transportation Impacts and Mitigation)<sup>2</sup></li> <li>• <b>Bus routing changes:</b> elimination or modification of bus routes to improve coverage and service levels and avoid duplicating light rail service (service hours mostly reallocated to other bus routes in the corridor)</li> <li>• <b>Marquam Hill Connection:</b> dual 370-foot-long inclined elevators on an angled structure to make a new pedestrian connection between the Gibbs Station on SW Barbur Blvd. and the medical and educational facilities on Marquam Hill</li> <li>• <b>Shared transitway:</b> 2 miles of paved light rail transitway in South Portland (between SW Lincoln St. and the 4900 block of SW Barbur Blvd.) to allow shared use by buses to and from downtown, with one station for buses located at SW Gibbs St.</li> <li>• <b>PCC-Sylvania Shuttle:</b> shuttle route connecting the PCC-Sylvania campus with the nearby light rail station at SW 53rd Ave., including the purchase of three van-sized shuttle buses</li> <li>• <b>Hunziker O&amp;M Facility:</b> new light rail O&amp;M facility in Tigard to accommodate about 36 light rail vehicles (includes storage for 4 additional vehicles than is needed for the Preferred Alternative to allow for system growth and operations flexibility)</li> <li>• <b>Streetscape elements:</b> modifications to roadways along or intersecting the light rail alignment, including addition or reconstruction of signalized intersections, gated rail crossings, bicycle facilities, sidewalks and water quality treatments</li> </ul>
<b>Upper Boones Ferry Terminus Option<sup>3</sup></b>
<p>All elements of the Preferred Alternative, except for the following differences:</p> <ul style="list-style-type: none"> <li>• <b>Light rail alignment:</b> a 10-mile light rail line between downtown Portland and Tigard, with approximately 2.1 miles of elevated trackway or bridges and one cut-and-cover crossing</li> <li>• <b>Stations and park and rides:</b> 12 light rail stations, including four new or modified park and rides with 1,060 spaces total</li> </ul>
<b>Hall Terminus Option<sup>3</sup></b>
<p>All elements of the Preferred Alternative, except for the following differences:</p> <ul style="list-style-type: none"> <li>• <b>Light rail alignment:</b> an 8-mile light rail line between downtown Portland and Tigard, with approximately 1.5 miles of elevated trackway or bridges and one cut-and-cover crossing</li> <li>• <b>Stations and park and rides:</b> 10 light rail stations, including four new or modified park and rides with 1,060 spaces total</li> <li>• <b>Light rail vehicles:</b> purchase of 30 light rail vehicles to add to the TriMet fleet</li> </ul>
<b>Related Transportation Improvements<sup>4</sup></b>
<b>Ross Island Bridgehead Reconfiguration</b>
<p>An option to modify the roads and ramps at the west end of the Ross Island Bridge to reduce regional traffic on SW Naito Pkwy., add new signalized intersections, and add or enhance facilities for walking and bicycling</p>
<b>Station Access Improvements</b>
<p>Options for new walking and bicycling infrastructure to improve access to stations, including sidewalks, bicycle facilities, three pedestrian bridges and one multi-use path on a light rail structure</p>

Note: O&M = operations and maintenance; PCC = Portland Community College; TriMet = Tri-County Metropolitan Transportation District of Oregon.

<sup>1</sup> To allow for comparison with the Draft EIS alignment alternatives, the analysis in this Final EIS separates the discussion of the Preferred Alternative into the alignment and stations for each segment, the Marquam Hill Connection, the PCC-Sylvania Shuttle and the Hunziker O&M Facility.

<sup>2</sup> 2035 is the forecast year used in the regional travel demand modeling for this Final EIS. Opening year frequencies have not yet been determined.

<sup>3</sup> The terminus options are portions of the Preferred Alternative that could be constructed if there is insufficient funding for the full-length alignment.

<sup>4</sup> The related transportation improvements are options for additional access and mobility improvements that could be phased to be built before, with or after the light rail investment, depending on funding availability, including other federal grants or local funding initiatives.

For this Final EIS, the **Project** consists of a **light rail investment** and **related transportation improvements**. Figure 2.2-1 provides a map of these project elements.

The **light rail investment** includes a light rail alignment, stations, park and rides, accompanying streetscape elements, a connection to Marquam Hill, a shuttle to the Portland Community College (PCC) Sylvania campus and a new O&M facility. For this Final EIS, the light rail investment is evaluated as:

- **Preferred Alternative.** The Preferred Alternative for the light rail investment represents the full 11-mile light rail alignment that would terminate in Tualatin, including 13 new light rail stations and 5 new or modified park and rides.
- **Terminus options.** The terminus options are portions of the Preferred Alternative that could be constructed if there is insufficient funding for the full-length alignment. The Final EIS evaluates two terminus options: the Upper Boones Ferry Terminus Option and the Hall Terminus Option.

To allow for comparison to the Draft EIS light rail alternatives, the impacts of the Preferred Alternative are reported using the following structure where appropriate:

- Preferred Alternative alignment and stations, by segment<sup>1</sup>
- Marquam Hill Connection (located in Segment A)
- PCC-Sylvania Shuttle (located in Segment B)
- Hunziker O&M Facility (located in Segment C)

The **related transportation improvements** are additional access improvements, separate from the light rail investment, that would extend the mobility benefits of developing light rail. These improvements are optional and could be phased to be built before, with or after the light rail investment, depending on funding availability, including other federal grants or local funding initiatives. The related transportation improvements consist of:

- **Ross Island Bridgehead Reconfiguration.** This option would improve access to light rail by removing pedestrian barriers in South Portland. It would add new pedestrian crossings on SW Naito Parkway and reduce regional traffic through the historic South Portland neighborhood by reconfiguring roadways and ramps at the west end of the Ross Island Bridge. This option is also referred to as SW Naito Parkway Main Street in the City of Portland's planning efforts.
- **Station access improvements.** There are 30 options for investments in pedestrian and bicycle facilities to improve access to the light rail stations. They include sidewalks, bikeways, enhanced pedestrian crossings and pedestrian bridges or multi-use paths over Interstate 5 (I-5) and Highway 217.

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<sup>1</sup> Similar to the term *alignment alternatives* in the Draft EIS, the term *alignment and stations* refers to the light rail trackway and shared transitway, stations, park and rides, streetscape elements, and other associated infrastructure such as systems buildings and stormwater facilities.



## Comparison to Draft EIS Terminology

Table 2.2-2 provides a comparison of project terminology between the Draft EIS and Final EIS. See Section 2.3 for a summary of the Draft EIS light rail alternatives.

**Table 2.2-2. Comparison of Project Terminology Between Draft EIS and Final EIS**

Description of Project Element	Draft EIS Term and Additional Context	Final EIS Term and Additional Context
Draft or adopted route for the proposed light rail investment, including definition of the transit mode, alignment, stations, termini and other elements	<p><b>Draft EIS light rail alternatives:</b> the range of alignment alternatives, Marquam Hill connection options, PCC-Sylvania shuttle options and O&amp;M facility options studied in the Draft EIS</p> <p><b>Initial route proposal:</b> a draft proposed light rail route that was identified within the Draft EIS to provide an opportunity to comment on a full-length light rail alternative<sup>1</sup></p>	<b>Preferred Alternative:</b> the route that has been adopted into the Regional Transportation Plan, and generally the alternative that has been identified by the lead agencies as the favored course of action to meet the Project's Purpose and Need; includes the Preferred Alternative alignment and stations, Marquam Hill Connection, PCC-Sylvania Shuttle and Hunziker O&M Facility
Locations for the light rail alignment, stations and park and rides, as well as associated streetscape elements	<b>Alignment alternatives:</b> three alternatives in Segment A, four in Segment B and six in Segment C	<b>Preferred Alternative alignment and stations:</b> the elements of the Preferred Alternative that are equivalent in scope to the Draft EIS alignment alternatives, for comparison purposes (excluding the Marquam Hill Connection, PCC-Sylvania Shuttle and Hunziker O&M Facility)
A pedestrian connection between a light rail station near SW Gibbs Street and the medical and educational facilities on Marquam Hill	<b>Marquam Hill connection options:</b> four options for the type of connection	<b>Marquam Hill Connection:</b> the inclined elevator connection that has been selected as part of the Preferred Alternative
A shuttle operating between PCC-Sylvania and one or two nearby light rail stations	<b>PCC-Sylvania shuttle options:</b> two options for the shuttle route	<b>PCC-Sylvania Shuttle:</b> the SW 53rd Ave. shuttle route that has been selected as part of the Preferred Alternative
A new light rail O&M facility in Tigard	<b>O&amp;M facility options:</b> three options for the location of the facility	<b>Hunziker O&amp;M Facility:</b> the facility location near SW Hunziker St. that has been selected as part of the Preferred Alternative
A portion of the light rail investment that could be constructed if there is insufficient funding to construct the full length	<b>Minimum Operable Segment options:</b> two options for the extent of the line to construct, terminating at either the Tigard Transit Center (Hall) Station or the Bridgeport Station	<b>Terminus options:</b> two options for the extent of the Preferred Alternative to construct, terminating at either the Upper Boones Ferry Station or the Hall Station
Changes to roadway circulation and new pedestrian and bicycle facilities on various roads and ramps connecting to the west end of the Ross Island Bridge	<b>Bridgehead Reconfiguration:</b> streetscape elements included as part of Alternative A2-BH, to accommodate light rail on SW Naito Pkwy.	<b>Ross Island Bridgehead Reconfiguration:</b> a related transportation improvement, separate from the light rail investment
Additional pedestrian and bicycle facilities to improve access to the light rail stations	<b>Station access improvements:</b> 29 options for pedestrian and bicycle facilities	<b>Station access improvements:</b> 30 options for pedestrian and bicycle facilities, which are related transportation improvements, separate from the light rail investment

Note: EIS = Environmental Impact Statement; O&M = operations and maintenance; PCC = Portland Community College.

<sup>1</sup> The initial route proposal included several design refinements, which were proposed changes to the design of the Draft EIS alignment alternatives. These changes were intended to avoid or minimize impacts identified in the Draft EIS analysis and to optimize transit performance and capital costs.

### 2.2.2. Overview of Project Infrastructure

Table 2.2-3 summarizes the project infrastructure. Table 2.2-4 lists key characteristics of the proposed light rail stations, and Table 2.2-5 lists characteristics of the park and rides. Table 2.2-6 summarizes the number of roadway crossings, crossover tracks and substations by segment.

