1 PURPOSE AND NEED

1.1 Lynnwood Link Extension

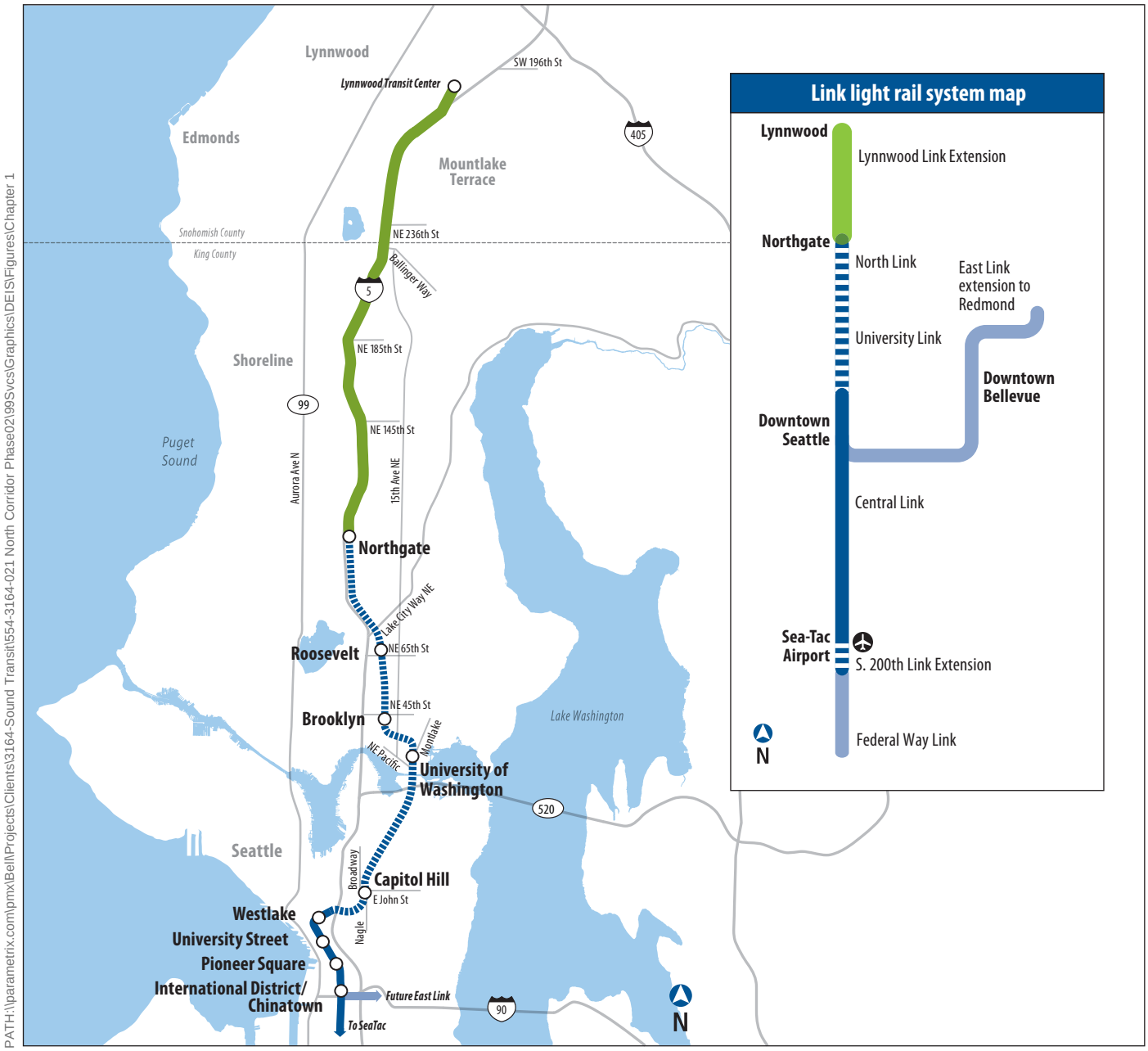
The Central Puget Sound Regional Transit Authority (Sound Transit) is proposing the Lynnwood Link Extension to expand the regional light rail system north from Northgate in Seattle to Shoreline, Mountlake Terrace, and Lynnwood in Washington State. This project was previously known as the North Corridor Transit Project.

The Lynnwood Link Extension would help implement the Puget Sound Regional Council's (PSRC) *VISION 2040* (PSRC 2009) and the Sound Transit 2005 *Regional Transit Long-Range Plan* (Sound Transit Long-Range Plan) (Sound Transit 2005a), both of which call for the eventual extension of light rail north of the city of Lynnwood to the city of Everett in Snohomish County.

Sound Transit and the Federal Transit Administration (FTA) are preparing this environmental impact statement (EIS) for the project in compliance with the National Environmental Policy Act (NEPA) and the Washington State Environmental Policy Act (SEPA). FTA is the federal lead agency for the NEPA EIS process, and Sound Transit is the state lead agency for SEPA. This chapter describes the proposed project's setting and why the project is being proposed.

1.1.1 Project Area

The proposed Lynnwood Link Extension would begin at Northgate in north Seattle and end at the Lynnwood Transit Center (Figure 1-1). The 8.5-mile project corridor generally follows Interstate 5 (I-5), the major north-south freeway through the state, and the primary route serving a large commuter market traveling between Snohomish and King counties. The corridor travels through the cities of Seattle and Shoreline in King County, and Mountlake Terrace and Lynnwood in Snohomish County. This is one of the most densely developed urbanized areas in the Pacific Northwest and is part of a longer north-south corridor connecting Olympia, Tacoma, Seattle, and Everett. Roadways in this corridor experience high levels of congestion throughout large portions of the day, which degrades mobility and reliability. Despite that, the corridor is one of the region's most productive markets for transit, and there have been major investments in public transit infrastructure and service over the past 40 years.



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DATA SOURCES: (Sound Transit)

Legend

- Lynnwood Link Extension
- Under construction
- Link in service
- In planning

Figure 1-1
Regional Setting for
the Lynnwood Link Extension

Sound Transit began light rail service in 2009 with Central Link, which launched a system that now runs 13.9 miles between downtown Seattle and Seattle-Tacoma International Airport (Sea-Tac Airport). Construction currently underway will extend light rail by 3 miles from downtown Seattle to the University of Washington by 2016, and another 4.3 miles from the University of Washington to Northgate by 2021 (Figure 1-1). With the Lynnwood Link Extension and the other projects in the Sound Transit 2 (ST2) program, Sound Transit is developing nearly 36 miles of new service to the north, south, and east. The combined *Sound Move* and ST2 programs will complete nearly 55 miles of light rail to serve the Puget Sound region. The ST2 program defined the Lynnwood Link Extension as light rail extending from the Northgate Transit Center to the Lynnwood Transit Center, with intermediate stations serving north Seattle, Shoreline, and Mountlake Terrace.

1.1.2 Corridor Communities

The project corridor is home to established communities that are redeveloping and increasing in density. The compact nature of these communities is reinforced by the geographic constraints of Puget Sound and Lake Washington on either side of the corridor, and by the presence of other local jurisdictions including Everett to the north and Seattle, the state's largest population and employment center, to the south. Land use in the project corridor is largely residential but is anchored by major regional commercial centers at Northgate and Lynnwood, with town centers and other activity centers located in between. As of the 2010 United States Census, nearly 126,000 people lived within 0.5 mile of the project corridor in Seattle, Shoreline, Mountlake Terrace, and Lynnwood; for the same period, PRSC estimated nearly 60,000 jobs were within the corridor. The total population and employment in each of these cities is even higher: 720,000 people and 565,000 jobs as of 2010.

Regional and local plans anticipate higher levels of growth in the corridor communities through 2040. Population during this period is predicted to grow 21 percent and employment 39 percent by 2040.

1.2 Purpose and Need for the Lynnwood Link Extension

In 2010, Sound Transit developed a preliminary Purpose and Need Statement as part of an Alternatives Analysis and early scoping process for the proposed project. Following public and agency review, the preliminary statement was revised based on comments received. When this EIS was initiated with environmental scoping and another public comment period in September and October 2011, Sound Transit again invited public comment on the Purpose and Need Statement. The current Purpose and Need Statement reflects public and agency comments as well as the direction of the Sound Transit Board of Directors in late 2011 and early 2012. This included the Board's adoption of Motion M2011-87, which incorporated the results of the Alternatives Analysis, and confirmed light rail as the high-capacity transit

mode for the Lynnwood Link Extension. As Chapter 2, Alternatives Considered, further describes, the Alternatives Analysis found light rail in an exclusive right-of-way was the only mode that would address the corridor's growing mobility, access, and capacity needs.

1.2.1 Purpose of the Project

The purpose of the Lynnwood Link Extension is to expand the Sound Transit Link light rail system from Northgate in Seattle north into Shoreline, Mountlake Terrace, and Lynnwood in Snohomish County in order to:

- Provide reliable, rapid, and efficient peak and off-peak transit service of sufficient capacity to meet the existing and projected demand for travel to and from the corridor communities and other urban centers in the Central Puget Sound area.
- Create an alternative to travel on congested roadways, and improve connections to the regional multimodal transportation system.
- Support the adopted land use, transportation, and economic development plans of the region and the corridor communities.
- Advance the long-range vision, goals, and objectives for transit service established by the Sound Transit Long-Range Plan for high-quality regional transit service connecting major activity centers in King, Pierce, and Snohomish counties.
- Implement a financially feasible system that seeks to preserve and promote a healthy environment.

1.2.2 Need for the Project

The project is needed to:

- Address increasingly unreliable travel times for transit trips that now rely on the corridor's highly congested roadways and high-occupancy vehicle (HOV) lanes.
- Address overcrowding caused by insufficient transit capacity.
- Create a reliable alternative to automobile trips on I-5 and State Route (SR) 99, the two primary highways serving the project corridor, which are unreliable and over capacity throughout large portions of the day.
- Increase mobility, access, and transportation capacity for the 20 percent growth in population and 40 percent growth in employment projected in the regional growth and activity centers in the corridor and the region, consistent

with PSRC's *VISION 2040* and *Transportation 2040*, as well as related county and city comprehensive plans.

- Create the transit infrastructure needed to support the development of Northgate and Lynnwood—the corridor's two designated regional growth centers.
- Advance the Sound Transit Long-Range Plan for a future extension of mass transit north to Everett.
- Ensure long-term regional mobility, multimodal connectivity, and convenience for the corridor's citizens and communities, which include travel-disadvantaged residents and low-income and minority populations.
- Help the state and region reduce transportation-related energy consumption and reduce harmful greenhouse gas emissions in the atmosphere, in accordance with Revised Code of Washington (RCW) 47.01.440, and as outlined in Chapter 70.235 RCW (Limiting Green House Gas Emissions).

1.3 Planning History for Lynnwood Link Extension

Many years of planning and past investments have focused on the need for effective regional transit serving the corridor's communities. Transit shaped the original development of these communities beginning in 1910, when the Interurban railway began operating between Seattle and Everett. However, transit service faltered in the 1950s when the Interurban stopped running. The "Forward Thrust" regional transit system proposals of the late 1960s and early 1970s included fixed guideway transit along the I-5 corridor in King County, but funding was defeated at the polls. Since then, a largely commuter-oriented transit system comprising express bus infrastructure and services has developed to serve rapid population and employment growth along the I-5 corridor, helping to connect Snohomish County suburban residents to jobs in Seattle. Express bus investments have included HOV lanes, park-and-ride facilities, transit centers, direct access ramps, and freeway transit stations.

The region renewed its efforts to develop mass transit service connecting Seattle and Snohomish County in the 1990s. In 1993, the Central Puget Sound Regional Transit Authority (Sound Transit) was created, and in 1995 the Lynnwood Link Extension project corridor was part of a large proposal for developing regional light rail connecting King, Pierce, and Snohomish counties; however, the voters did not approve that program. The following year, voters approved a scaled-back program known as *Sound Move* that included light rail in King County, improved regional express bus services, commuter rail, and related facilities. Sound Transit defined a second phase of investments after a Long-Range Plan Update in 2005 and the resulting ST2 program was approved by voters in 2008.

Chapter 2, Alternatives Considered, describes the more recent steps in this project's planning, including an Alternatives Analysis Sound Transit conducted starting in 2010.

1.3.1 Regional Plans for Managing Growth

The Puget Sound region, which encompasses urbanized King, Pierce, Snohomish, and Kitsap counties, has a coordinated series of regional, county, and local plans and policies that guide how the region is managing its growth. The primary plans at the regional level are PSRC's *VISION 2040* (PSRC 2009) and *Transportation 2040* (PSRC 2010a). The Sound Transit Long-Range Plan serves as the regional transit element of *Transportation 2040*. These plans share land use, growth management, and transportation policies that call for an effective regional transit system to link the urban centers where the region's growth will be focused. County and local city comprehensive plan policies in the project corridor and throughout the region reinforce the need for high-capacity transit investments to support new population and employment developments, as well as to provide for vibrant urban communities that offer alternatives to automobiles.