**Table 2.2-3. Overview of Infrastructure Included in the Project**

Project Element	Potentially Included Infrastructure
<b>Light Rail Investment</b>	
Alignment and stations for the Preferred Alternative or terminus options	<ul style="list-style-type: none"> <li>· light rail trackway, including a combination of trackway at grade in exclusive right of way, on elevated structure, on built-up fill, in a cut-and-cover undercrossing, and in retained cut or fill</li> <li>· tracks, including a combination of embedded, on ballast or directly fixed, and including switches or turnouts</li> <li>· purchase of light rail vehicles</li> <li>· shared transitway for buses, including embedded tracks in a paved transitway, bus platforms within the transitway, and signalized intersections to allow buses to enter and exit the transitway</li> <li>· safety walls between the light rail trackway and adjacent freight rail tracks</li> <li>· sound walls along the light rail trackway or along adjacent roadways</li> <li>· access roads for construction and long-term maintenance</li> <li>· staging areas for construction</li> <li>· overhead wires and support poles</li> <li>· electrification stations and substations (typically housed in small buildings, spaced approximately 1 mile apart)</li> <li>· train controls and signals, including signal management structures</li> <li>· traffic signals and crossing protection</li> <li>· new or rebuilt roadways and bridges, including widening of certain roadways or modification of existing through lanes, turn lanes or parking</li> <li>· utilities and utility relocation</li> <li>· streetscape elements, including sidewalks, bicycle facilities, landscape buffers, bioswales, benches, lighting and signage</li> <li>· stormwater treatment and detention facilities, including pipes; underground cisterns; and aboveground basins, planters and swales</li> <li>· platforms up to 200 feet long, which would be located between the tracks in the roadway median, on both sides of the tracks in the roadway median, curbside or elevated</li> <li>· tail tracks or third tracks at stations for operational flexibility</li> <li>· station amenities, including shelters, seating, lighting, signage, telephones, refuse cans and fare collection equipment</li> <li>· at-grade pedestrian crossings accessing one or both ends of each platform</li> <li>· surface or structured auto parking, bicycle parking and space for passenger pickup and drop-off</li> <li>· pedestrian bridges</li> </ul>
Marquam Hill Connection	<ul style="list-style-type: none"> <li>· dual 370-foot-long inclined elevators on an angled structure</li> <li>· associated pedestrian circulation, including stairs, ramps and pathways</li> </ul>
PCC-Sylvania Shuttle	<ul style="list-style-type: none"> <li>· shuttle bays and related passenger facilities</li> <li>· shuttle equipment and storage</li> <li>· shuttle ramp accessing campus</li> <li>· purchase of van-sized shuttle buses</li> </ul>
Hunziker O&M Facility	<ul style="list-style-type: none"> <li>· maintenance and wash bays</li> <li>· storage tracks</li> <li>· wheel truing equipment</li> <li>· unit repair facility (for vehicle parts) and parts storage</li> <li>· surface parking for employees and fleet vehicles</li> <li>· maintenance of way facilities</li> <li>· administrative space</li> <li>· on-site stormwater management</li> </ul>
<b>Related Transportation Improvements</b>	
Ross Island Bridgehead Reconfiguration	<ul style="list-style-type: none"> <li>· new or rebuilt roadways and bridges, which may include widening of the roadway or modification of existing through lanes, turn lanes or parking</li> <li>· removal of existing roadways and ramps</li> <li>· new or rebuilt sidewalks and bicycle lanes</li> <li>· new signalized intersections</li> </ul>
Station access improvements	<ul style="list-style-type: none"> <li>· sidewalks, bicycle lanes, shared in-street bikeways and multi-use paths</li> <li>· protected pedestrian crossings and pedestrian bridges</li> </ul>

Note: O&M = operations and maintenance; PCC = Portland Community College.



**Table 2.2-4. Light Rail Station Characteristics**

Station	Preferred Alternative	UBF Terminus Option Changes	Hall Terminus Option Changes
Gibbs Station	Split platforms in roadway median that serve light rail on the outside and buses using the shared transitway on the inside	No changes	No changes
Hamilton Station	Center platform in roadway median	No changes	No changes
13th Station <sup>1</sup>	Center platform in roadway median	No changes	No changes
19th Station	Split side platforms in roadway median on far sides of SW 19th Ave./SW Capitol Hill Rd. crossing	No changes	No changes
30th Station	Split side platforms in roadway median on far sides of SW 30th Ave. crossing	No changes	No changes
Barbur TC Station	Center platform in roadway median P&R and bus facility reconstructed with access modifications	No changes	No changes
53rd Station	Center platform next to I-5 New surface P&R (see Table 2.2-5)	No changes	No changes
68th Station	Side platforms in side-running configuration next to Pacific Hwy. (designated as Oregon Route 99W) New surface P&R (see Table 2.2-5)	No changes	No changes
Elmhurst Station	Center platform in side-running configuration next to SW Elmhurst St.	No changes	No changes
Hall Station <sup>2</sup>	Platforms at three tracks in side-running configuration next to SW Hall Blvd. New surface P&R (see Table 2.2-5)	No changes	No changes
Bonita Station	Side platforms on elevated structure	No changes	Station not included
UBF Station	Split side platforms on near sides of SW UBF Rd. crossing	Add third track Shift southbound platform to north side of SW UBF Rd.	Station not included
Bridgeport Station	Platforms at three tracks away from roadway on north side of SW LBF Rd. Pedestrian bridge over SW LBF Rd. Existing surface P&R replaced with structured P&R on south side of SW LBF Rd. (see Table 2.2-5) Transit center with bus bays on ground level of P&R structure	Station not included	Station not included

Note: I-5 = Interstate 5; LBF= Lower Boones Ferry; N/A = not applicable; P&R = park and ride; TC = Transit Center; UBF = Upper Boones Ferry.

<sup>1</sup> The 13th Station was named the Custer Station in the Draft EIS.

<sup>2</sup> The Hall Station was named the Tigard Transit Center Station in the Draft EIS.

**Table 2.2-5. Park and Ride Characteristics**

Station <sup>1</sup>	Existing		Preferred Alternative		UBF and Hall Terminus Options	
	Spaces	Description	Spaces	Description	Spaces	Description
Barbur TC Station	368	Surface lot	300	Replacement of existing surface lot with reconfigured surface lot at same location	300	Replacement of existing surface lot with reconfigured surface lot at same location
53rd Station	N/A	N/A	310	New surface lot	310	New surface lot
68th Station	N/A	N/A	350	New surface lot	350	New surface lot
Hall Station <sup>2</sup>	N/A	N/A	100	New surface lot	100	New surface lot
Bridgeport Station	368	Two surface lots, north and south of SW LBF Rd.	960 <sup>3</sup>	Replacement of existing surface lots with new five-level garage south of SW LBF Rd.	368	Existing surface lots retained (not served directly by light rail)

Note: LBF = Lower Boones Ferry; N/A = not applicable; TC = Transit Center; UBF = Upper Boones Ferry.

<sup>1</sup> Park and rides are not included at the Gibbs, Hamilton, 13th, 19th, 30th, Elmhurst, Bonita or Upper Boones Ferry Stations.

<sup>2</sup> The Hall Station would also be served by an existing 103-space surface park and ride at the Tigard Transit Center.

<sup>3</sup> The analysis of impacts to motor vehicle operations also considers an option for 710 spaces at the Bridgeport Park and Ride (see Chapter 3).

**Table 2.2-6. Number of Roadway Crossings, Crossovers Tracks and Substations by Segment**

Infrastructure Element	Segment A	Segment B	Segment C		
	Preferred Alternative and Terminus Options	Preferred Alternative and Terminus Options	Preferred Alternative	UBF Terminus Option	Hall Terminus Option
Signalized roadway crossings	8	14	3	3	3
Gated roadway crossings	None	None	5	4	2
Crossover tracks	3	2	3	2	1
Substations	2	3	6	5	3

Note: UBF = Upper Boones Ferry.

### 2.2.3. Preferred Alternative: Segment A

Segment A encompasses the area from the southern edge of downtown Portland to just north of SW Brier Place (see Figure 2.2-2). The Preferred Alternative light rail alignment would tie in to the Downtown Portland Transit Mall, which runs along SW Fifth and Sixth Avenues. The Transit Mall currently supports MAX Green, Yellow and Orange Lines. The Project would extend MAX Green Line service from its terminus at SW Fifth Avenue and SW Jackson Street near Portland State University.

Segment A also includes the Marquam Hill Connection, which is described below following the Preferred Alternative alignment and stations section.

Figure 2.2-2 illustrates the elements of the Project in Segment A, including the Preferred Alternative alignment and stations, Marquam Hill Connection and related transportation improvements. The related transportation improvements are described in Section 2.2.7.

#### Preferred Alternative Alignment and Stations

The Preferred Alternative would run on SW Barbur Boulevard for most of Segment A, primarily operating at grade in the center of the roadway.

The Preferred Alternative would diverge from the existing MAX tracks at SW Fifth Avenue and SW Lincoln Street. It would cross Interstate 405 (I-405) on a new structure east of and parallel to the SW Fifth Avenue bridge and on-ramp. The alignment would continue south on this structure to cross over the on-ramp, SW Broadway, SW Caruthers Street and SW Sheridan Street. The alignment would land in the center of SW Barbur Boulevard just south of SW Sheridan Street and match the roadway grade just north of SW Hooker Street. The alignment would continue running in the center of SW Barbur Boulevard at grade until the segment break point near SW Brier Place.

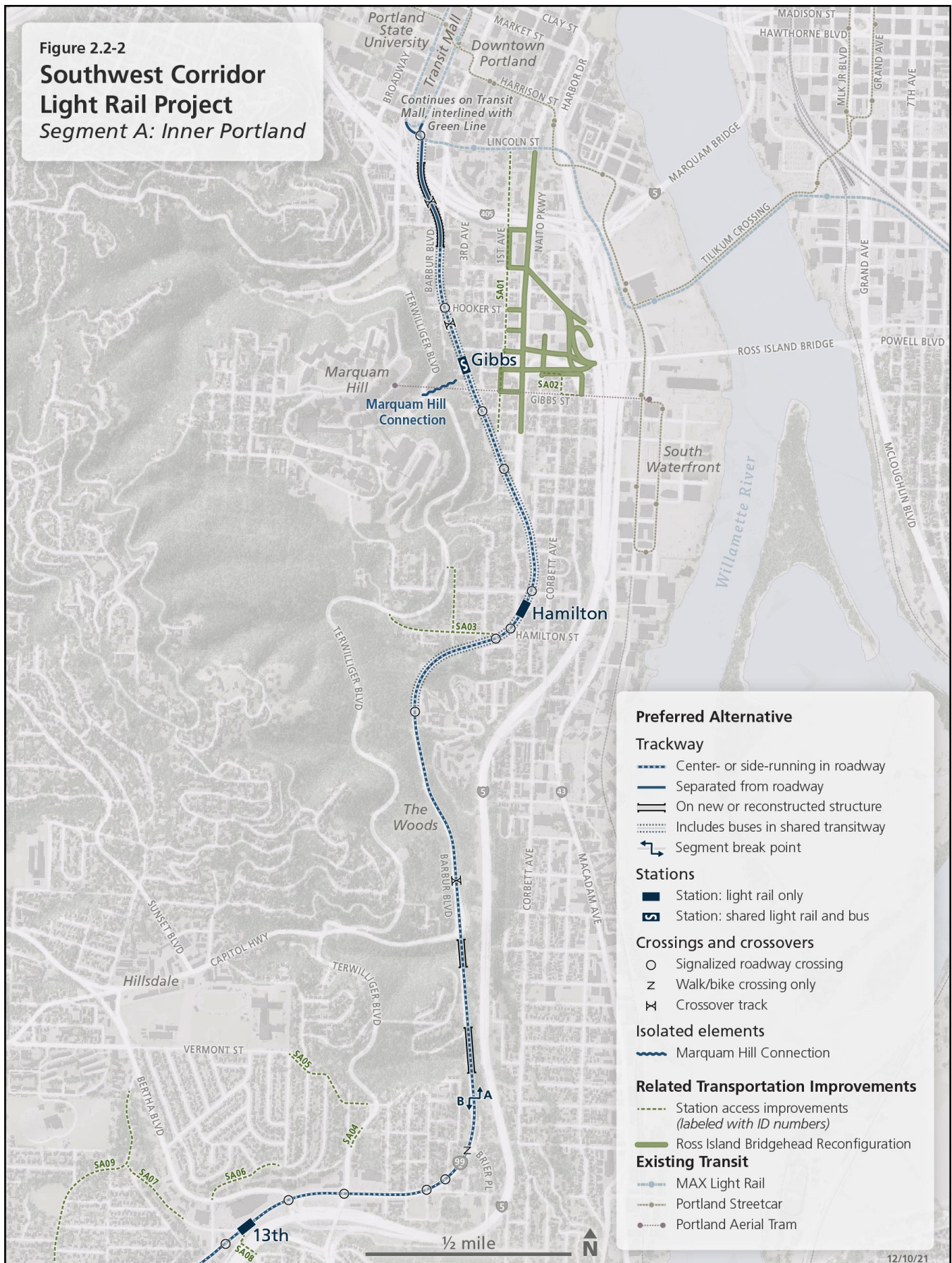
Two miles of the light rail trackway would be paved to provide a shared transitway that would allow buses as well as light rail (see Exhibit 2.2-1). Located between SW Lincoln Street and the 4900 block of SW Barbur Boulevard, the shared transitway would allow buses to avoid traffic congestion in order to improve travel times and reliability.