VISION 2040

VISION 2040, which was adopted by PSRC in May 2008, is the region's integrated, long-range vision for accommodating the approximately 5 million people expected to live in the Puget Sound region by 2040. The goals of *VISION 2040* are to maintain a healthy region, promote the well-being of people and communities, ensure economic vitality, and preserve a healthy environment. Northgate and Lynnwood are both designated as regional growth centers in *VISION 2040*.

Transportation 2040

Transportation 2040, which was adopted by PSRC in May 2010, is the region's metropolitan transportation plan and one of the key action plans to implement the *VISION 2040* strategy over the next 30 years. The region's growth in jobs and population is expected to boost demand for travel within and through the region by about 40 percent. *Transportation 2040* outlines a long-term program for regional transportation investments, including the Lynnwood Link Extension, to address rising travel demand.

1.3.2 Regional and Local Transportation Systems

Regional Highways

The project corridor encompasses I-5—one of the two primary north-south highways between Lake Washington and Puget Sound. I-5 is the most heavily traveled highway in the state, serving regional and interstate movements of both people and goods, carrying from 159,000 to 196,000 vehicles in the project corridor

on an average day. In addition to I-5, SR 99 provides a north-south connection, and several other state highways, including SR 104 and SR 523, provide important east-west connections.

The Washington State Department of Transportation (WSDOT) time-reliability calculator indicates that a trip from Everett to Seattle at free-flow speeds should take about 21 minutes on I-5 (WSDOT 2012). Because of the high levels of congestion and unpredictable delays, a commuter must allow 71 minutes for the trip during the AM peak hour to ensure arriving on time 95 percent of the time. Physical and environmental constraints limit the addition of more highway capacity in the project corridor. Regional transportation planners expect the current high levels of travel demand to continue growing, and congestion and unreliability for travelers on I-5 to increase through 2040 (PSRC 2010b).

Transit

The project corridor has an extensive network of bus routes, most of which run generally north and south. Much of the project corridor's transit demand is fueled by commuters from north King County and south Snohomish County heading for downtown Seattle and the University District—two major employment centers in the region. Thirty-six weekday bus routes provided by three transit agencies operate through the project corridor along I-5. The majority of these routes are peak-period, peak-direction, point-to-point services linking south Snohomish County, north King County neighborhoods, and park-and-ride lots to major employment centers in King County. The project corridor carries the second highest bus ridership volumes in the region, with 19,000 daily riders in 2011.

Delays on I-5 affect travel times and reliability because HOV lanes are not continuous south of Northgate. Slow traffic in the general purpose lanes slows travel in the HOV lanes as well. This makes transit travel particularly unreliable and lengthy during the morning and evening peak periods when most transit service occurs. The I-5 HOV lanes in the project corridor do not meet the WSDOT policy standard for average HOV lane speeds of 45 miles per hour (mph) or greater at least 90 percent of the time during the morning and afternoon rush hours.

1.4 Applying the Purpose and Need to the Project

The Purpose and Need Statement has helped Sound Transit define the Draft EIS alternatives described in Chapter 2, Alternatives Considered. In Chapter 5, Evaluation of Alternatives, Sound Transit and FTA measure how well the alternatives would serve the purpose and need and compare other factors such as environmental impacts, costs, and constructability.

2 ALTERNATIVES CONSIDERED

This Draft EIS evaluates several light rail alternatives for the Lynnwood Link Extension along with a No Build Alternative. The light rail extension would be 8.5 miles long, starting at the Northgate neighborhood of Seattle and continuing north to the cities of Shoreline, Mountlake Terrace, and Lynnwood.

The Lynnwood Link Extension would directly connect to the northern terminus of the Link light rail system at Northgate. From there, riders could continue south on the Link system to the University of Washington, Capitol Hill, downtown Seattle, Tukwila, SeaTac, and Sea-Tac Airport. Separate projects to extend light rail to the south and east will allow direct connections to Bellevue, Redmond, and Federal Way.

Sound Transit has built on several decades of previous planning and environmental review to define the alternatives for this Draft EIS. A light rail connection between King and Snohomish counties was part of the 1996 Regional Transit System Plan and EIS (Sound Transit 1996), which resulted in the *Sound Move* program. The *Sound Transit Regional Transit Long-Range Plan* (adopted July 7, 2005) and its *Final Supplemental EIS on the Regional Transit Long-Range Plan* (June 2005) formed the basis for the ST2 Plan. The ST2 Plan identified the project that is now the Lynnwood Link Extension (Sound Transit 2005a, 2005b, 2008). In 2010, Sound Transit started the detailed project-level planning that produced the specific alternatives studied in this Draft EIS. Section 2.5, Alternatives Development, describes the steps Sound Transit and FTA took to work with the public, tribes, and agencies to consider the range of alternatives during the Alternatives Analysis process. A comparative evaluation of the alternatives is in Chapter 5, Evaluation of Alternatives.

2.1 Light Rail Alternatives

This Draft EIS evaluates a range of ground level (at-grade with I-5) or elevated light rail routes and station alternatives generally following I-5 from the Northgate Transit Center in Seattle to the Lynnwood Transit Center. The alternatives are arranged in three geographic segments, as shown in Figure 2-1.

Segment A: Northgate to Shoreline. There are six Segment A alternatives between Northgate in Seattle and NE 185th Street in Shoreline, all on the east side of I-5. They include at-grade and elevated alignments, each with two or three stations, some of which would include park-and-ride facilities. The potential station sites are at NE 130th Street, NE 145th Street, NE 155th Street, and NE 185th Street.

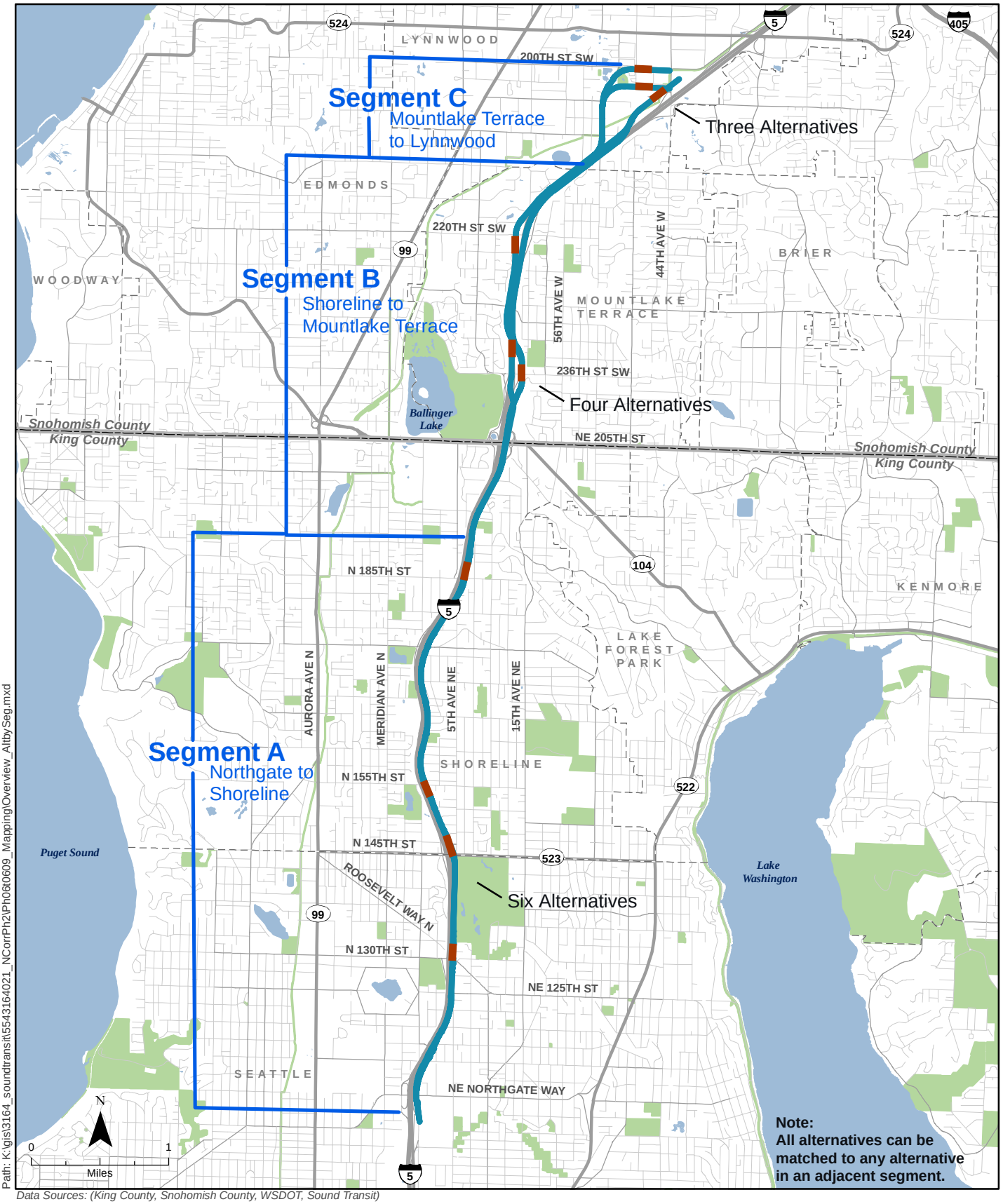


Figure 2-1
Alternatives by Segment

Lynnwood Link Extension

Segment B: Shoreline to Mountlake Terrace. There are four Segment B alternatives between NE 185th Street in Shoreline and 212th Street SW in Mountlake Terrace. Each alternative begins on the east side of I-5 and ends either in the I-5 median or on the west side of I-5. These alternatives feature one or two stations with park-and-ride facilities, including a station serving the existing Mountlake Terrace Transit Center (234th Street SW) and potentially an additional station at 220th Street SW.

Segment C: Mountlake Terrace to Lynnwood. Segment C has three alternative routes for departing from the I-5 median or west side of I-5 to end at a northern terminus station, with park-and-ride facilities at or near the existing Lynnwood Transit Center at 200th Street SW.

2.2 No Build Alternative

This EIS also evaluates a No Build Alternative, as required under NEPA and SEPA, to provide a baseline against which the other alternatives can be compared. The No Build Alternative represents the existing transportation system with improvements assumed in adopted plans but without the Lynnwood Link Extension. The No Build Alternative includes other committed highway, transit, and nonmotorized projects identified in the *Metropolitan Transportation Plan* adopted by PSRC in 2010 (*Transportation 2040*), but there would not be a major transit investment between Northgate and Lynnwood. The No Build Alternative also assumes population and employment growth as estimated by PSRC through 2035.

Transit developments in *Transportation 2040* that are included and funded under the ST2 program include the Northgate Link Extension to Northgate; the East Link Extension to Overlake in Redmond; the Federal Way Transit Extension, which ST2 funds to the vicinity of Highline Community College in Des Moines; and service enhancements to the Sound Transit Express regional bus and Sounder commuter rail systems. ST2 also funds the construction of a new light rail maintenance and operations facility for the expanded system, as well as the purchase of additional light rail vehicles.

Other assumed transportation projects include King County Metro's E-Line bus rapid transit improvements along SR 99 in Shoreline and Seattle. Minor local bus service additions by both King County Metro and Community Transit are also expected; however, the overall bus network and its service levels were assumed to remain similar to today.

Other transportation projects identified in *Transportation 2040* and assumed in the No Build Alternative include the I-90 Two-Way Transit and HOV operations project, the SR 520 Bridge Replacement and HOV program, and the SR 99 Alaskan Way Viaduct Replacement Program.

2.3 Typical Features of the Light Rail Alternatives

All of the light rail alternatives would operate in exclusive rights-of-way outside of traffic, which avoids operating and safety conflicts. This would also allow the fast and frequent service needed to serve the project corridor, with trains as often as every 4 minutes and track speeds of up to 55 mph.

Light rail would operate in a mix of surface (at-grade) and elevated configurations to address the project corridor's rolling terrain. In many locations, the alternative routes follow the general grade of I-5. This allows longer sections of level track, which is better for operations and rider comfort. Different profiles also allow the light rail guideway to cross over or under highway bridges, streets, or other physical obstacles. Figure 2-2 shows the typical features of at-grade and elevated guideways and stations.

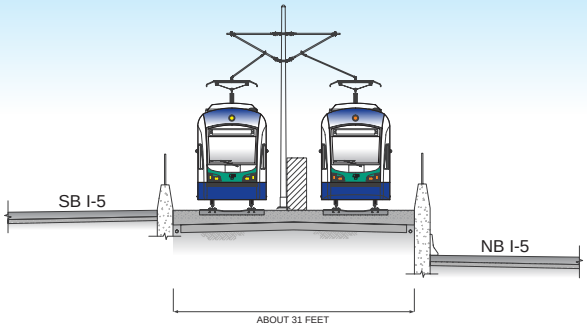
To help define where at-grade or elevated guideways would be appropriate (and also to evaluate other profile choices such as tunnels or street-running light rail), Sound Transit has developed criteria that consider (1) topography, (2) physical barriers, (3) available surface right-of-way, (4) operating needs, (5) development density, and (6) cost. Environmental impacts are also considered.

At-grade guideways are best suited for areas where the grade is 5 or 6 percent or less and where there is sufficient right-of-way available. While "at-grade guideway" typically refers to ground level, it also includes retained cut-and-fill structures that are used to maintain a consistent grade.

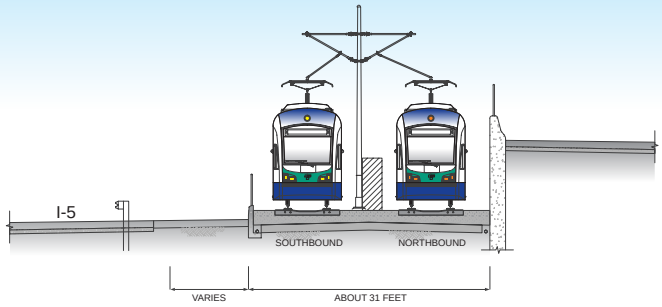
Elevated structures are appropriate where the topography varies more widely or creates barriers, where the light rail system must cross over other physical barriers such as cross streets and freeway lanes, where the available right-of-way is limited, or where grade separation is required for higher train frequencies. Tunnels may be options in areas with slopes of more than 5 or 6 percent, where physical barriers must be crossed, where the right-of-way is inadequate, in areas of high building density, or in areas of high train frequency. Tunnels may also be appropriate where major ridership centers cannot be served in any other way.

For the Lynnwood Link Extension, the frequent train service needed to accommodate the line's high ridership levels requires a guideway within an exclusive right-of-way. In addition, because of terrain, limited right-of-way, frequent cross streets, or other barriers, both at-grade and elevated sections are needed.

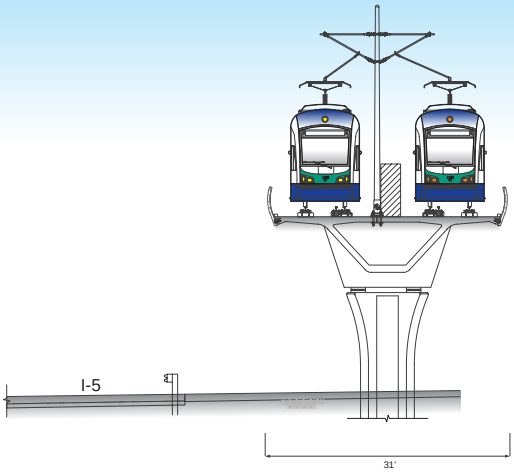
Whether elevated or at-grade, the light rail guideways are typically 30 to 40 feet wide, with room for two sets of tracks. This width also includes room for the poles and overhead catenary (contact wire) needed to power the trains. Many sections also contain space for emergency access as well as walls or barriers to restrict other access.



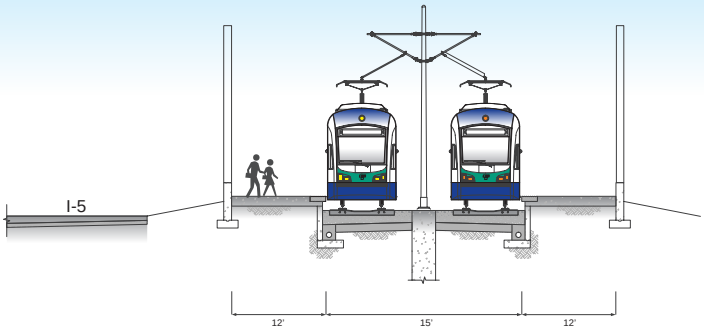
TYPICAL I-5 MEDIAN SECTION



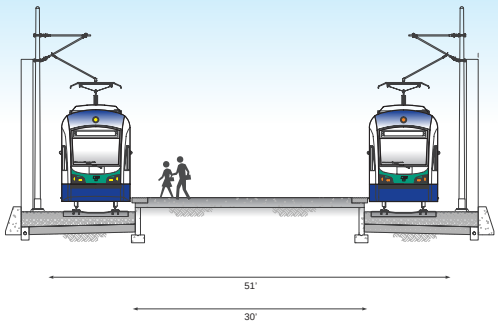
TYPICAL AT-GRADE SECTION BESIDE I-5



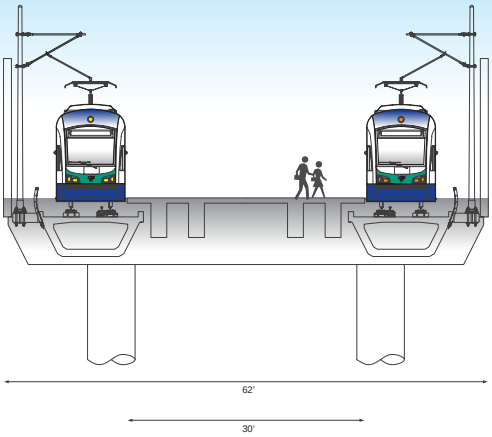
TYPICAL ELEVATED SECTION BESIDE I-5



TYPICAL AT-GRADE SIDE PLATFORM STATION BESIDE I-5



TYPICAL AT-GRADE CENTER PLATFORM STATION BESIDE I-5



TYPICAL ELEVATED CENTER PLATFORM

Figure 2-2
Typical Light Rail Guideways and Stations

Light Rail Stations

This Draft EIS evaluates the potential for the proposed project to develop four to six light rail stations to serve the major transit markets in the project corridor. The stations would be either elevated or at-grade according to their site conditions and the design needs for the connecting guideway; however, the station designs have common features.

The boarding platforms would be approximately 380 feet long to serve four-car trains. The platform would be either on the outer side of the tracks or in the center with tracks on both sides. Escalators, elevators, and stairs would be provided to access the platforms. All stations would be accessible as required under the Americans with Disabilities Act (ADA). They would include pedestrian and bicycle access to and from feeder bus lines, park-and-ride facilities, and surrounding streets. They would be designed to satisfy all applicable public access, fire, and life-safety requirements, which typically include two points for passengers to exit or enter the passenger platform area. For safety purposes, the trains would sound warning bells when they enter or leave a station. Each station would have a bicycle storage area at one or more entrances, with added space for expansion. The station plans also include proposed bus stops, paratransit stops, and handicapped-accessible areas.

Most of the stations would have parking areas for transit patrons in either a structure or a surface lot, including some surface lots leased from other parties. At several station locations, the existing transit facilities already include park-and-ride lots that would be expanded or reconfigured.

Other System Facilities or Structures

Traction power substations along the project alignment would provide power to the overhead catenary (wire suspended above the light rail that provides electricity to the trains). Traction power substations would likely be located near NE 145th Street and NE 185th Street for all Segment A alternatives, at the Mountlake Terrace Transit Center for all Segment B alternatives, and near 212th Street SW and the Lynnwood terminus for all Segment C alternatives.

Example of a Traction Power Substation

Depending on whether the guideway is elevated, at-grade, or in areas with slopes, other structures may be required. Elevated structures require support columns or other bridging support structures placed at intervals. Noise walls may be added to avoid noise impacts. Elevated guideways typically feature short noise walls, although some may have higher noise walls. For at-grade guideways in areas with slopes, retaining walls could be placed where the route cuts into an adjacent hillside, and

walls can also hold fill for the guideway. Noise walls may also be placed on top of retaining walls.

Some sections of the guideway would also feature crossover tracks with switches to allow trains to safely pass from one set of tracks to the other during track maintenance, to bypass a stalled train, to turn the opposite direction, or to operate in the event of emergencies. At a terminus station, tail tracks would extend beyond the station platform to store trains that are leaving service or waiting to enter service. These features are identified where they occur by alternative in Tables 2-1a, 2-1b, and 2-1c.

Stormwater management facilities are also part of the project. These types of facilities would include detention or infiltration ponds, vaults, swales or other bioretention facilities, or vegetated embankments along the corridor.

Light Rail Train with Overhead Catenary Wires in Tukwila, WA

Crossover Tracks

2.4 Descriptions of Light Rail Alternatives by Segment

The following sections describe key features of the light rail alternatives based on conceptual design information. Appendix F includes conceptual design drawings that show the key elements assumed for each light rail alternative's alignment and stations. Although the conceptual designs provide the primary elements required to develop and operate a light rail alternative, landscaping, screening, and other design elements would be further detailed in later stages of project design. In addition, further design, mitigation planning, permitting, and construction-stage planning might identify other features needed for construction staging, construction access, utility work, and other infrastructure connections.

Finally, the alternatives described below reflect different combinations of key features for the project. The individual alternatives have some features, such as stations or localized design elements, which could work for other alternatives in a segment. This is particularly true in Segment A, where the alignments all remain along the east side of I-5, but where there are different ways to approach station design, the profile or structures for light rail, street modifications, parking areas, or other features. A preferred alternative could be developed for analysis in the Final EIS that includes a different combination of features studied in the Draft EIS.

Tables 2-1a, 2-1b, and 2-1c list the alternatives, their options, and other key features, and Figures 2-3 through 2-8 illustrate them.

Table 2-1a. Summary of Design Features for Segment A Alternatives

Cross Streets	A1 At-grade/Elevated with NE 145th and NE 185th Street Stations	A3 Mostly Elevated with NE 145th and NE 185th Street Stations	A5 At-grade/Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A7 Mostly Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A10 At-grade/Elevated with NE 130th, NE 145th, and NE 185th Street Stations	A11 Mostly Elevated with NE 130th, NE 145th, and NE 185th Street Stations
NE 104th Street to Northgate Way	• Elevated guideway from NE 104th Street at Northgate, crossing over 1st Avenue NE	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1
NE 117th Street overpass	• Crosses under NE 117th Street (117th Street overpass rebuilt)	• Cross over existing overpass	• At-grade crossing east of NE 117th Street overpass	• Same as Alternative A3	• Same as Alternative A5	• Same as Alternative A3
NE 117th Street to NE 130th Street	• At-grade with sections of retained cut or fill (aligned between I-5 and 5th Avenue NE)	• Elevated	• Same as Alternative A1	• Same as Alternative A3	• At-grade with retained cut or fill (running north between I-5 and 5th Avenue NE)	• Same as Alternative A3
NE 130th Street	• Under NE 130th Street off-ramp and NE 130th Street overpass (both reconstructed) • 5th Avenue NE and NE 130th Street off-ramp grade-separated rebuild	• Cross over existing overpass	• NE 130th Street Station Option 1: At-grade (center platform) • NE 130th Street overcrossing re-aligned • 5th Avenue NE and NE 130th Street off-ramp grade-separated rebuild • 100 leased parking spaces	• NE 130th Street Station Option 2: Elevated • 100 parking spaces to the north	• NE 130th Street Station Option 1: at-grade, but with no parking • NE 130th Street overcrossing re-aligned • 5th Avenue NE and NE 130th Street off-ramp grade-separated rebuild	• Same as Alternative A7

Table 2-1a. Summary of Design Features for Segment A Alternatives

Cross Streets	A1 At-grade/Elevated with NE 145th and NE 185th Street Stations	A3 Mostly Elevated with NE 145th and NE 185th Street Stations	A5 At-grade/Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A7 Mostly Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A10 At-grade/Elevated with NE 130th, NE 145th, and NE 185th Street Stations	A11 Mostly Elevated with NE 130th, NE 145th, and NE 185th Street Stations
NE 130th Street to NE 145th Street	• Along 5th Avenue NE, at-grade to NE 137th Street, elevated to NE 145th Street • Crossover tracks south of NE 145th Street	• Elevated to NE 145th Street • Crossover tracks south of NE 145th Street	• Along 5th Avenue NE, at-grade to NE 137th Street, elevated to NE 145th Street • Crossover tracks at about NE 137th Street	• Elevated to NE 145th Street • Crossover tracks at about NE 137th Street	• Along 5th Avenue NE, at-grade to NE 137th Street, elevated to NE 145th Street • Crossover tracks south of NE 145th Street	• Same as Alternative A7
NE 145th Street	•NE 145th Street Station Option 1: Keep existing northbound on-ramp • 500-car garage north of I-5 on-ramp	• NE 145th Street Station Option 2: Move I-5 on-ramp farther north • 500-car garage south of new I-5 on-ramp	• Elevated crossing – no station	•Same as Alternative A5	• NE 145th Street Station Option 1: Keep existing northbound on-ramp • 650 parking spaces	•NE 145th Street Station Option 2: Move I-5 northbound on-ramp •500-car garage north of existing on-ramp
NE 145th Street to NE 175th Street	• Elevated to NE 150th Street • At-grade to NE 154th Street • Elevated to NE 157th Street • At-grade to NE 174th Street; realign sections of 1st Avenue NE	• Elevated to NE 157th Street • At-grade to NE 174th Street; realign sections of 1st Avenue NE	• Same as Alternative A1	• Elevated to NE 148th Street • At-grade to NE 154th Street • Elevated to NE 156th Street • At-grade to NE 174th Street; realign sections of 1st Avenue NE	• Same as Alternative A1	• Same as Alternative A3