Segment A light rail stations would be located near SW Gibbs Street and SW Hamilton Street. Platforms for buses using the shared transitway would be incorporated into the Gibbs Station. The buses and light rail trains running in the same direction would share opposite sides of an at-grade platform. The Hamilton Station would use an at-grade center platform serving light rail trains only.



Figure 2.2-2

# **Southwest Corridor Light Rail Project Segment A: Inner Portland**



## Exhibit 2.2-1

### What is the shared transitway?

A shared transitway is a paved portion of light rail trackway that allows access for buses in order to improve bus travel time and reliability. For example, the existing MAX Orange Line includes a 1.3-mile shared transitway, which provides access for the bus Lines 17 and 9 and the Portland Streetcar approaching and on the Tilikum Crossing bridge.

The Preferred Alternative would include a 2-mile shared transitway through the South Portland neighborhood in Segment A. An automated system would control transit traffic in the event of disruptions on the transitway, such as by using automatic braking to avoid a collision. The shared transitway would run between SW Lincoln Street and a new signalized intersection at the 4900 block of SW Barbur Boulevard. The buses would serve a stop within the shared transitway near SW Gibbs Street to provide access to Marquam Hill. In each direction at the Gibbs Station, a busway would split off from the light rail trackway to allow buses and light rail vehicles to serve opposite sides of a shared platform, with buses on the inside and light rail vehicles on the outside. Buses would reenter the transitway on the far side of each platform. See Appendix A for a map of the station.

The final decision on bus network changes in support of the Project, including which buses would use the shared transitway, would be made much closer to opening day. For the purpose of this Final EIS analysis, TriMet's bus Lines 44 and 56 are assumed to use the shared transitway, while Line 54 would continue to provide local service not on the shared transitway between Hillsdale and downtown Portland. Appendix A provides more information on bus routing.

The Preferred Alternative would add a signalized pedestrian crossing of SW Naito Parkway at SW Gibbs Street to provide access across SW Naito Parkway and onto the pedestrian bridge over I-5 at SW Gibbs Street. The Marquam Hill Connection, described in a separate section below, would provide access between the Gibbs Station and Marquam Hill.

Three crossover tracks are assumed to be located in Segment A, one on the new light rail structure just south of I-405, one just south of SW Hooker Street and one just north of SW Capitol Highway in The Woods. Approximately two substations would be required in Segment A. These would be placed on parcels that would need to be acquired for the light rail trackway, one near SW Bancroft Street and one near SW Capitol Highway in The Woods.

South of SW Sheridan Street, SW Barbur Boulevard would be widened and largely rebuilt to accommodate light rail and to add sidewalks and bicycle lanes. North of SW Naito Parkway, the sidewalks and auto lanes would be slightly narrower than those south of SW Naito Parkway in order to minimize residential displacements. To address the elevation difference between the west and east sides of the roadway, parts of SW Barbur Boulevard would have retaining walls and changes to the grade of connecting side streets.

The Preferred Alternative would modify intersections and other vehicle access along SW Barbur Boulevard, and would remove the center two-way turn lane that is in some of the existing roadway sections. The junction of SW Barbur Boulevard and SW Naito Parkway would be modified from a merge to a signalized intersection and shifted slightly to the north. The Preferred Alternative would modify traffic lanes, maintaining two lanes in each direction south of the junction of SW Barbur Boulevard and SW Naito Parkway. Some side-street access along SW Barbur Boulevard would be restricted to right-in and right-out turns. The Preferred Alternative would replace the Newbury and Vermont trestle bridges and the SW Capitol Highway overpass in The Woods.



## Marquam Hill Connection

The Marquam Hill Connection would link SW Barbur Boulevard near SW Gibbs Street to the intersection of SW Terwilliger Parkway and SW Campus Drive on Marquam Hill. This new connection would provide access between the Gibbs Station and the complex of medical and educational facilities located at the top of the hill, including the Oregon Health & Science University (OHSU), the Veterans Affairs (VA) Portland Health Care System and the Portland Shriners Hospital for Children. See Figure 2.2-2 for the general location of the connection, and Figure 2.2-3 for a map and elevation profile of the connection. Appendix B4.05, Supporting Material for Visual Quality Analysis, includes conceptual renderings of the view of the Marquam Hill Connection from SW Barbur Boulevard and SW Terwilliger Boulevard.

Multiple options for connecting to Marquam Hill were presented in the Draft EIS, and were then refined for the Final EIS through a public process that included multiple stakeholders, including representatives from area institutions, neighborhood associations and agencies. Through this process, the western connection point for the Marquam Hill Connection also shifted to connect with pedestrian improvements planned by OHSU. To learn more about this process, see Chapter 6, Public Involvement, Agency Coordination and Required Permits. To learn more about the options that were considered and removed during this process, see Appendix I of this Final EIS, Preferred Alternative Selection and Project Refinements.

For the Preferred Alternative in this Final EIS, the Marquam Hill Connection would include two parallel 370-foot-long inclined elevators to assist with the grade change between SW Barbur Boulevard and the facilities on Marquam Hill. See Exhibit 2.2-2 for more information about inclined elevators. The inclined elevators would operate on an angled structure that would mostly be more than 15 feet above the current slope of the hillside. The inclined elevators would operate at approximately a 40 percent grade, which generally matches the average grade of the hillside. The two elevator cabs would each hold approximately 40 people, and a trip in the elevator would take about one minute. The inclined elevator structure would include a stairway for emergency egress, which is assumed to be located between the two elevator tracks. Passenger boarding areas would be located on either end of the inclined elevators: one near the Gibbs Station at the base of the hillside and the other on the east side of SW Terwilliger Boulevard just north of SW Campus Drive. The connection would include lighting for all passenger facilities, including in loading or waiting areas, but with shielding to limit spillover into natural areas. A new signalized intersection at SW Terwilliger Boulevard and SW Campus Drive would provide an at-grade pedestrian crossing of SW Terwilliger Boulevard. Separate from the project action, OHSU has proposed constructing new stairs and a path between SW Terwilliger Boulevard and the OHSU campus to the west.

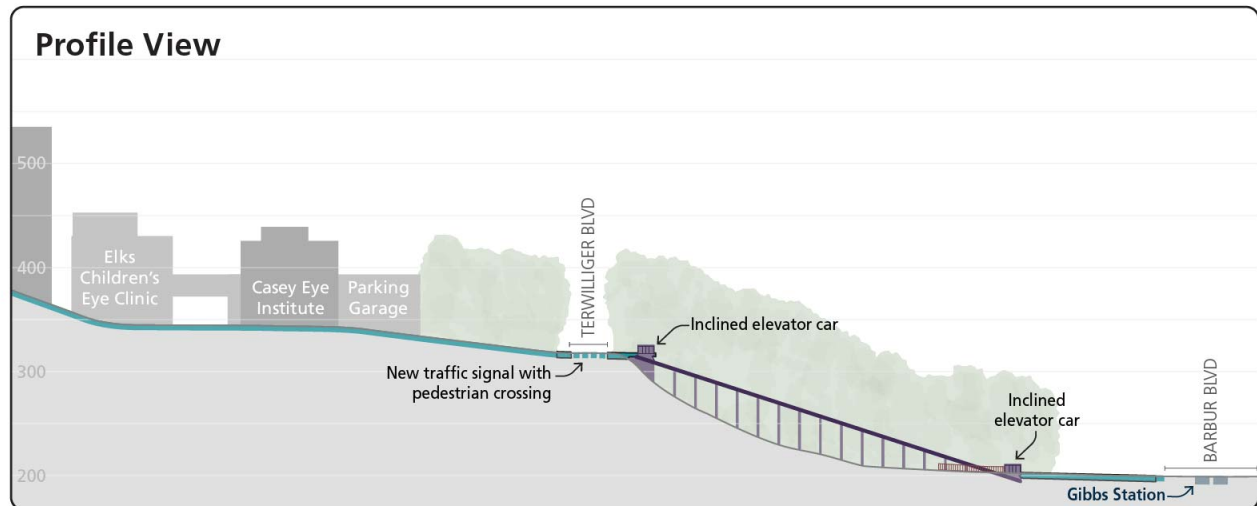
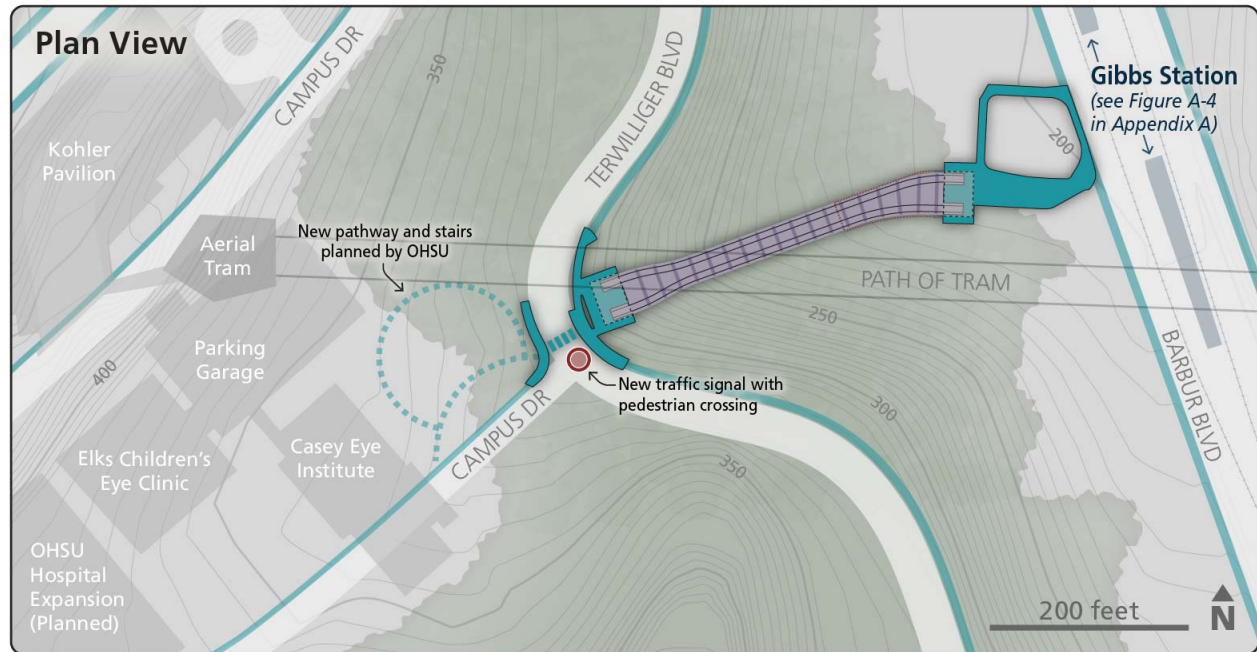
### Exhibit 2.2-2

#### What is an inclined elevator?

An inclined elevator works similar to a standard elevator but provides both horizontal and vertical movement. Inclined elevators resemble funiculars, which are found throughout Europe, the United States and Canada. Unlike a traditional funicular, in which the two cabs counterbalance each other, an inclined elevator's cabs can operate independently.

**Figure 2.2-3**  
**Marquam Hill Connection**

5/28/21



**Plan View**

**Assumed connection elements**

- Inclined elevator structure
- Inclined elevator tracks
- Wall or bridge column
- Fence below structure
- Covering over boarding area
- Sidewalk, path or boarding area
- Crosswalk

**Existing conditions**

- Sidewalk or path
- Tree cover

**Profile View**

**Assumed connection elements**

- Inclined elevator trackway
- Wall or bridge column
- Fence below structure
- Sidewalk, path or boarding area

**Existing conditions**

- Ground level
- Sidewalk or path
- Tree cover



## **2.2.4. Preferred Alternative: Segment B**

Segment B extends from SW Barbur Boulevard at SW Brier Place to the Portland/Tigard city boundary, near the intersection of SW Barbur Boulevard and Pacific Highway (designated as Oregon Route 99W) with SW 65th Avenue (see Figure 2.2-4). The Preferred Alternative would run in the center of SW Barbur Boulevard through the northern portion of this segment, and then transition to run adjacent to I-5 south of the Barbur Transit Center.