Table 2-1a. Summary of Design Features for Segment A Alternatives

Cross Streets	A1 At-grade/Elevated with NE 145th and NE 185th Street Stations	A3 Mostly Elevated with NE 145th and NE 185th Street Stations	A5 At-grade/Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A7 Mostly Elevated with NE 130th, NE 155th, and NE 185th Street Stations	A10 At-grade/Elevated with NE 130th, NE 145th, and NE 185th Street Stations	A11 Mostly Elevated with NE 130th, NE 145th, and NE 185th Street Stations
NE 155th Street	• Elevated guideway adjacent to I-5 overpass at NE 155th Street	• Same as Alternative A1	• Elevated station • 500-car parking garage south side of NE 155th Street	• Same as Alternative A5	• Same as Alternative A1	• Same as Alternative A1
NE 175th Street	• Elevated guideway adjacent to I-5 overpass at NE 175th Street	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1	• Same as Alternative A1
NE 175th Street to NE 185th Street	• NE 178th Street to NE 185th Street at-grade • Realign 1st Avenue NE near NE 175th Street • Realign 7th Avenue NE near NE 185th Street	• NE 174th Street to NE 185th Street elevated • Realign 1st Avenue NE near NE 175th Street	• Same as Alternative A1	• Same as Alternative A3	• Same as Alternative A1	• Same as Alternative A3
NE 185th Street	• NE 185th Street Station Option 1: At-grade • 500-car parking garage west of I-5, with realigned 5th Avenue NE • Rebuild overpass	• NE 185th Street Station Option 2: Elevated • 500-car park-and-ride east of I-5, east of station • No overpass rebuild	• NE 185th Street Station Option 3: At-grade • Surfacing parking for up to 350 cars	• Same as Alternative A3	• Same as Alternative A5	• Same as Alternative A3

Table 2-1b. Summary of Design Features for Segment B Alternatives

Cross Streets	B1 East Side to Mountlake Terrace Transit Center to Median	B2 East Side to Mountlake Terrace Transit Center to West Side	B2A East Side to Mountlake Terrace Transit Center to West Side with 220th Street SW Station	B4 East Side to Mountlake Terrace Freeway Station to Median
NE 185th Street to NE 195th Street	• Retained cut or elevated east side (depends on Segment A alternative) • NE 195th Street pedestrian bridge reconstructed	• Same as Alternative B1	• Same as Alternative B1	• Same as Alternative B1
NE 195th Street to Ballinger Way/SR 104 overpass	• Elevated east side	• Same as Alternative B1	• Same as Alternative B1	• Same as Alternative B1
Ballinger Way/SR 104 overpass	• Elevated • Crosses over Ballinger Way/SR 104 interchange	• Same as Alternative B1	• Same as Alternative B1	• Similar to Alternative B1 but slightly different location
Ballinger Way/SR 104 overpass to 236th Street SW	• Elevated east side	• Same as Alternative B1	• Same as Alternative B1	• Crosses over 236th Street SW northbound I-5 off-ramp and northbound I-5 lanes • Drops to median at-grade and crosses under 236th Street SW overpass
236th Street SW overpass	• Mountlake Terrace Transit Center Station: Elevated • Station straddles 236th Street SW • No additional parking, but existing surface lot reconfigured	• Same as Alternative B1, except existing surface lot not reconfigured	• Same as Alternative B1, except existing surface lot not reconfigured	• Crosses under 236th Street SW overpass • Mountlake Terrace Freeway Station: Reconstructed and freeway bus station extended on retained fill structure • New north end station pedestrian bridge across northbound I-5 lanes at 232nd Street SW

Table 2-1b. Summary of Design Features for Segment B Alternatives

Cross Streets	B1 East Side to Mountlake Terrace Transit Center to Median	B2 East Side to Mountlake Terrace Transit Center to West Side	B2A East Side to Mountlake Terrace Transit Center to West Side with 220th Street SW Station	B4 East Side to Mountlake Terrace Freeway Station to Median
236th Street SW to 220th Street SW	• Continues north elevated • Short section retained cut in hillside north of Mountlake Terrace Transit Center • Crosses over northbound I-5 lanes elevated • Enters freeway median, drops to grade near 232nd Street SW	• Continues north elevated • Crosses I-5 lanes to west side • Alternates retained cut/fill and elevated to south of 220th Street SW	• Same as Alternative B2	• Drops to median and runs at-grade north of the freeway station
220th Street SW overpass	• At-grade in median under 220th Street SW overpass	• Elevated over 220th Street SW overpass on west side of southbound I-5 ramps	• Elevated with 220th Street SW Station elevated over the street • 200-space parking garage north of 220th Street SW	• At-grade in median
220th Street SW to 212th Street SW	• At-grade in median • Crossover tracks south of 212th Street SW	• Curves to east side of 60th Avenue West • Elevated along west side of I-5 with at-grade retained cut/fill section • Crossover tracks south of 212th Street SW • End with elevated guideway crossing over 212th Street SW	• Same as Alternative B2	• At-grade in median • Crossover tracks south of 212th Street SW

Table 2-1c. Summary of Design Features for Segment C Alternatives

Cross Streets	C1 52nd Avenue West to 200th Street SW Station	C2 52nd Avenue West to Lynnwood Transit Center Station	C3 Along I-5 to Lynnwood Park-and-Ride Station
Option 1: From I-5 median	• Transition from at-grade in median near 210th Street SW; elevated guideway to cross southbound I-5 lanes to 52nd Avenue West • Continues elevated north along east side of 52nd Avenue West	• Same as Alternative C1	• Continues at-grade in median • At about 208th Street SW, transitions to cross elevated over southbound I-5 lanes angling away from I-5 • Crosses Interurban Trail
Option 2: From west side of I-5	• Elevated along west side of I-5 until it approaches 52nd Avenue West • Turns north, elevated along east side of 52nd Avenue West	• Same as Alternative C1	• Elevated west side of I-5 • Alignment gradually shifts away from I-5 after 208th Street SW • Crosses Interurban Trail
52nd Avenue West	• Elevated along east side of 52nd Avenue West • Turns east over corner of Scriber Creek Park at 200th Street SW • Crosses Interurban Trail	• As elevated guideway approaches 204th Street SW, alignment turns NE and crosses south of Scriber Creek Park • Crosses Interurban Trail	• Not applicable
Lynnwood Transit Center	• Elevated along south side of 200th Street SW • 200th Street SW Station: Elevated • 2 garages south of 200th Street SW: Adds 500 spaces to the existing park-and-ride	• Alignment enters Lynnwood Transit Center, with station south of 48th Street West and existing transit center • Lynnwood Transit Center Station: Elevated • New garage on current surface parking lot, adds 500 more spaces	• Lynnwood Park-and-Ride Station (south of 48th Avenue West, east of existing direct access ramp): Elevated • New garage replaces displaced parking and adds 500 spaces • Station Option 1: Existing transit center remains • Station Option 2: Existing transit center relocated adjacent to new station

2.4.1 Segment A: Seattle to Shoreline

The Segment A alternatives reflect choices about the location of stations (at NE 130th Street, NE 145th Street, NE 155th Street, or NE 185th Street), as well as the number of stations (two or three). The station locations and height and location of existing street overcrossings of I-5 also largely influence whether the alignment is at-grade or elevated at a given location.

Alternative A1: At-grade/Elevated with NE 145th and NE 185th Stations

Alternative A1 (Figure 2-3) would begin at the tail tracks that Sound Transit will be constructing for the Northgate Link Extension. It would start east of I-5, with the elevated guideway crossing over 1st Avenue NE north of NE 104th Street and would remain elevated until it crosses back over 1st Avenue NE, and would then descend to cross under a rebuilt NE 117th Street overpass. The alignment would then generally run at-grade, with short sections of retained cut or retained fill structures, between 5th Avenue NE and I-5, crossing under the NE 130th Street off-ramp and overpass. Both the off-ramp and the overpass would be reconstructed, including the NE 130th Street and 5th Avenue NE intersection and a short section of 5th Avenue NE. At NE 130th Street, the northbound off-ramp would be relocated to the south and grade-separated from southbound 5th Avenue NE, which would be lowered to go under the off-ramp.

The guideway would continue along 5th Avenue NE and transition to an elevated structure to reach the elevated NE 145th Street Station Option 1. This center platform station would have a platform above the existing I-5 transit only off-ramp and northbound on-ramp, with a ground-level plaza on the north side of NE 145th Street. To the north, a parking structure with up to three levels would provide approximately 500 spaces.

Alternative A1 would transition to retained fill north of the station. It would then cross over NE 155th Street on an elevated guideway, then have retained cut or fill sections to an elevated structure over NE 175th Street, and continue in a retained cut to under NE 185th Street. It would require realigning sections of 1st Avenue NE near NE 175th Street, and 5th Avenue NE near NE 185th Street. It includes the NE 185th Street Station Option 1, which would be in a retained cut along I-5, north of a rebuilt NE 185th Street overpass, with a 500-space park-and-ride garage (up to three levels) west of I-5, and an access driveway connected to local streets.

Alternative A3: Mostly Elevated with NE 145th and NE 185th Stations

Alternative A3 is similar to Alternative A1, but would be elevated to the NE 145th Street Station (see Figure 2-3). It would cross over the existing NE 117th Street bridge and the NE 130th Street off-ramp and overpass, thus avoiding the need to rebuild these facilities. The NE 145th Street Station Option 2 would be elevated north of NE 145th Street, similar to Option 1. However, the northbound on-ramp would be relocated close to the northern edge of the existing surface park-and-ride lot, and an approximately 500-stall parking garage with up to three levels would be located near the station platform, south of the relocated ramp.

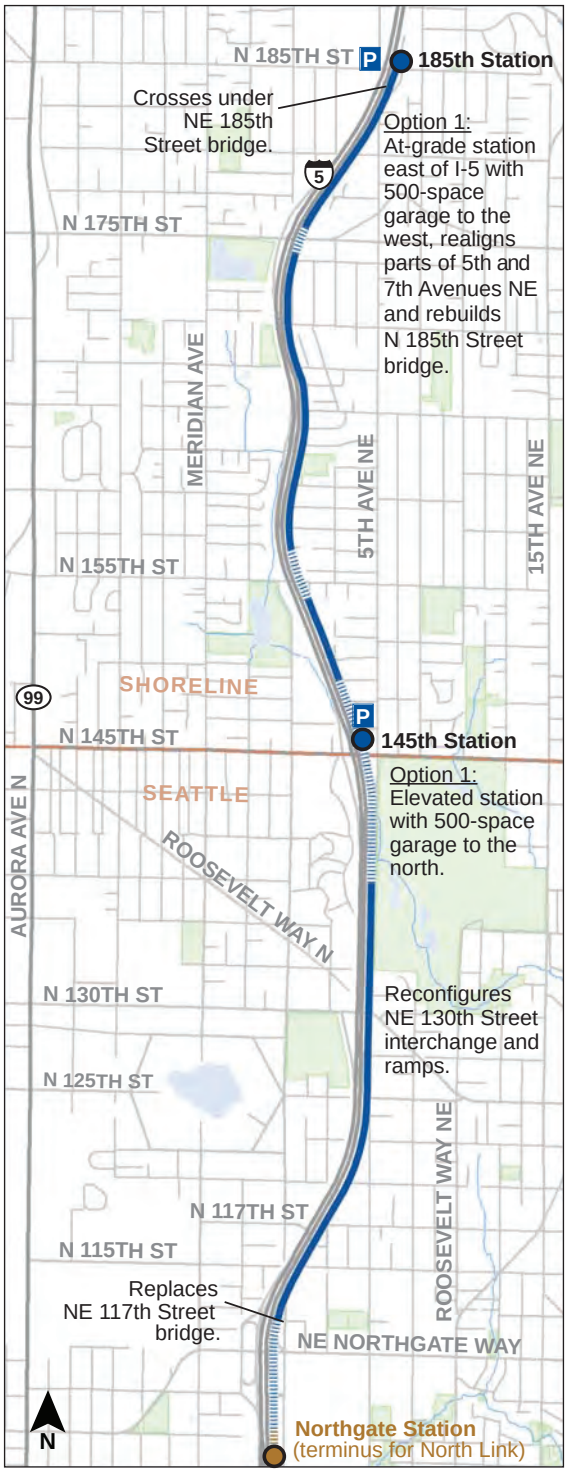
North of NE 145th Street, the alignment would be the same as Alternative A1 to NE 175th Street, but would then continue on an elevated guideway to the NE 185th Street Station. It also would require a realignment of 1st Avenue NE near NE 175th Street and 5th Avenue NE near NE 185th Street. The NE 185th Street Station Option 2 would be elevated, and to the east would be an approximately 500-stall parking garage and an integrated transit center with a circular transit driveway.