Segment B also contains the PCC-Sylvania Shuttle, which is described below following the Preferred Alternative alignment and stations section.

Figure 2.2-4 illustrates the project elements in Segment B, including the Preferred Alternative alignment and stations, PCC-Sylvania Shuttle and related transportation improvements. The related transportation improvements are described in Section 2.2.7.

### **Preferred Alternative Alignment and Stations**

The Preferred Alternative would run in the center of SW Barbur Boulevard until the Barbur Transit Center. SW Barbur Boulevard would be widened to accommodate light rail tracks, bicycle lanes and sidewalks. Part of the widening would be accomplished by removing two-way center turn lanes and on-street parking where they exist.

The Preferred Alternative would reconstruct the existing SW Barbur Boulevard bridges over SW Multnomah Boulevard and SW 26th Way. The Preferred Alternative would construct additional signalized intersections on SW Barbur Boulevard to accommodate left turns and U-turns. Other side-street and driveway access along SW Barbur Boulevard would be limited to right-in and right-out only.

The alignment would depart from the center of SW Barbur Boulevard at SW Taylors Ferry Road, including a signalized crossing of the northbound lanes of SW Barbur Boulevard. The alignment would run through a portion of the existing park and ride at Barbur Transit Center. The alignment would cross over I-5, SW Capitol Highway and SW Barbur Boulevard on a new light rail structure, and then continue adjacent to I-5 until SW 60th Avenue.

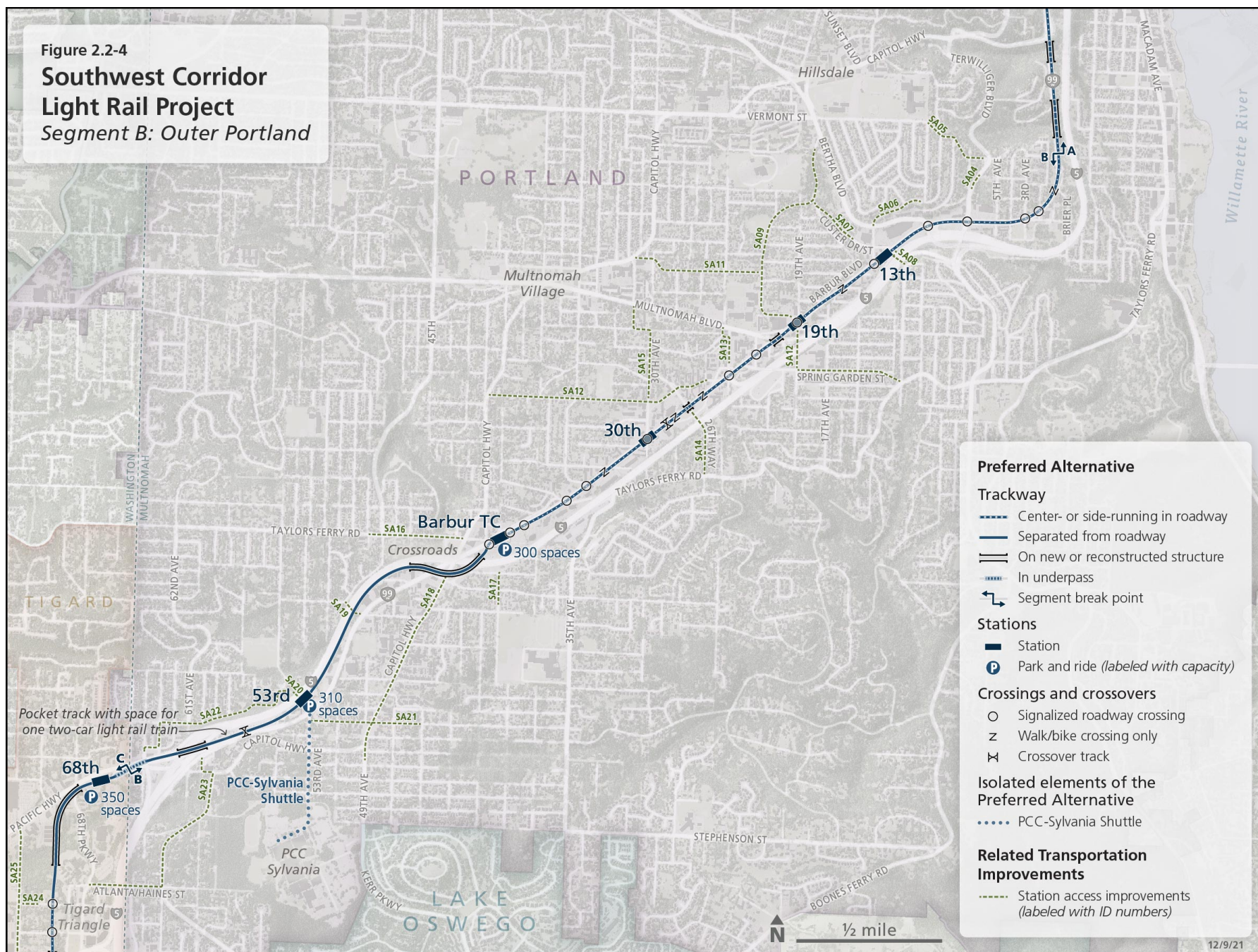
Just west of SW 60th Avenue, the alignment would cross over I-5 on a new light rail structure parallel to and north of the existing SW Barbur Boulevard bridge over I-5. On the west side of I-5, the alignment would land in between SW Barbur Boulevard and the southbound I-5 off-ramp, and then drop into a cut-and-cover underpass below SW Barbur Boulevard between SW 64th Avenue and SW 65th Avenue.

Stations would be located at grade in the center of SW Barbur Boulevard at SW 13th Avenue, SW 19th Avenue, SW 30th Avenue and the Barbur Transit Center. Another station would be located adjacent to I-5 at SW 53rd Avenue. The existing Barbur Transit Center surface park and ride would be reconstructed with underground stormwater tanks and would have a slightly reduced capacity of about 300 spaces. The 53rd Station would include a surface park and ride with about 310 spaces. See Appendix A for a detailed map of each station.

The Preferred Alternative would rebuild SW 53rd Avenue between the light rail station and PCC-Sylvania with new pavement, sidewalks, stormwater controls and lighting to improve walking and bicycling access.

Figure 2.2-4

# **Southwest Corridor Light Rail Project Segment B: Outer Portland**



A short pocket track for vehicle storage would be located along the north side of the trackway just east SW 60th Avenue. The pocket track would be approximately 230 feet long, which would provide space for one train (a two-car set). Two crossover tracks are assumed to be located in Segment B, one just north of the 30th Station and one between the 53rd Station and the pocket track. Approximately three substations would be required in Segment B. These would be placed on parcels that would need to be acquired for the light rail trackway or stations, and are assumed to be located near SW Troy Street, SW Baird Street and the 53rd Station.

### **PCC-Sylvania Shuttle**

Because it would require about a 0.5-mile walk to access the PCC-Sylvania campus from the 53rd Station, the Preferred Alternative would include a shuttle to connect to PCC-Sylvania if funding is available. The PCC-Sylvania Shuttle would operate in mixed traffic on an up to 0.5-mile route along SW 53rd Avenue between the PCC-Sylvania campus and the 53rd Station (see Figure 2.2-4).

Currently, a portion of SW 53rd Avenue is undeveloped, and the street dead ends at G Street on the edge of the campus. The Preferred Alternative alignment and stations include rebuilding the street with new pavement, sidewalks, stormwater controls and lighting to improve walking and bicycling access to the campus. The shuttle would use this same improved roadway, with the addition of an exclusive ramp for the shuttle to connect to the campus.

The shuttle would be open to the public and would operate at the same service frequency as light rail, ranging from every 7 to 15 minutes in 2035 (see Chapter 3, Transportation Impacts and Mitigation). The shuttle would use about three small van-sized shuttle buses to operate.

### **2.2.5. Preferred Alternative: Segment C**

This segment extends from the Portland/Tigard city boundary to Bridgeport Village in Tualatin, which would be the southern terminus of the Preferred Alternative light rail alignment (see Figure 2.2-5). In this segment, the light rail trackway would primarily run adjacent to existing roads or railroads.

Segment C also includes an O&M facility to support light rail operations, which is described below following the Preferred Alternative alignment and stations section.

Figure 2.2-5 illustrates the project elements in Segment C, including the Preferred Alternative alignment and stations, Hunziker O&M Facility and related transportation improvements. The related transportation improvements are described in Section 2.2.7.

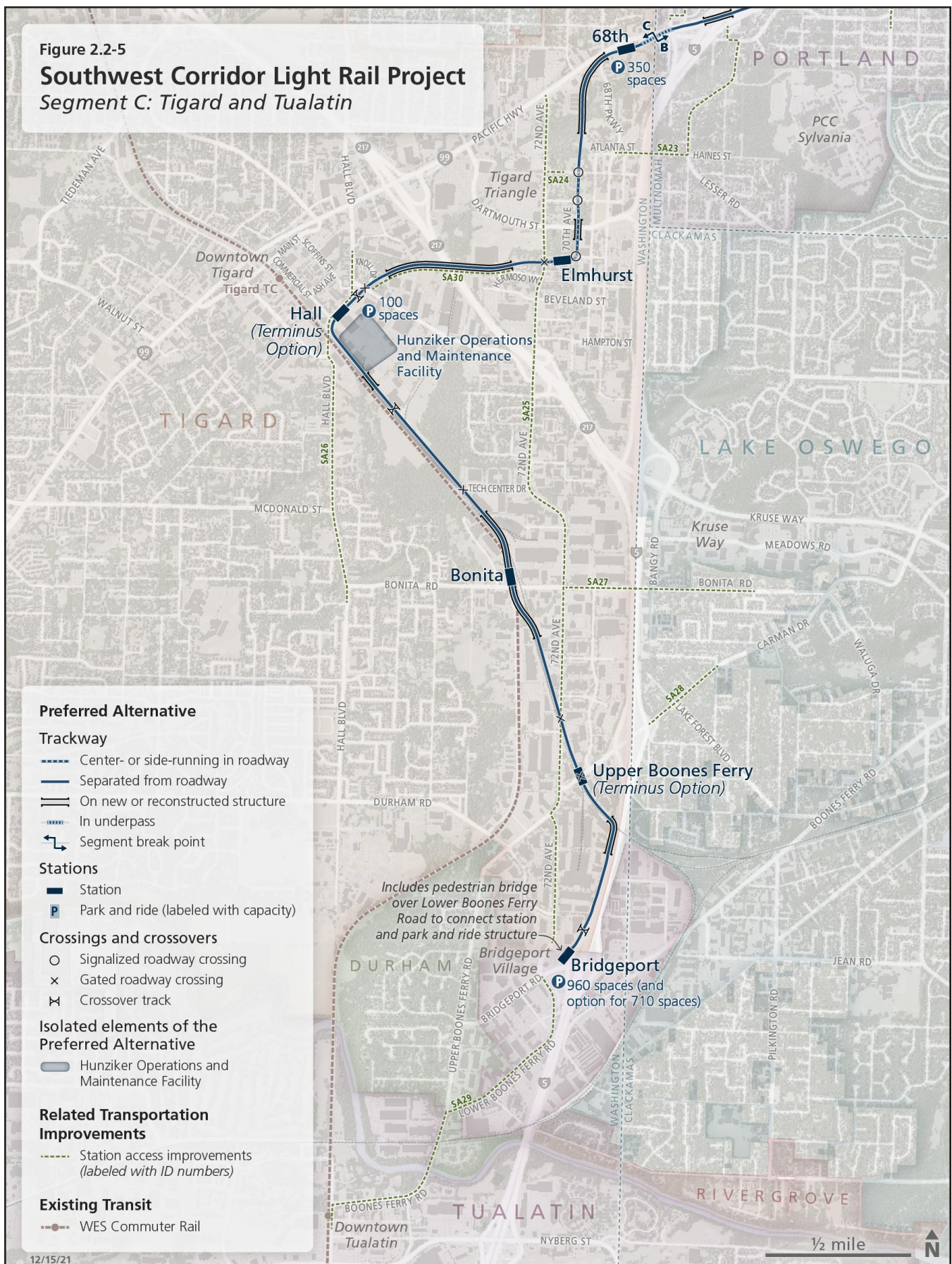
#### **Preferred Alternative Alignment and Stations**

As discussed in the section above about Segment B, the light rail trackway would run below SW Barbur Boulevard between SW 64th Avenue and SW 65th Avenue in a cut-and-cover undercrossing. The trackway would continue in this undercrossing below SW Coronado Street and then emerge on the south side of Pacific Highway just west of SW Coronado Street. The trackway would continue along the south side of Pacific Highway and then cross over SW 68th Parkway and turn south into the Tigard Triangle to connect with SW 70th Avenue (see Exhibit 2.2-3 for more information on the Tigard Triangle).



Figure 2.2-5

## Southwest Corridor Light Rail Project Segment C: Tigard and Tualatin



### Exhibit 2.2-3

#### What is the Tigard Triangle?

The “Tigard Triangle” usually refers to the triangle-shaped area bounded by I-5, Highway 217 and Pacific Highway. (In Section 4.4, Communities, the Tigard Triangle neighborhood extends farther southwest, beyond Highway 217 to SW Hall Boulevard, the Westside Express Service (WES) Commuter Rail/freight railroad tracks and SW Bonita Road.)

The east half of the Tigard Triangle has a gridded street network with a mix of housing and office buildings, while the west half of the Tigard Triangle contains larger retail businesses with some pockets of smaller businesses and housing. Although the Tigard Triangle is within the Urban Growth Boundary, a lack of access and missing sewer and stormwater infrastructure have limited development of the Tigard Triangle, and large expanses of vacant land remain.

Local planning has explored ways to overcome these constraints and focus new growth in the Tigard Triangle. The *Tigard Triangle Strategic Plan* (City of Tigard, 2015) outlines a vision of an area with a diverse mix of uses in an enjoyable walking environment that has improved connectivity for all travel modes. The city’s *High Capacity Transit Land Use Plan* (City of Tigard, 2012) identified the Tigard Triangle as a potential high capacity transit station area community in advance of Southwest Corridor planning. See Section 4.2, Land Use, for more information on the Project’s consistency with local land use plans.

In the Tigard Triangle, the trackway would be side-running along the east side of SW 70th Avenue. Between SW Baylor Street and SW Elmhurst Street, the Preferred Alternative would construct missing portions of the SW 70th Avenue roadway. At the intersection of SW 70th Avenue with SW Dartmouth Street, light rail would cross over SW Dartmouth Street on a new structure, while the auto lanes and sidewalks would remain at grade. The route would turn west on SW Elmhurst Street and then cross over Highway 217 on a new light rail structure to reach downtown Tigard. The alignment would cross SW Hunziker Street at grade at SW Knoll Drive, and then run adjacent to SW Hall Boulevard until SW Commercial Street. SW Hunziker Street would be reconstructed to align with SW Scoffins Street at the intersection with SW Hall Boulevard.

South of downtown Tigard, the alignment would turn southeast to run along the east side of the existing freight rail and WES Commuter Rail tracks. Between the Hunziker O&M Facility and SW Wall Street, the alignment would be on structure to cross over Red Rock Creek and the adjacent floodplain. Between SW Tech Center Drive and SW Bonita Road, the light rail trackway would cross to the west side of the freight rail and WES Commuter Rail tracks on a new light rail structure. The trackway would continue on this structure over SW Bonita Road, over Ball Creek, and over the WES Commuter Rail and freight rail tracks again to land on the east side of the freight rail tracks. The alignment would continue south on the east side of the freight rail tracks, with at-grade gated crossings at SW 72nd Avenue and SW Upper Boones Ferry Road (new light rail crossings adjacent to existing freight rail crossings). At I-5, the alignment would turn southwest to cross over the freight rail tracks and then run along the west side of I-5 until the terminus just north of SW Lower Boones Ferry Road.

The Preferred Alternative would include two stations in the Tigard Triangle (68th and Elmhurst Stations) and one serving downtown Tigard (Hall Station). The 68th Station would be at grade on the south side of Pacific Highway just east of SW 68th Avenue. The Elmhurst Station would be on SW Elmhurst Street between SW 72nd Avenue and SW 70th Avenue. The Hall Station would be located on the southeast side of SW Hall Boulevard between SW Commercial Street and SW Hunziker Street. The WES Commuter Rail station and the Tigard Transit Center bus facilities would remain co-located in their existing location, approximately 0.25 mile from the Hall Station.



South of downtown Tigard, stations would be included at SW Bonita Road, SW Upper Boones Ferry Road and Bridgeport Village. The Bonita Station would be an elevated station located on the north side of SW Bonita Road between SW Milton Court and the WES Commuter Rail tracks. The Upper Boones Ferry Station would be at grade, with near-side platforms on either side of SW Upper Boones Ferry Road. The Bridgeport Station would be located on the north side of SW Lower Boones Ferry Road between SW 72nd Avenue and I-5.

The Preferred Alternative would include a new surface park and ride with about 350 spaces at the 68th Station, a new surface park and ride with about 100 spaces at the Hall Station, and a structured park and ride with up to about 960 spaces on five levels at the Bridgeport Station.<sup>2</sup> The Hall Park and Ride would supplement the existing 103-space surface park and ride at the Tigard Transit Center. The Bridgeport Park and Ride would be located on the site of an existing surface park and ride south of SW Lower Boones Ferry Road, and would include a transit center with bus bays on the ground level below the structured parking. A new pedestrian bridge would be constructed to allow people to connect between the station north of SW Lower Boones Ferry Road and the transit center and park and ride on the south side of the road. See Appendix A for a detailed map of each station.

Both the Hall Station and the Bridgeport Station would include three tracks and a combined center and side platform, similar to a trail track, to allow vehicles to turn around. Three crossover tracks are assumed to be included in Segment C, located just south of SW Hunziker Street, just north of SW Wall Street and just north of the Bridgeport Station. Approximately six substations would be required in Segment C. These would be placed on parcels that would need to be acquired for the light rail trackway or stations, and are currently assumed to be located near SW 68th Avenue, SW Hermoso Way, the Hall Station, SW Bonita Road, the Upper Boones Ferry Station and the Bridgeport Station.

### **Hunziker Operations and Maintenance Facility**

The Project would construct a new light rail O&M facility to accommodate the added light rail vehicles in the TriMet system. The Hunziker O&M Facility would be located in Tigard, along the light rail alignment in the industrial area east of downtown Tigard (see Figure 2.2-5 for the general location). The facility would encompass about 15 acres. Figure 2.2-6 provides a detailed map of the facility.

The facility layout would be designed to provide 9,000 feet of storage track for approximately 36 light rail vehicles. The storage track would accommodate four additional vehicles than the 32 that would be purchased for the Project to allow for system growth and operational flexibility. The facility site would have space to add more storage tracks later, for up to 60 vehicles total, to accommodate further system growth.

In addition to providing light rail vehicle storage, the facility would accommodate most maintenance functions necessary to operate the light rail system, including five maintenance bays, a space for wheel-truing, a vehicle wash area, a unit repair facility (for vehicle parts), maintenance of way facilities (trackway maintenance) and parts storage areas (both indoor and outdoor). The facility would also include a surface parking lot for employees and fleet vehicles, administrative space to support the on-site operations (including an employee gym facility), and on-site stormwater management. The site would have space for an additional facilities building to support the maintenance needs associated with future system growth.

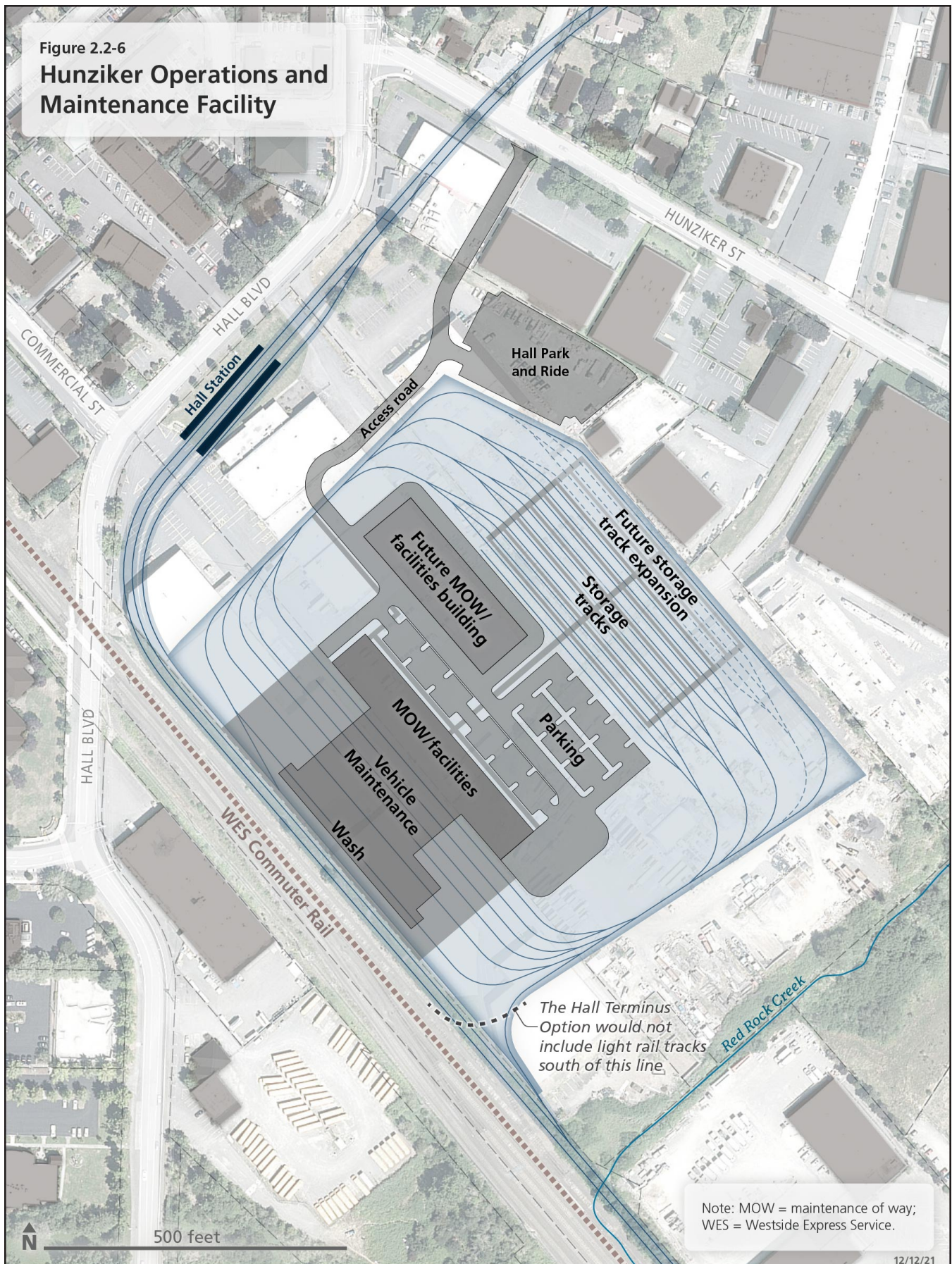
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<sup>2</sup> The analysis of impacts to motor vehicle operations also considers an option for 710 park and ride spaces at the Bridgeport Station. See Chapter 3 for more information.



Figure 2.2-6

## Hunziker Operations and Maintenance Facility



Light rail trains would access the facility via switches on the main light rail alignment parallel to the WES and freight railroad tracks, just south of the Hall Station.