Alternative A5: At-grade/Elevated with NE 130th, NE 155th, and NE 185th Stations

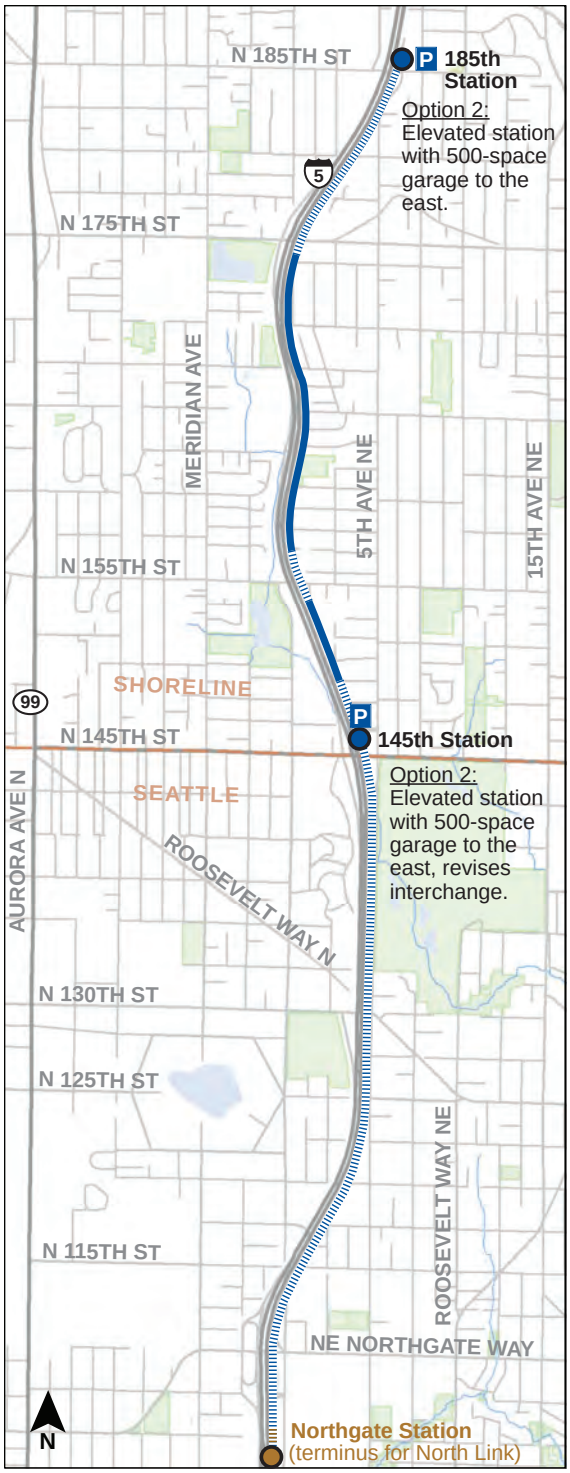
Alternative A5 is largely based on Alternative A1, but would feature stations at NE 130th and NE 155th streets (instead of a station at NE 145th Street), and would have a different option for a NE 185th Street Station (see Figure 2-4). It also would cross at-grade east of the NE 117th Street overpass, thus avoiding the need for rebuilding the bridge. Like Alternative A1, this alternative would also rebuild the NE 130th Street I-5 off-ramp and overcrossing, including the 5th Avenue NE intersection and roadway.

The NE 130th Street Station Option 1 for this alternative is a center platform, retained-cut station, with the platform close to the level of I-5 and a street-level plaza north of NE 130th Street. The station could include approximately 100 park-and-ride spaces leased at an existing church parking lot on NE 131st Street, if the parking lot is available.

The route would continue on retained fill, before moving to an elevated section near Jackson Park Golf Course, similar to Alternative A1. It would be elevated past NE 145th Street, then transition to a short section of retained fill, before transitioning back to an elevated guideway into the NE 155th Street Station, which would be above NE 155th Street adjacent to the I-5 bridge over NE 155th Street. The station would have entrances on the north and south sides of the street. An approximately 500-space parking garage with up to four levels would be located on the south side of the street.



A1: AT-GRADE/ELEVATED TO NE 145th AND NE 185th STATIONS



A3: MOSTLY ELEVATED TO NE 145th AND NE 185th STATIONS

Legend

- Elevated
- At-grade
- Station
- City Boundary
- Parking Structure

Figure 2-3
Alternatives A1 and A3

This alignment would be the same as Alternative A1 from the NE 155th Street Station to the NE 185th Street Station Option 3. This station option would be in a retained cut under the NE 185th Street overpass, similar to Option 1 with Alternative A1, but would not require rebuilding the NE 185th Street overpass. It would include surface parking for approximately 150 vehicles east of this station. There would be a second surface lot with approximately 200 spaces on Seattle City Light right-of-way east of 8th Avenue NE.

Alternative A7: Mostly Elevated with NE 130th, NE 155th, and NE 185th Stations

Alternative A7 has station choices similar to Alternative A5, but with the mostly elevated guideway alignment of Alternative A3, including elevated sections over the NE 117th Street overpass and the NE 130th Street off-ramp and bridge (see Figure 2-4). This alternative's NE 130th Street Station Option 2 would be elevated. There would be parking for approximately 100 vehicles north of the station and under the elevated guideway along 5th Avenue NE.

From NE 130th Street north to the station at NE 155th Street, it would be the same as Alternative A5. From NE 155th Street, Alternative A7, including the guideway and NE 185th Street Station Option 2, would be the same as Alternative A3.

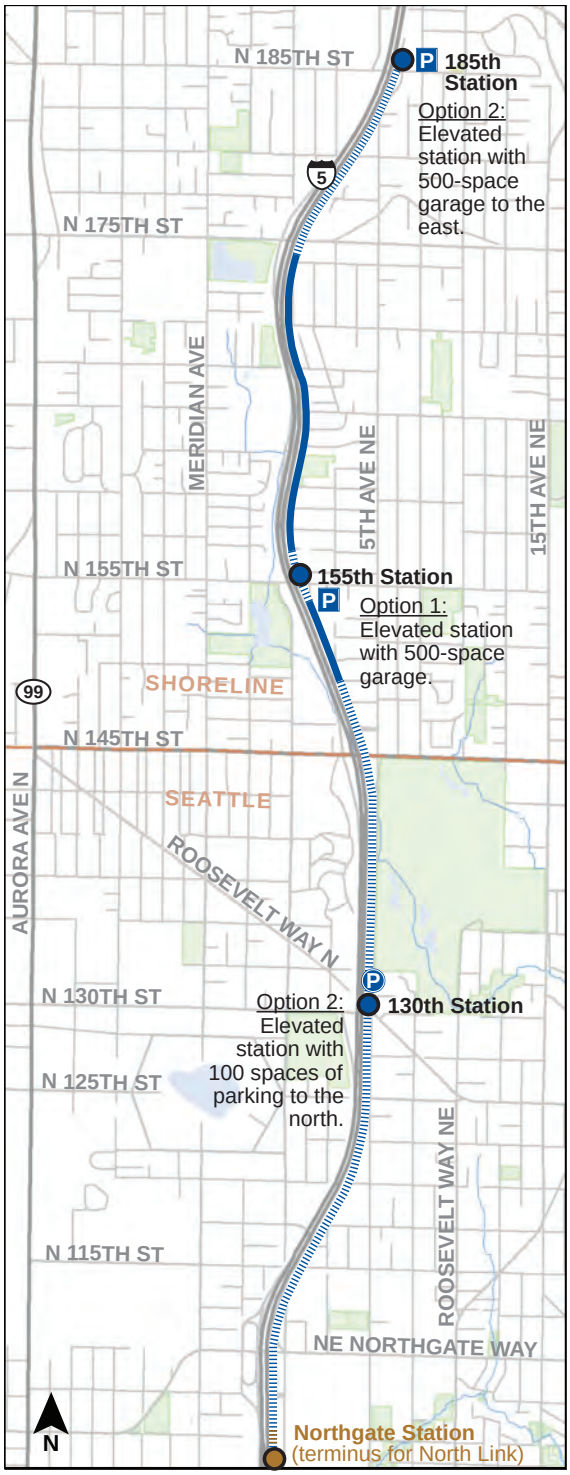
Alternative A10: At-grade/Elevated with NE 130th, NE 145th, and NE 185th Stations

Alternative A10 would be similar to Alternative A5 from the Northgate Station north to NE 130th Street, including an at-grade alignment crossing east of the NE 117th Street overpass (see Figure 2-5). It would include the at-grade NE 130th Street Station Option 1, the same as with Alternative A5, but with no parking. From NE 130th Street north to NE 145th Street, Alternative A10 would be the same as Alternative A1, using the NE 145th Street Station Option 1. North of NE 145th Street, Alternative A10 would be the same as Alternative A5.

Alternative A11: Mostly Elevated with NE 130th, NE 145th, and NE 185th Stations

Alternative A11 would be the same as Alternative A7, except that an elevated station at NE 145th Street (Station Option 2) would be built instead of a NE 155th Street Station (see Figure 2-5).