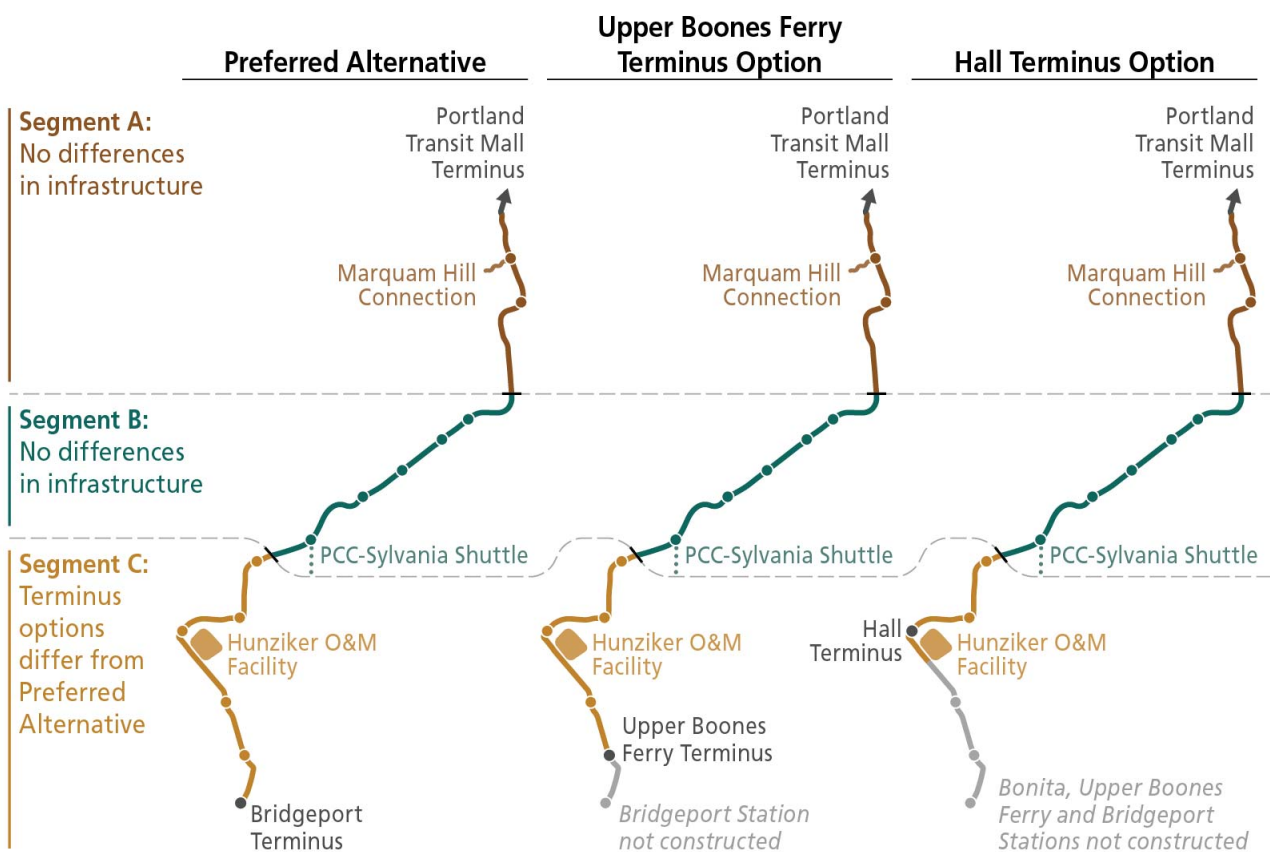
## 2.2.6. Terminus Options

This Final EIS considers two terminus options for phasing the construction of the Preferred Alternative in the event that there is insufficient funding to construct the full length of the alignment, shown on Figure 2.2-7:

- Upper Boones Ferry Terminus Option
- Hall Terminus Option

Figure 2.2-7

### Terminus Options Compared to the Preferred Alternative



In accordance with FTA’s Capital Investment Grants Program guidance, a project that would construct a portion of a preferred alternative, referred to as a minimum operable segment (MOS), “must be able to function as a stand-alone project and not be dependent on any future segments being constructed” (FTA Circular C-9300.1B). Either terminus option could meet these requirements and function as an MOS. If additional funding were identified at a later date, either terminus option could ultimately be extended to build the full-length Preferred Alternative alignment described in this Final EIS.



### ***Upper Boones Ferry Terminus Option***

The Upper Boones Ferry Terminus Option is defined as a 10-mile alignment terminating at the Upper Boones Ferry Station. The following elements of the Preferred Alternative would *not* be constructed as part of this option:

- trackway across and south of SW Upper Boones Ferry Road
- regrading of SW Upper Boones Ferry Road between the existing freight rail tracks and I-5
- the Bridgeport Station
- a new park and ride structure, and associated pedestrian bridge and bus bays at the Bridgeport Station

In addition, the Upper Boones Ferry Station would be modified for the Upper Boones Ferry Terminus Option to include platforms only on the north side of SW Upper Boones Ferry Road instead of being split across the roadway. A third track would be added to allow light rail trains to turn around and dwell.

### ***Hall Terminus Option***

The Hall Terminus Option is defined as an 8-mile alignment terminating at the Hall Station, but including trackway extending beyond the station to access the adjacent Hunziker O&M Facility. The following elements of the Preferred Alternative would *not* be constructed as part of this option:

- trackway south of the Hunziker O&M Facility
- the Bonita, Upper Boones Ferry and Bridgeport Stations
- a new park and ride structure, and associated pedestrian bridge and bus bays at the Bridgeport Station

## **2.2.7. Related Transportation Improvements**

### **Ross Island Bridgehead Reconfiguration**

The Ross Island Bridgehead Reconfiguration is an option to improve neighborhood access to light rail in South Portland. It would supplement the circulation changes made by the Preferred Alternative in South Portland with several measures to improve circulation for bicycles, pedestrians and local vehicles, including by shifting regional traffic movements off of neighborhood streets, creating new at-grade signalized intersections on SW Naito Parkway, and adding or rebuilding sidewalks and bikeways to improve access.<sup>3</sup> For this Final EIS, the Ross Island Bridgehead Reconfiguration includes the following infrastructure changes, which are illustrated on Figure 2.2-8:

- reconstructing SW Naito Parkway between SW Harrison Street and SW Curry Street to include raised, protected bicycle lanes, sidewalks and five new signalized intersections
- removing the existing frontage road along the west side of SW Naito Parkway

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<sup>3</sup> Although the Ross Island Bridgehead Reconfiguration is assumed to be funded separately from the light rail investment, it is analyzed in this Final EIS as an option that would supplement the Preferred Alternative. For example, because the Preferred Alternative would reconstruct SW Naito Parkway between SW Curry Street and SW Barbur Boulevard, the Ross Island Bridgehead Reconfiguration would include roadway reconstruction only north of SW Curry Street. The traffic analysis in this Final EIS considers two build scenarios for the Project: one scenario of the Preferred Alternative alone and a second scenario of the Preferred Alternative combined with the Ross Island Bridgehead Reconfiguration.



- replacing the existing ramps between SW Naito Parkway and the Ross Island Bridge with two east-west streets that would operate as a couplet, converging near SW Kelly Avenue at the west end of the Ross Island Bridge
- adding a new signalized intersection near the west end of the Ross Island Bridge to merge traffic coming from SW Kelly Avenue (capturing traffic from the north, including downtown Portland and Interstate 405) with traffic coming from the eastbound leg of the couplet (capturing traffic from the south, including SW Barbur Boulevard)
- reconstructing SW Arthur Street, SW Kelly Avenue and SW Corbett Avenue between SW First Avenue and the west end of the Ross Island Bridge
- adding two new signalized intersections on SW Kelly Avenue

The Ross Island Bridgehead Reconfiguration was an integral part of Alternative A2-BH in the Draft EIS, and featured reconstruction of SW Naito Parkway with sidewalks and the addition of intersections allowing pedestrian, bicycle and local vehicle crossings. Exhibit 2.2-4 provides background on the origin of the Ross Island Bridgehead Reconfiguration.

#### **Exhibit 2.2-4**

##### **Background on the Ross Island Bridgehead Reconfiguration**

The “Ross Island Bridgehead” refers to the area at the west end of the Ross Island Bridge in the South Portland neighborhood (see Figure 2.2-8).

This area has been shaped and reshaped by infrastructure projects since the early 1900s. As the automobile became more popular and streets replaced streetcar lines, high-volume roadways such as SW Barbur Boulevard, I-5, SW Harbor Drive, SW Front Avenue (now SW Naito Parkway), freeway interchanges and Ross Island Bridge ramps displaced homes and businesses, and placed barriers to access in the remaining neighborhood.

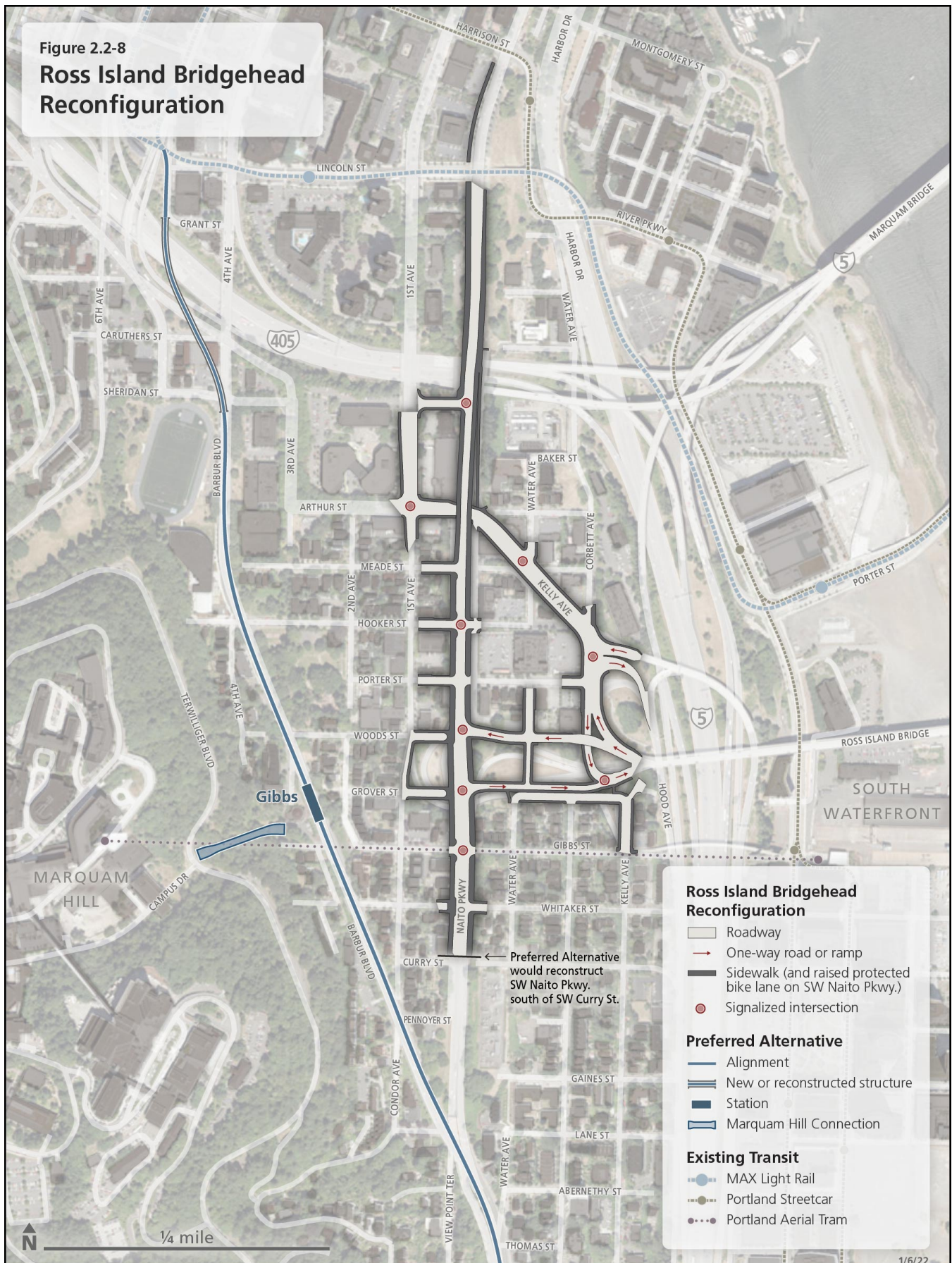
Congested traffic conditions continue today with queues regularly spilling into the neighborhoods, impacting quality of life, and constraining walking and bicycling access. The Ross Island Bridgehead Reconfiguration derives from nearly 40 years of plans for the area, and is intended to accomplish a range of land use and transportation goals of both the City of Portland and Oregon Department of Transportation (ODOT).