A5: AT-GRADE/ELEVATED WITH NE 130th, NE 155th AND NE 185th STATIONS

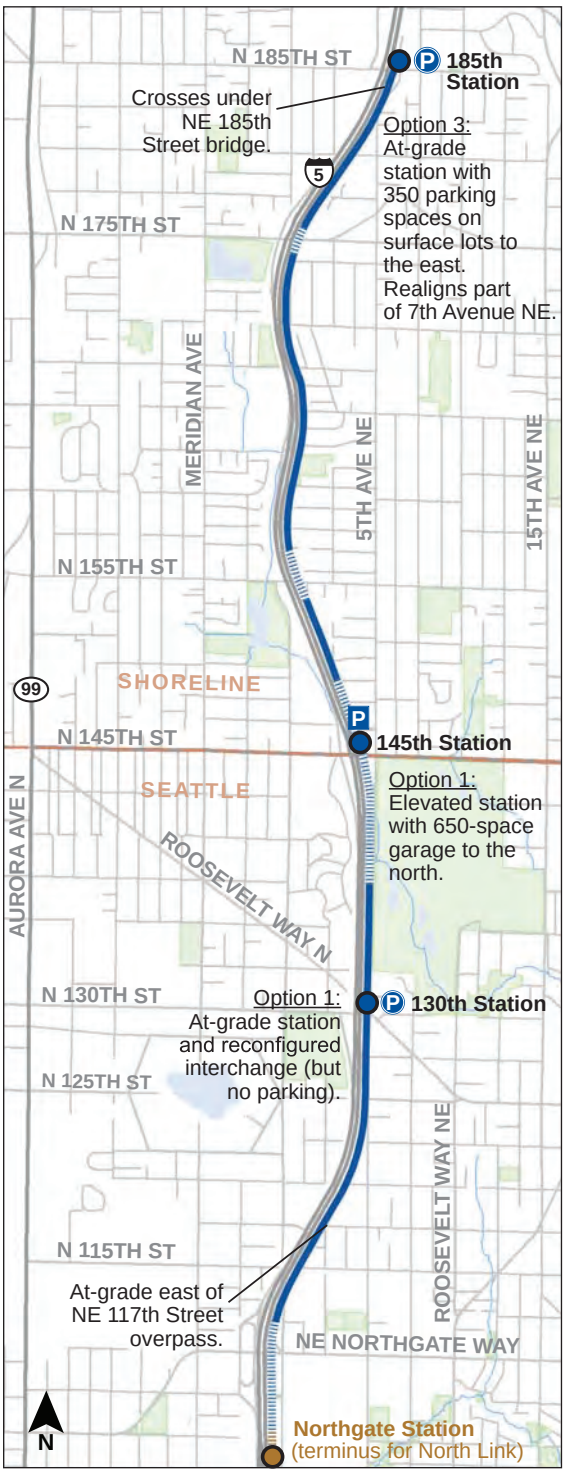


A7: MOSTLY ELEVATED WITH NE 130th, NE 155th AND NE 185th STATIONS

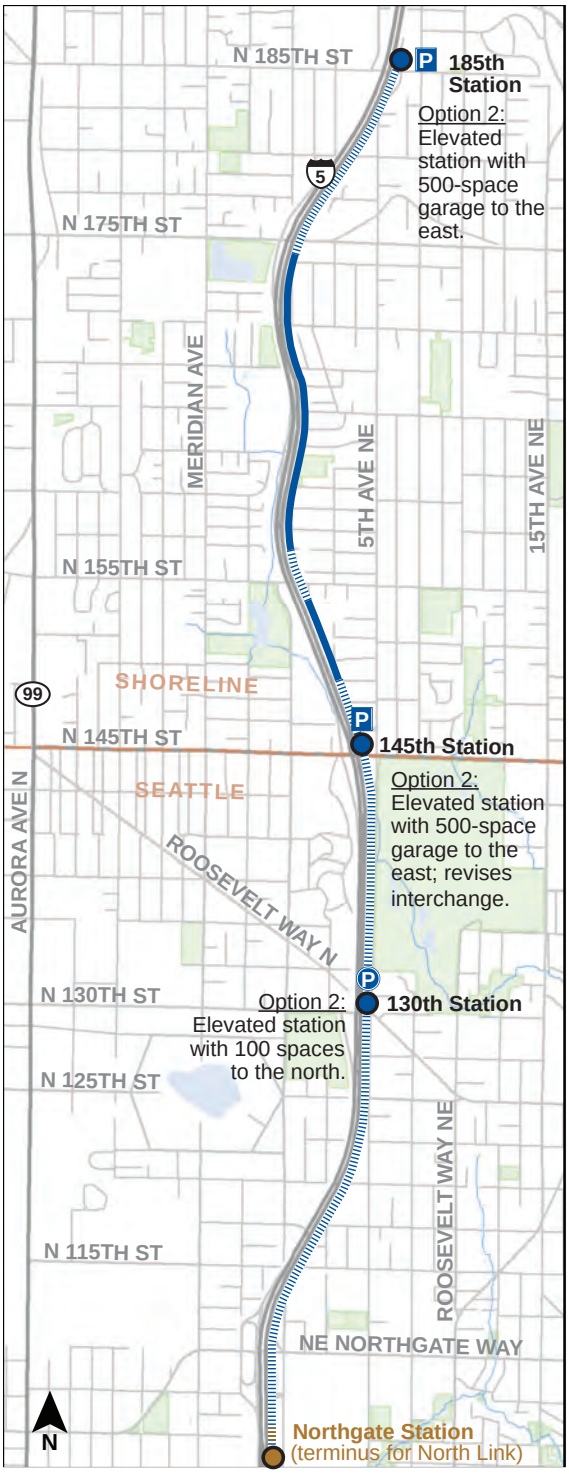
Legend

- Elevated
- At-grade
- Station
- City Boundary
- Parking Structure
- Surface Parking

Figure 2-4
Alternatives A5 and A7



A10: AT-GRADE/ELEVATED WITH NE 130th, NE 145th AND NE 185th STATIONS



A11: MOSTLY ELEVATED WITH NE 130th, NE 145th AND NE 185th STATIONS

Legend

- Elevated
- At-grade
- Station
- City Boundary
- Parking Structure
- Surface Parking

Figure 2-5
Alternatives A10 and A11

2.4.2 Segment B: Shoreline to Mountlake Terrace

The Segment B alternatives involve choices for a Mountlake Terrace Station location (at the current transit center or at its freeway station) and between alternatives that use the freeway median or cross over to the west side of I-5. There is also an additional station choice at 220th Street SW.

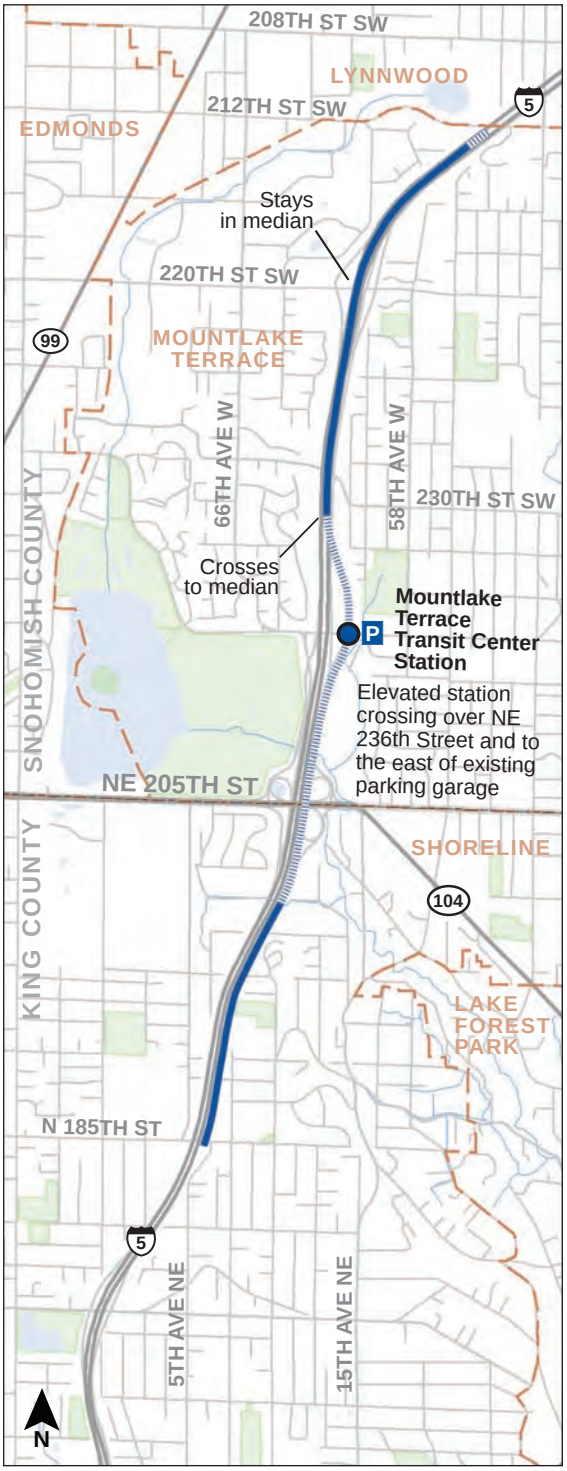
Alternative B1: East Side to Mountlake Terrace Transit Center to Median

Alternative B1 begins north of the NE 185th Street Station and would be either in a retained cut or elevated guideway along the east side of I-5, depending on how it is paired with a Segment A alternative (see Figure 2-6). It would then be in a retained cut while crossing under the NE 195th Street pedestrian bridge, which would be replaced. It would then be largely elevated to the north and cross over the Lake Ballinger Way/SR 104 interchange and over 236th Street SW to reach an elevated station at the Mountlake Terrace Transit Center, east of the existing parking garage. The station platform would straddle 236th Street SW, with station entrances and elevators, escalators, and stairs on the south and north sides of the street. The south entrance would include a new path connecting to existing streets. To provide effective access at this station, including for bus transit, Sound Transit would reconfigure the existing transit center's surface parking and circulation to the east of the current parking garage, but would maintain the transit center's overall parking capacity of 880 spaces.

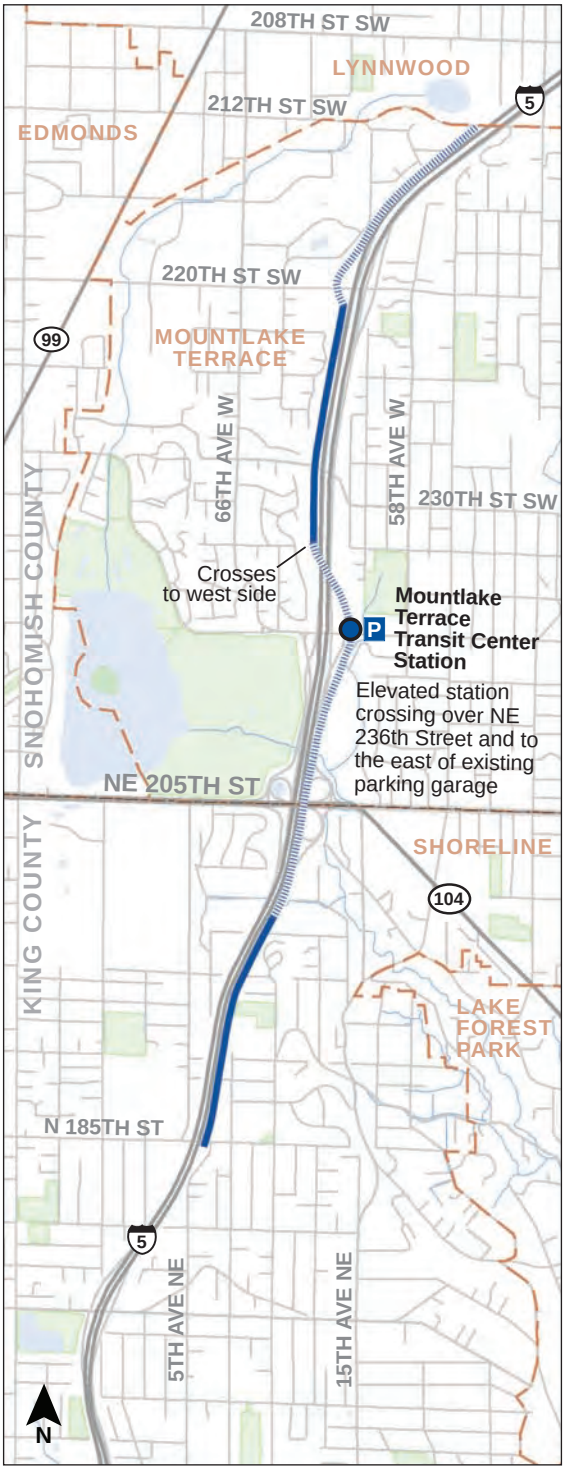
North of the Mountlake Terrace Transit Center Station, the Alternative B1 route would continue north on an elevated guideway structure, with a short section cut into the hillside north of the transit center. This alternative would then cross over the northbound lanes of I-5 and enter the freeway median and drop to at-grade. The alignment would continue at-grade in the median of I-5, generally at the level of the southbound I-5 lanes, north to approximately 212th Street SW.

Alternative B2: East Side to Mountlake Terrace Transit Center to West Side

Alternative B2 is the same as Alternative B1 between NE 185th Street and the north side of the Mountlake Terrace Transit Center Station (see Figure 2-6). North of the Mountlake Terrace Transit Center Station, the route would continue north on an elevated structure, crossing over to the west side of I-5. The route would then continue along the west side of I-5, alternating between retained cut and retained fill until just south of 220th Street SW. Here it would become elevated, continuing over 220th Street SW and the I-5 southbound on- and off-ramps, and would curve on an elevated structure to the east side of 60th Avenue West, and then along the west side of I-5, mostly on retained cut and fill structures, before ending with an elevated guideway crossing over 212th Street SW.



B1: EAST SIDE TO MOUNTLAKE TERRACE TRANSIT CENTER TO MEDIAN



B2: EAST SIDE TO MOUNTLAKE TERRACE TRANSIT CENTER TO WEST SIDE

Legend

- Elevated
- At Grade
- Station
- City Boundary
- Parking Structure

Figure 2-6
Alternatives B1 and B2

Alternative B2A: East Side to Mountlake Terrace Transit Center to West Side with 220th Street SW Station

Alternative B2A has the same alignment as Alternative B2, but with the addition of a 220th Street SW Station, over and south of the street (see Figure 2-7). This elevated, center platform station would include a parking garage to the north with room for up to 200 vehicles. Entrances to the station would be on the north and south sides of 220th Street SW and from the parking garage and its entrance on 60th Avenue West.