The Ross Island Bridgehead Reconfiguration would redirect traffic from downtown Portland to I-405, including eastbound U.S. 26 traffic, along SW Kelly Avenue to a new ramp on the Ross Island Bridge, and convert SW Naito Parkway to a surface boulevard with at-grade intersections. It would change other ramp accesses to the bridge, add bicycle facilities and open up nearly 3 acres of land for development.

### **Station Access Improvement Options**

The station access improvements include 30 options for walking and bicycling investments that would enhance access to the light rail stations in the Preferred Alternative. The improvements include adding bikeways, sidewalks, enhanced pedestrian crossings, and pedestrian bridges or multi-use paths over I-5 and Highway 217. The station access improvements are expected to be constructed within existing right of way. See Appendix A for maps and a description of each station access improvement option.

**Figure 2.2-8**  
**Ross Island Bridgehead**  
**Reconfiguration**



## **2.2.8. Project Construction Activities**

The anticipated construction activities associated with the Project are summarized below and described in more detail in Appendix A. This information is based on conceptual design and typical construction practices. Construction practices will continue to be refined during the preliminary and final design stages.

The timing of project construction is currently unknown, because planning and design efforts for the Project were paused in late 2020 (see Chapter 1, Project Introduction, for more information). The major construction phase would last approximately four years. Although construction activities would occur along the length of the Project during this time, the impact would not be continuous along the corridor for the full duration, because the Project would likely be divided into various segments or line sections for construction.

Construction would include activities such as demolitions, utility relocations, construction of the light rail elements, and stormwater treatments and landscaping. In addition, construction typically requires staging areas for activities such as stockpiling materials, assembling project elements and locating construction field administration offices. Potential staging areas are identified in Appendix A, and more specific staging area locations will be identified when the Project is in final design. To minimize impacts to properties, parcels that would be needed for the project footprint could be used as staging areas before the construction of project elements on those parcels. Staging activities could also occur in areas near the construction footprint, either on nearby public right of way (with necessary permits for such use) or on private property leased by the contractors (such as a parking lot).

Where possible, construction activities would be coordinated with other capital improvement projects, including projects carried out by the local jurisdictions, to help minimize construction impacts. In addition, TriMet will actively engage with local jurisdictions as the Project nears construction to develop a conduct of construction plan that would guide coordination throughout construction.

## **2.3. Draft EIS Alternatives and Subsequent Refinements**

This section provides a summary of the light rail alternatives studied in the Draft EIS, the identification of an initial route proposal and several potential design refinements in the Draft EIS, the adoption of the Preferred Alternative, and further refinements to the design of the Preferred Alternative.

### **2.3.1. Draft EIS Light Rail Alternatives**

This section summarizes the light rail alternatives that were considered in the Draft EIS. For more detailed information, see Chapter 2 and Appendix A of the Draft EIS. The Draft EIS light rail alternatives are not studied further in this Final EIS, but they are referenced when appropriate in this Final EIS in the context of mitigations and other refinements to designs.

Table 2.3-1 and Figure 2.3-1 provide an overview of the alternatives and options for the design of the light rail project that were considered in the Draft EIS, including various routes, connections to stations and O&M facility locations.



**Table 2.3-1. Draft EIS Light Rail Alternatives by Segment**

<b>Alignment Alternatives</b>	<b>Additional Project Elements</b> <i>(pair with all alignment alternatives unless otherwise noted)</i>
<b>Segment A: Inner Portland</b>	
<ul style="list-style-type: none"> <li>Alternative A1: Barbur</li> <li>Alternative A2-BH: Naito with Bridgehead Reconfiguration</li> <li>Alternative A2-LA: Naito with Limited Access</li> </ul>	<p><b>Marquam Hill Connection</b></p> <ul style="list-style-type: none"> <li>Connection 1A: Elevator/Bridge and Path</li> <li>Connection 1B: Elevator/Bridge and Recessed Path</li> <li>Connection 1C: Elevator/Bridge and Tunnel</li> <li>Connection 2: Full Tunnel</li> </ul> <p><b>Station Access Improvements</b></p> <ul style="list-style-type: none"> <li>SA01 through SA03 (see Appendix A of the Draft EIS for detailed information)</li> </ul>
<b>Segment B: Outer Portland</b>	
<ul style="list-style-type: none"> <li>Alternative B1: Barbur</li> <li>Alternative B2: I-5 Barbur TC to 60th</li> <li>Alternative B3: I-5 26th to 60th</li> <li>Alternative B4: I-5 Custer to 60th</li> </ul>	<p><b>PCC-Sylvania Shuttle</b></p> <ul style="list-style-type: none"> <li>Barbur TC and Baylor Shuttle</li> <li>53rd Shuttle</li> </ul> <p><b>Station Access Improvements</b></p> <ul style="list-style-type: none"> <li>SA04 through SA23 (see Appendix A of the Draft EIS for detailed information)</li> </ul>
<b>Segment C: Tigard and Tualatin</b>	
<p><b>Through Route</b></p> <ul style="list-style-type: none"> <li>Alternative C1: Ash to I-5</li> <li>Alternative C2: Ash to Railroad</li> <li>Alternative C3: Clinton to I-5</li> <li>Alternative C4: Clinton to Railroad</li> </ul> <p><b>Branched Route</b></p> <ul style="list-style-type: none"> <li>Alternative C5: Ash and I-5 Branched</li> <li>Alternative C6: Wall and I-5 Branched</li> </ul>	<p><b>Operations and Maintenance Facility</b></p> <ul style="list-style-type: none"> <li>Hunziker Facility</li> <li>Through 72nd Facility (pairs with Alternatives C1 and C3)</li> <li>Branched 72nd Facility (pairs with Alternatives C5 and C6)</li> </ul> <p><b>Station Access Improvements</b></p> <ul style="list-style-type: none"> <li>SA24 through SA29 (see Appendix A of the Draft EIS for detailed information)</li> </ul>

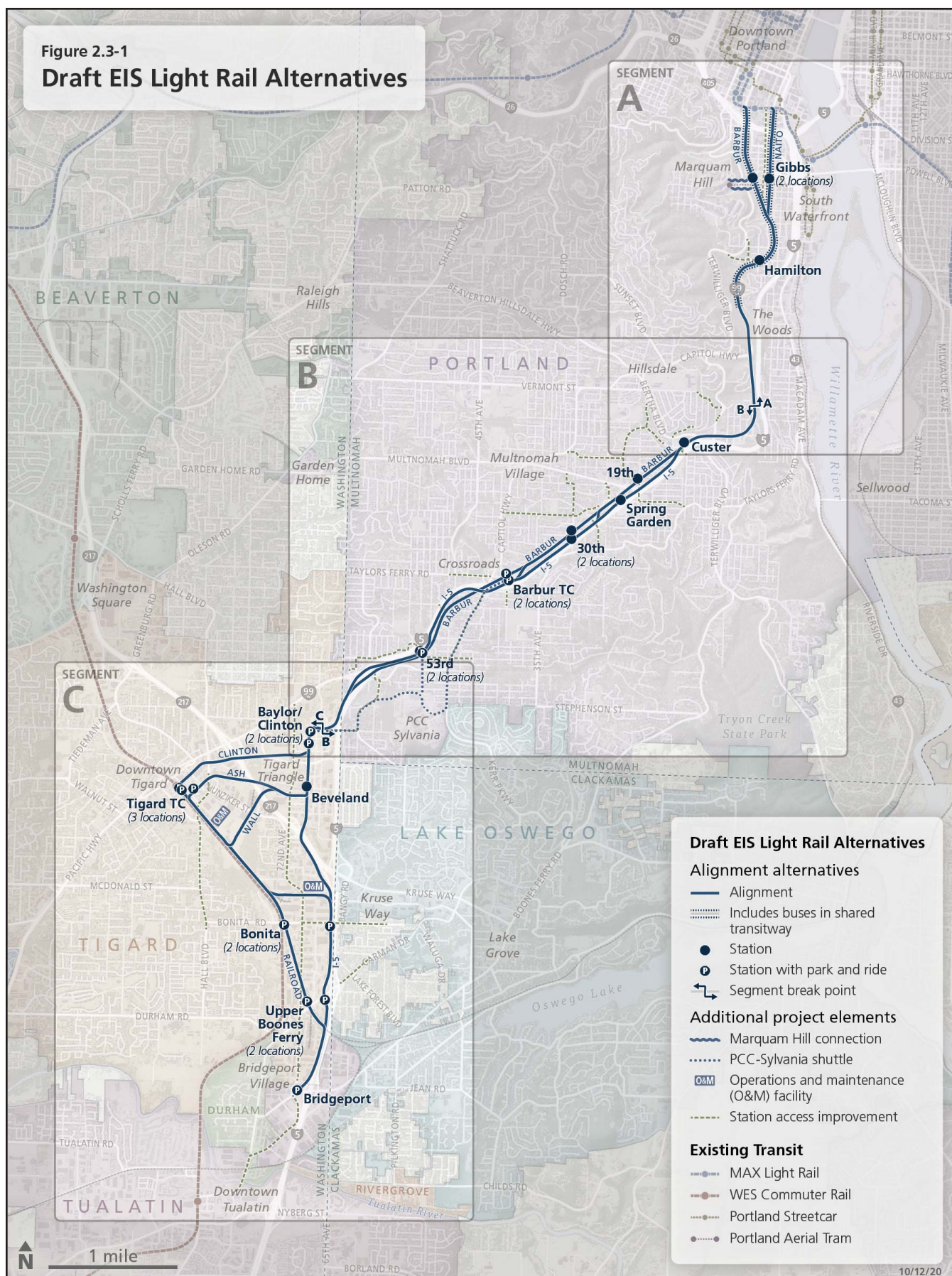
Note: EIS = Environmental Impact Statement; I-5 = Interstate 5; PCC = Portland Community College; TC = Transit Center.

## Segment A Alignment Alternatives

The Draft EIS alignment alternatives in Segment A included two locations for the light rail alignment, either on SW Barbur Boulevard or on SW Naito Parkway. All Draft EIS alignment alternatives in Segment A would run on SW Barbur Boulevard south of SW Naito Parkway.

For the alignment alternatives on SW Naito Parkway, the Draft EIS studied two different approaches for the configuration of the roads and ramps that access the west end of the Ross Island Bridge. Alternative A2-LA would reconstruct SW Naito Parkway and the adjacent streets to generally maintain the existing limited-access roadway configuration. Alternative A2-BH would instead include changes to SW Naito Parkway and the bridge access, known collectively as the Ross Island Bridgehead Reconfiguration (see Exhibit 2.2-4).

**Figure 2.3-1**  
**Draft EIS Light Rail Alternatives**



## Marquam Hill Connection Options

The Draft EIS considered four options for connecting to Marquam Hill, including various combinations of bridges, elevators, pathways and pedestrian tunnels. Options 1A, 1B and 1C would all include an elevator near SW Barbur Boulevard that would connect to a bridge to SW Terwilliger Parkway. West of SW Terwilliger Parkway, Options 1A, 1B and 1C would include a second elevator near Kohler Pavilion that would be connected to SW Terwilliger Parkway by an at-grade path, recessed path or tunnel, respectively. Option 2 would include a deeper tunnel with a portal near SW Barbur Boulevard that would connect to a single elevator near Kohler Pavilion.

## Segment B Alignment Alternatives

The Draft EIS considered alignment alternatives in Segment B that would be located in the center of SW Barbur Boulevard, adjacent to I-5, or a combination of the two. All Draft EIS alignment alternatives in Segment B would turn south near SW 60th Avenue and cross into the Tigard Triangle on a light rail structure over I-5.

Alternative B1 would remain in the center of SW Barbur Boulevard until SW 60th Avenue and would include reconstruction of the existing Crossroads bridge over I-5 (at the intersection of SW Barbur Boulevard and SW Capitol Highway).

Alternatives B2, B3 and B4 would run adjacent to I-5 for a portion of Segment B. From north to south, Alternatives B2, B3 and B4 would depart from SW Barbur Boulevard to run adjacent to I-5 at the Barbur Transit Center, SW 26th Avenue and SW Custer Street, respectively. None of these alignment alternatives would include reconstruction of the existing Crossroads bridge over I-5.

## PCC-Sylvania Shuttle

The Draft EIS included two options for a shuttle to connect to PCC-Sylvania:

- **Barbur Transit Center and Baylor Shuttle.** This option would include a route along SW Capitol Highway, SW 49th Avenue, SW Lesser Road and SW Atlanta Street, with stops at the Barbur Transit Center, the PCC-Sylvania campus and the Baylor Station.
- **53rd Shuttle.** This option would include a route along SW 53rd Avenue, with stops at the PCC-Sylvania campus and the 53rd Station.

## Segment C Alignment Alternatives

The Draft EIS studied alignment alternatives in Segment C that would use two different route configurations:

- Through Route to Bridgeport Village via downtown Tigard (Alternatives C1 through C4)
- Branched Route with a split in the Tigard Triangle, where some trains would continue south to Bridgeport Village while others would turn west to serve downtown Tigard (Alternatives C5 and C6)

The two types of route configurations would follow three different alignments in the Tigard Triangle and downtown Tigard area: Ash, Clinton and Wall. Alternatives C1, C2 and C5 would use the Ash alignment, which would travel along SW 70th Avenue to SW Beveland Street in the Tigard Triangle, and then would cross through downtown Tigard on SW Ash Avenue. Alternatives C3 and C4 would use the Clinton



alignment, which would travel along SW 70th Avenue to SW Clinton Street, and then would cross through downtown Tigard on a new street between SW Main Street and SW Ash Avenue. Alternative C6 would be a branched alignment similar to Alternative C5, but would use an alignment along SW Wall Street and adjacent to the WES Commuter Rail tracks to serve downtown Tigard instead of the Ash alignment.

Between downtown Tigard and Bridgeport Village, the Draft EIS considered two alignments: adjacent to the railroad and adjacent to I-5. All Through Route alignment alternatives would run adjacent to the railroad tracks north of SW Landmark Lane. Alternatives C2 and C4 would continue adjacent to the railroad tracks until just north of the terminus near Bridgeport Village, where they would transition to run adjacent to I-5. Alternatives C1 and C3 would turn east at SW Landmark Lane to reach I-5, and then would run adjacent to I-5 until the terminus. The Bridgeport branch of the Branched Route alternatives (Alternatives C5 and C6) would run adjacent to Highway 217 at the southern end of the Tigard Triangle and then adjacent to I-5 until the terminus.

### **Operations and Maintenance Facility Options**

The Draft EIS included three options for an O&M facility:

- **Hunziker Facility.** This option, which would be compatible with all alignment alternatives, would construct an O&M facility south of SW Hunziker Street.
- **Through 72nd Facility.** This option would construct an O&M facility east of SW 72nd Avenue to pair with either Alternative C1 or C3.
- **Branched 72nd Facility.** This option would construct an O&M facility east of SW 72nd Avenue to pair with either Alternative C5 or C6.

### **Station Access Improvement Options**

The Draft EIS included 29 options for constructing sidewalks, safe crossings, bikeways and pedestrian bridges to improve access to the proposed light rail stations.

### **2.3.2. Design Refinements and Initial Route Proposal**

Based on the available analysis and public feedback before publication of the Draft EIS, project partner staff developed six potential changes to the Draft EIS alignment alternatives, known as design refinements. The design refinements were intended to avoid or minimize impacts, improve travel time and reduce capital cost. The Draft EIS included a description and map of each design refinement, as well as preliminary analysis of the potential change in impacts compared to the Draft EIS alignment alternatives (see Appendix E of the Draft EIS, Potential Design Refinement Concepts and Options).

The Draft EIS also identified a draft Preferred Alternative, known as the initial route proposal, to give the public, agencies and tribal governments an opportunity to comment on a full-length light rail alternative. Chapter 6 of this Final EIS and Metro's *Summary of Public Input on Route Selection for Southwest Corridor Light Rail* (2018), provide more detailed information on the Draft EIS comment period. Chapter 7, Draft EIS Comment Summary, and Appendix J, Draft EIS Comments and Responses, of this Final EIS provide the comments received and the responses to those comments.

Project partner staff developed the initial route proposal based on information from the Draft EIS analysis and on public outreach, including input from Metro’s Southwest Corridor Light Rail Community Advisory Committee (CAC).<sup>4</sup> The initial route proposal included a selection of one alignment alternative from each segment and a set of proposed design refinements to modify the alignment alternatives. Table 2.3-2 shows the alignment alternatives, design refinements and additional project elements that were included in the initial route proposal. See Chapter 2 of the Draft EIS for a map of the initial route proposal.

**Table 2.3-2. Initial Route Proposal Overview**

Segment	Alignment Alternatives and Design Refinements <sup>1</sup>	Additional Project Elements
<b>Segment A</b>	Alternative A1: Barbur Refinement 1: Barbur Woods East-Side Running	Marquam Hill connection options <sup>2</sup>
<b>Segment B</b>	Alternative B2: I-5 Barbur TC to 60th Refinement 2: Taylors Ferry I-5 Overcrossing Refinement 4: Barbur Undercrossing	PCC-Sylvania shuttle options <sup>2</sup>
<b>Segment C</b>	Alternative C2: Ash to Railroad Refinement 5: Elmhurst Refinement 6: Tigard Transit Center Station East of Hall	Hunziker O&M Facility

Note: I-5 = Interstate 5; O&M = operations and maintenance; PCC = Portland Community College; TC = Transit Center.

<sup>1</sup> Refinement 3 was not included in the initial route proposal.

<sup>2</sup> The initial route proposal did not select an option for the Marquam Hill connection or the PCC-Sylvania shuttle route.

### 2.3.3. Selection of the Preferred Alternative

Metro’s Southwest Corridor Steering Committee<sup>5</sup> recommended a Preferred Alternative based on recommendations from project partner staff and the CAC, analysis documented in the Draft EIS, and comments received from the public and agencies. The steering committee’s recommendation followed the initial route proposal, with the exception of the following two changes based on input received during the Draft EIS comment period:

- Refinement 1, Barbur Woods East-Side Running, was removed from consideration in favor of the original design for Alternative A1, a center-running alignment that would replace the existing trestle bridges on SW Barbur Boulevard in The Woods. Project partner staff recommended omitting Refinement 1 to improve safety for people walking and bicycling along SW Barbur Boulevard and to avoid one or two at-grade crossings between light rail and the northbound traffic lanes. The decision was also informed by input received during the Draft EIS comment period and a funding agreement that was developed after the Draft EIS was published to support replacing the existing SW Barbur Boulevard trestle bridges.

<sup>4</sup> The CAC is a group of community stakeholders that provide feedback and recommendations to project partner staff and decision-makers. Metro convened the CAC at the time of the initial route proposal selection and the recommendation of a Preferred Alternative. After the adoption of the Preferred Alternative, TriMet convened a new CAC. TriMet’s CAC is on hiatus while design and planning efforts are paused for the Project.

<sup>5</sup> Through 2018, the steering committee was made up of elected officials from seven cities (Portland, Tigard, Tualatin, Sherwood, Beaverton, King City and Durham), Washington County and Metro, and leaders from TriMet and ODOT. In 2019, after the selection of the Preferred Alternative, TriMet convened a new, smaller steering committee focused on the jurisdictions that would be most directly affected by the light rail project. Compared to the earlier steering committee that Metro had convened, Beaverton, King City and Sherwood are not represented. TriMet’s steering committee was put on hiatus in December 2020 after a regional transportation funding measure did not pass, resulting in a pause on further planning and design work.

- In the Crossroads area (the area at the intersection of SW Barbur Boulevard and SW Capitol Highway), both Refinement 2, Taylors Ferry I-5 Overcrossing, and the equivalent portion of Alternative B2 remained under consideration. Metro’s steering committee recommended further study of route options at the Crossroads area before the start of the Final EIS. This recommendation was informed by feedback received during the Draft EIS comment period (see Chapter 7 of this Final EIS for a summary of concerns raised about Refinement 2 from community members). After further analysis and outreach, TriMet’s steering committee selected a route for the Preferred Alternative that would serve a station in the center of SW Barbur Boulevard at the Barbur Transit Center and then depart SW Barbur Boulevard at SW Taylors Ferry Road. This route was chosen to improve station visibility and access, and to reduce the length of the light rail structure over I-5. See Appendix A for a map of the Barbur Transit Center Station. See Appendix I for more information on the options studied at the Crossroads area, and see Chapter 6 for more information about the public process that led to the Preferred Alternative route.

The following entities endorsed the steering committee’s recommendation for the Preferred Alternative in the fall of 2018:

- Beaverton City Council
- Oregon Department of Transportation (ODOT)
- Portland City Council
- Tigard City Council
- TriMet Board of Directors
- Tualatin City Council
- Washington County Commission

Metro Council took these endorsements into consideration and approved the Preferred Alternative in November 2018, and then adopted it into the *Regional Transportation Plan* in December 2018. Chapter 6 provides details on the process of identifying the Preferred Alternative.

### **2.3.4. Further Refinements to the Preferred Alternative**

Between the selection of the Preferred Alternative and the publication of the Final EIS, additional smaller refinements were made to the light rail project design. These changes were made to avoid or minimize impacts identified in the Draft EIS, to respond to comments received during the Draft EIS comment period, to improve transit performance or to reduce the overall project cost.

The following types of refinements were made:

- added stormwater treatment and detention facilities
- converted select at-grade crossings to grade-separated crossings
- refined assumptions about walking and bicycling facilities in certain locations, such as adding sidewalks or replacing buffered bicycle lanes with raised protected bicycle lanes
- added bus platforms within the shared transitway at the Gibbs Station
- changed roadway connections due to adjustments in grades and wall heights



- shifted alignment slightly in certain locations to minimize property impacts and wall heights
- added details for construction and ongoing O&M, such as staging areas and access roads
- reduced assumed maximum park and ride capacities to avoid or minimize traffic impacts
- adjusted roadway designs to avoid or minimize traffic impacts, such as by lengthening turn lanes or realigning intersections
- reduced the scope and footprint of the Marquam Hill Connection and refined the connection to use inclined elevators instead of bridges, vertical elevators or tunnels
- selected the route along SW 53rd Avenue for the PCC-Sylvania Shuttle
- adjusted the layout and location of the Hunziker O&M Facility to avoid long-term floodplain impacts
- added the Upper Boones Ferry Terminus Option

For more detailed information on these changes, including the primary reasons for each change, see Appendix I.

### **2.3.5. Refinements to the Related Transportation Improvements**

All of the station access improvements studied in the Draft EIS are included in this Final EIS as related transportation improvements. The Final EIS considers one additional station access improvement, a multi-use path on the light rail structure over Highway 217, which was previously part of the Draft EIS alignment alternatives.

The Ross Island Bridgehead Reconfiguration has been refined to reduce property impacts by using a couplet configuration for the streets connecting SW Naito Parkway and the Ross Island Bridge.

See Appendix I for more information on refinements to the related transportation improvements since the Draft EIS.