Alternative B4: East Side to Mountlake Terrace Freeway Station to Median

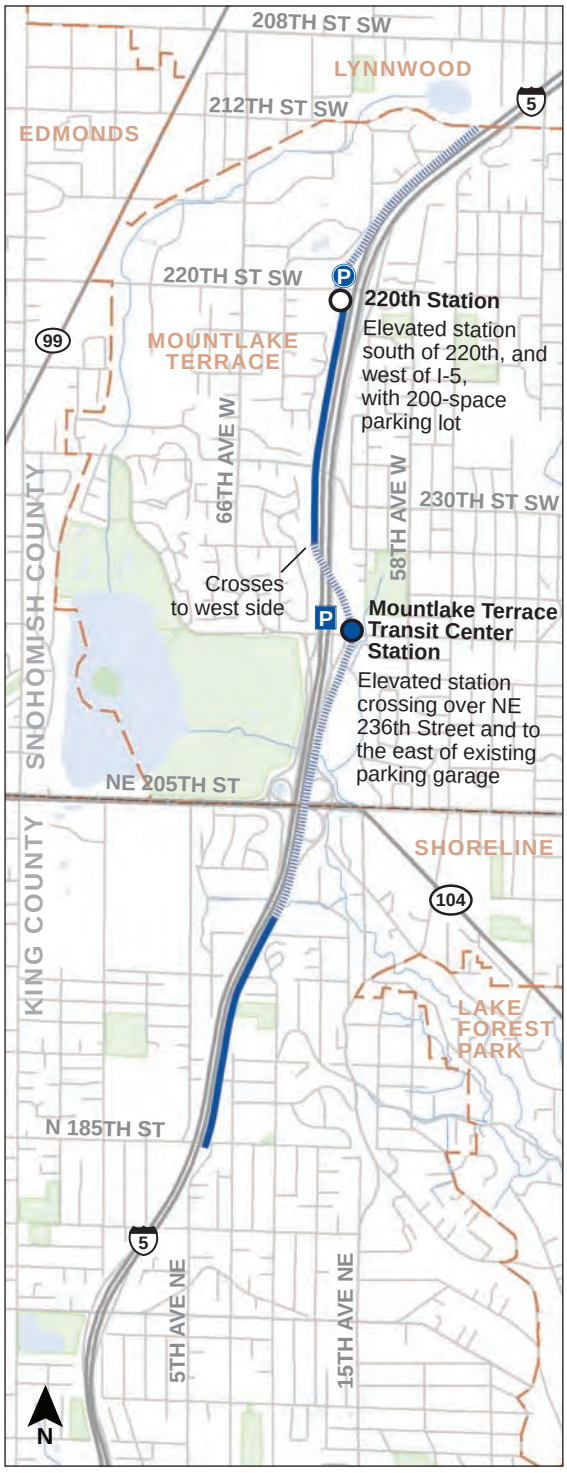
Alternative B4 (see Figure 2-7) is the same as Alternative B1 from NE 185th Street Station north to approximately the overcrossing at the Lake Ballinger Way/SR 104 interchange. It would then transition to cross over the northbound I-5 lanes to the I-5 median and descend to cross under the 236th Street SW overpass. The Alternative B4 alignment would connect to the existing Mountlake Terrace Freeway Station, which would be extended to the north, retrofitted to accommodate light rail trains, and closed to bus use. This side platform station would have a south entrance served by the existing pedestrian bridge. A new north entry to the station and pedestrian bridge would connect to the east, crossing over northbound lanes of I-5, with a second tower and pedestrian bridge rising in elevation to connect to 232nd Street SW. The other features of the existing transit center and its 880 parking spaces would be the same as today. North of the Mountlake Terrace Freeway Station, the Alternative B4 alignment would continue at-grade in the I-5 median to approximately 212th Street SW, similar to Alternative B1.

2.4.3 Segment C: Mountlake Terrace to Lynnwood

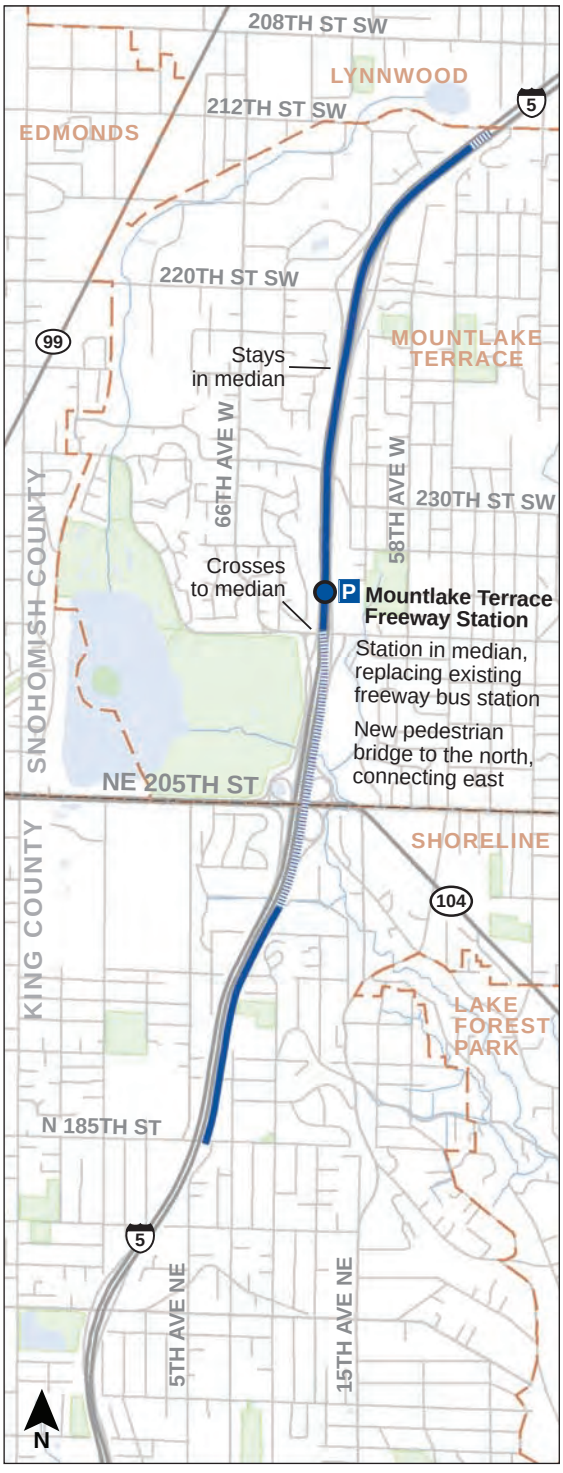
The Segment C alternatives involve choices for different routes to reach the Lynnwood Transit Center, as well as different station siting and park-and-ride configurations. These alternatives are shown in Figure 2-8.

Alternative C1: 52nd Avenue West to 200th Street SW

Alternative C1 begins with two alignment options to connect with Segment B alternatives. Alignment Option 1 would transition from elevated in the I-5 median (connecting to Alternative B1 or B4). It would begin to transition away from the I-5 median near 210th Street SW, which would require an elevated guideway to cross over the southbound lanes of I-5, and then would continue elevated north along the east side of 52nd Avenue West and Cedar Valley Road. Alignment Option 2 would continue elevated on the west side of I-5 (connecting to Alternatives B2 and B2A). It would continue elevated along the west side of I-5 until it approached 52nd Avenue West, where it would turn north along the east side of 52nd Avenue West, crossing over the Interurban Trail around 208th Street SW. With either alignment option, Alternative C1 would then turn east over the corner of Scriber Creek Park and along the south side of 200th Street SW and arrive at the elevated 200th Street SW Station, east of 48th Avenue West.



B2A: EAST SIDE TO MOUNTLAKE TERRACE TRANSIT CENTER TO WEST SIDE WITH 220TH ST SW STATION

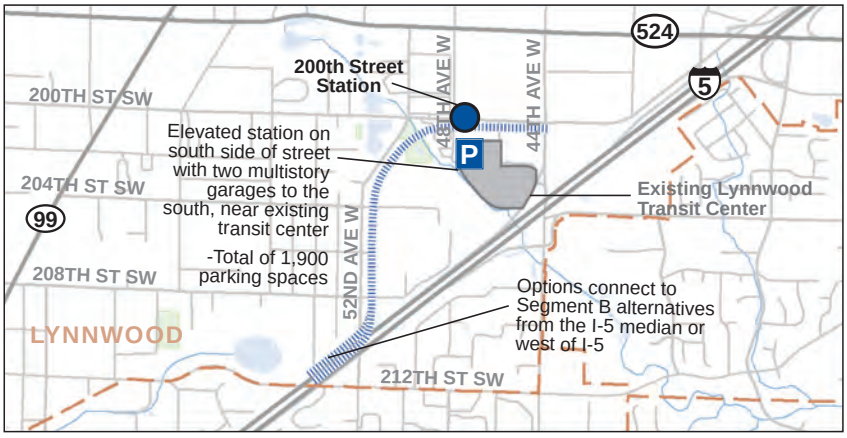


B4: EAST SIDE TO MOUNTLAKE TERRACE FWY STATION TO MEDIAN

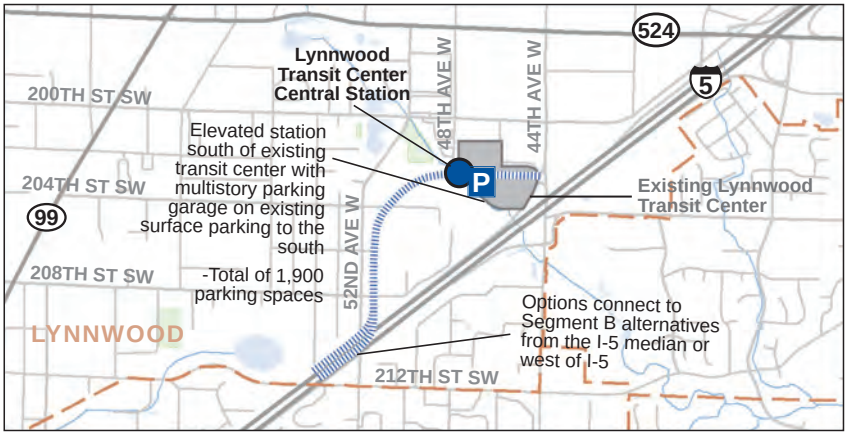
Legend

- Elevated
- At Grade
- Station
- Station Option
- City Boundary
- Parking Structure
- Surface Parking

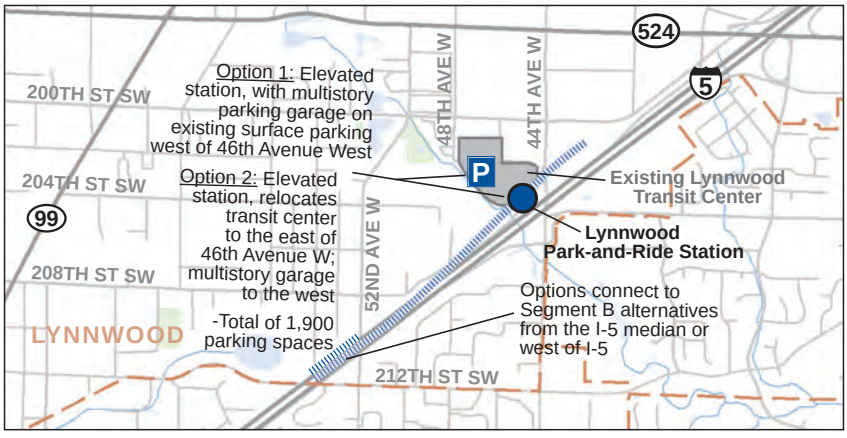
Figure 2-7
Alternatives B2A and B4



C1: 52ND AVE W TO 200TH ST STATION



C2: 52ND AVE W TO LYNNWOOD TRANSIT CENTER STATION



C3: ALONG I-5 TO LYNNWOOD PARK-AND-RIDE STATION

Legend

- Elevated
- At Grade
- Station
- City Boundary
- Parking Structure

Figure 2-8
Alternatives C1, C2, and C3

Two new parking garages with two levels each would be south of the elevated 200th Street SW Station. These garages would be partly on one of the Lynnwood Transit Center's existing park-and-ride surface lots, and would hold a total of 900 parking spaces. This would replace about 400 spaces that are on the surface lot today, and add 500 spaces for a total park-and-ride capacity of 1,900 spaces to serve the transit center and light rail station. A plaza and walkways would connect south to the existing Lynnwood Transit Center and park-and-ride facility. An elevated guideway would continue approximately 800 feet east to 44th Avenue West, with tail tracks for out-of-service trains.

Alternative C2: 52nd Avenue West to Lynnwood Transit Center

Alternative C2 and its options are the same as Alternative C1 from its connection with Segment B northward to where the elevated guideway along the east side of 52nd Avenue West crosses over the Interurban Trail around 208th Street SW. As Alternative C2 approaches 204th Street SW, it would turn northeast on an elevated guideway and cross south of Scriber Creek Park to the Lynnwood Transit Center Station. This elevated, center platform station would be south of 48th Avenue NW and the existing Lynnwood Transit Center, and would use some of the existing park-and-ride facility. A plaza and walkways would connect the station to the transit center. A new, approximately 1,200-space parking garage with up to four levels would replace surface lot spaces displaced by the station and increase the existing park-and-ride capacity by 500 spaces, for a total of about 1,900 spaces. Tail tracks, with a crossover track, would extend 800 feet beyond the station to 44th Avenue West.

Alternative C3: Along I-5 to Lynnwood Park-and-Ride

Alternative C3 also features two options for connections to Segment B alternatives. Alignment Option 1 would continue northward along I-5 at-grade in the median (matching Alternative B1 or B4), transition to an elevated guideway at about 208th Street SW, and then cross over the southbound I-5 lanes and angle away from I-5. Alignment Option 2 would already be elevated on the west side of I-5 (matching Alternative B2 or B2A), and more gradually shift away from I-5 north of 208th Street SW. At 208th Street SW, the Alternative C3 route would cross the Interurban right-of-way and parallel I-5 to the Lynnwood Park-and-Ride Station south of 48th Avenue SW and east of the existing Lynnwood direct access ramp.

Two design options are being considered for the Lynnwood Park-and-Ride Station. Both of these options feature an elevated, center platform station west of the Interurban Trail. The station would include a parking garage (up to four levels) to the west, south of the existing transit center, which would replace current spaces and add approximately 500 new spaces, for a total park-and-ride capacity of about 1,900 spaces. Both design options also feature a guideway containing tail tracks extending about 800 feet northeast over 44th Avenue West.

With Station Option 1, the existing transit center would remain at its current location. The elevated, center platform station would have surrounding open spaces, as well as a large plaza area with a pathway to the northwest toward the existing transit center.

With Station Option 2, the existing transit center with 20 bus bays would be relocated adjacent to the light rail station, with transit driveways on and off of 48th Avenue NW, which would be converted to transit-only access west of 46th Avenue West. Other features would remain similar to Station Option 1.

2.4.4 Light Rail Operations

The light rail alternatives would operate consistent with Sound Transit's current long-range Link service plan, which accommodates the Lynnwood Link Extension and other planned light rail expansions through 2030. Four-car trains would operate during the peak periods and two-car trains would operate during late night and early morning hours. Table 2-2 shows the scheduled frequency of the trains.

Table 2-2. Operating Plan for Weekday Service

Service Period	Hours	Train Frequency
Early Morning	5:00 am to 6:00 am	7.5 minutes
Morning Peak	6:00 am to 8:30 am	4 minutes
Midday	8:30 am to 3:00 pm	5 minutes
Afternoon Peak	3:00 pm to 6:30 pm	4 minutes
Evening	6:30 pm to 10:00 pm	5 minutes
Evening Late Night	10:00 pm to 1:00 am	7.5 minutes

2.4.5 Construction Approach

Pre-construction investigations would be needed during final design, and could include archaeological investigations, as well as geotechnical and/or exploratory investigations to detect unmapped utilities, culverts, or other infrastructure. Some advance utility upgrades or relocations could also occur. Major project construction activities would last approximately 6 years from the start of construction to light rail operation. Although more detail on the specific construction approaches and methods would be developed when the project enters final design, this Draft EIS impact analysis covers the most likely major activities, as described below.

Sound Transit would need several sites to stage construction activities, load and unload trucks, store equipment and materials, and allow parking for construction workers. Sound Transit would also need access routes for construction areas not readily accessible from existing roadways. Where possible, Sound Transit would locate most of its construction activities on staging areas proposed for use by light rail (some of which is WSDOT right-of-way), but other sites along the corridor could also be used.

Construction activities and their approach vary by the type of light rail facilities to be built for a given alternative. Different approaches would be required for:

- At-grade guideways
- Retained cut and retained fill guideways
- Elevated guideway structures, including structures spanning major highways such as I-5
- Passenger stations
- Park-and-ride facilities
- Traction power substations, and communications and signal control facilities
- Other related improvements such as roadways, sidewalks, noise walls, utility relocations, and drainage and stormwater facilities, etc.
- Power transmission line relocations

The first phase of any construction work begins with site preparation. This would include erosion, sediment, and stormwater control measures; sensitive-area protection measures; demolition of structures; and re-routing of utilities. Next, construction of the alignment (such as for elevated guideway structures, retained cut-and-fill sections, and/or at-grade track guideways) can be initiated, followed by installation of the guideway. Stations and parking facilities can be constructed concurrently with the guideway if those sites are not needed for staging areas.

Any hazardous materials located in construction areas and materials from demolition would be transported to approved waste or disposal sites. Contractors would be required to have proper permits and approvals before any of these activities can begin.

Construction activity on Sound Transit light rail construction projects would be highest during the heavy civil construction period of the project. Elevated guideways, station areas, earthwork, and retaining wall construction typically generate the most intense construction activity because greater volumes of materials, equipment, and personnel are required to perform construction work in these locations. During subsequent periods involving station finishes, system installation, and testing, construction activity would be less intense, confined to smaller areas, and generally involve fewer workers.

Sound Transit typically constructs guideways and stations in segments in a linear fashion. In any given location, most of the work would be completed in 1 to 2 years. Sound Transit would avoid major construction late at night, early mornings, and on weekends, as practicable, but some locations and types of work may require exceptions. Elevated guideways and bridges over other roadways are types of construction that would typically require major construction at night or early mornings on the weekends, largely to minimize traffic impacts. Some partial or full

street closures as well as potential I-5 lane closures are expected. All would be temporary and are discussed in more detail in Chapter 3, Transportation Impacts and Mitigation. Throughout construction, Sound Transit would coordinate closely with local jurisdictions, WSDOT, affected residents and neighborhoods, affected commercial and industrial businesses, utility providers, and other affected local and state agencies to help minimize impacts and other disruptions or inconveniences.

As construction is completed, control systems would be installed and tested. Once those are tested and commissioned, the transit system can be opened to riders.

2.5 Alternatives Development

Sound Transit developed the alternatives being considered in this Draft EIS through a public planning process that dates back many years. The ST2 Plan approved by voters in 2008 was a major step in defining the general scope for a project connecting Northgate to Lynnwood. ST2 defined the project as part of a larger program to expand the regional mass transit system in Snohomish, King, and Pierce counties.

The start of the EIS phase for the Lynnwood Link Extension was built on ST2 planning and the results of an Alternatives Analysis Sound Transit performed in 2010 to 2011 that included early public and agency scoping, which began in October 2010. The Alternatives Analysis considered a broad range of alternatives and was necessary to comply with the federal regulations and guidelines then in place for projects seeking funding from FTA's New Starts program. The Alternatives Analysis developed and evaluated a range of alternatives to improve transit in the project corridor. It resulted in the September 2011 *Alternatives Analysis Report and SEPA Addendum* (Sound Transit 2011a) that identified the most promising alternatives for further study, and it served as an addendum to Sound Transit's 2005 *Supplemental EIS on the Regional Transit Long-Range Plan*. The *Alternatives Analysis Report and SEPA Addendum* reviewed the project corridor's long planning history and considered in detail a wide range of alternatives and their performance. The *Scoping Interurban Report* provided a summary. Both documents were available during public scoping for the Draft EIS, and the Alternatives Analysis Report is included in Appendix K.

Through several stages of detailed study in the Alternatives Analysis, Sound Transit evaluated light rail, Bus Rapid Transit, and transportation systems management alternatives. Sound Transit weighed the ability of these alternatives to meet the project's purpose and need, considering factors such as ridership and transportation performance, land use, community equity, environmental effects, cost, cost-effectiveness, and constructability. The final set of alternatives considered in the Alternatives Analysis featured an I-5 light rail alternative, two SR 99 alternatives (one with at-grade sections and one fully elevated), and a Bus Rapid Transit alternative with routes on I-5, SR 99 and 15th Avenue NE. The final evaluation showed the light rail alternatives would have nearly twice the ridership of the Bus Rapid Transit

alternative. Light rail had higher costs than Bus Rapid Transit, but would perform better in terms of cost per rider, and light rail's annual operating costs would be lower than Bus Rapid Transit. Finally, the Bus Rapid Transit alternative would not be consistent with Sound Transit's Long-Range System Plan, which envisions high capacity transit ultimately extending to Everett; therefore, it would not meet the project's Purpose and Need.

Figure 2-9 charts the alternatives evaluation and screening process and identifies which alternative concepts were not advanced from the Alternatives Analysis through the start of the Draft EIS. Figure 2-10 describes why specific alternatives considered for the Draft EIS were eliminated from consideration.

The Alternatives Analysis produced the following key findings that shape the current range of alternatives:

- Light rail must operate in an exclusive right-of-way with full separation from other traffic in order to provide the capacity, reliability, and travel time savings needed to address the growing demand for mass transit in the project corridor.
- Light rail along the I-5 corridor would offer the best overall performance across the broad set of evaluation criteria, including in the areas of ridership and transportation performance, consistency with regional land use plans, and cost-effectiveness.

After the public scoping comment period, the Sound Transit Board of Directors (Sound Transit Board) reviewed the comments received and the Alternatives Analysis Report and SEPA Addendum. In December 2011, the Sound Transit Board approved Motion M2011-87, which directs Sound Transit to study light rail alternatives along I-5 in the EIS. Sound Transit concluded that light rail is the best-performing transit mode and that I-5 is the best-performing general corridor for light rail extension, resulting in the shortest travel times and greatest access improvements to Northgate and Lynnwood. The Sound Transit Board's Motion also removed the other modes and corridors considered in the Alternatives Analysis from further study in the EIS. This included routes and stations along SR 99 and 15th Avenue NE, bus rapid transit, and extensions beyond the Lynnwood Transit Center. Light rail routes along SR 99 and 15th Avenue NE were eliminated because the Alternatives Analysis showed operating in mixed traffic would result in insufficient capacity, slow average speeds, and low reliability. Routes along SR 99 and 15th Avenue NE would not provide the kind of regional service identified in the Sound Transit Long-Range Plan nor would the routes meet the project's purpose and need related to transportation effectiveness. Scoping comments from the public and agencies strongly supported further study of I-5 light rail alternatives.

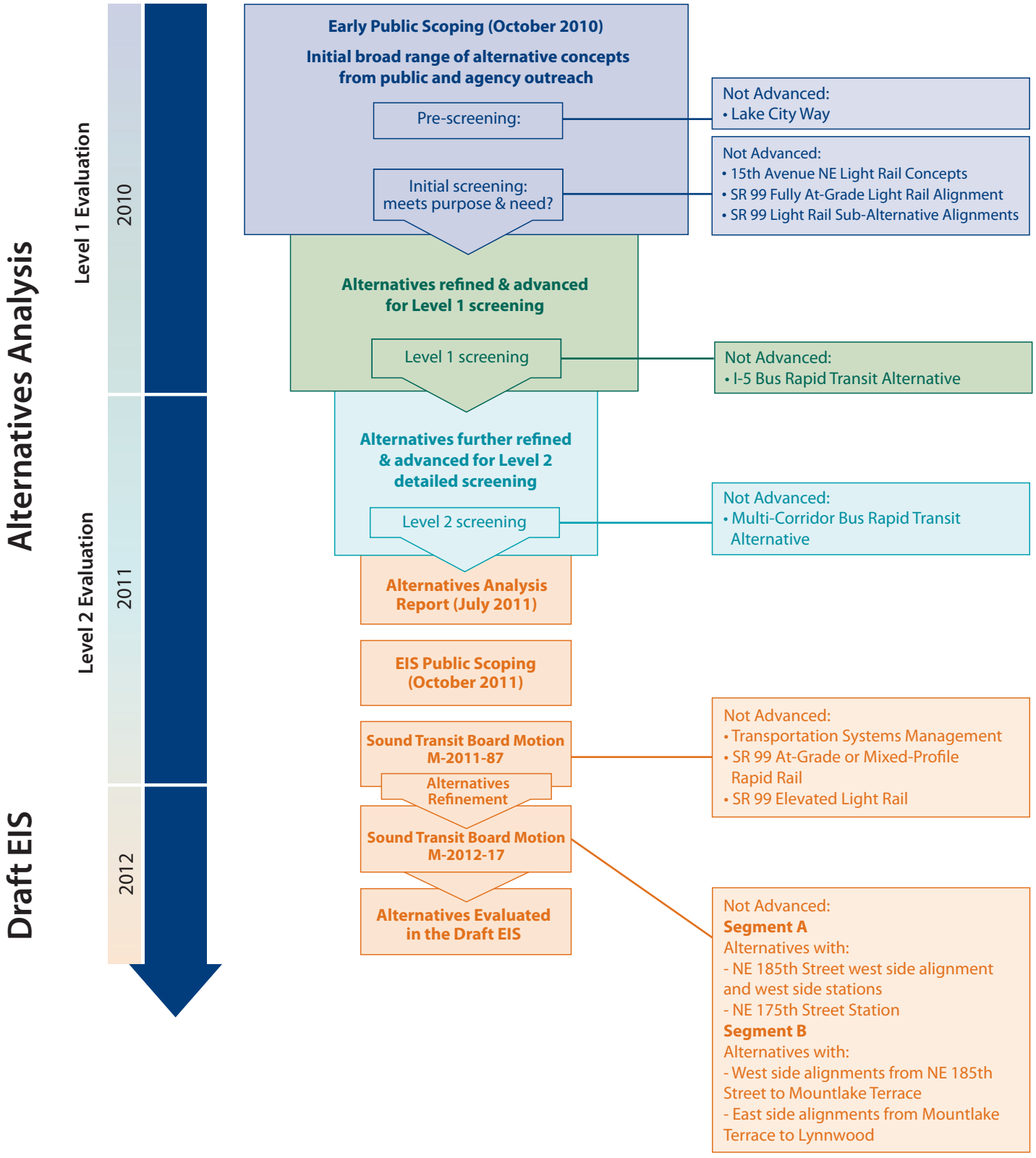


Figure 2-9
Alternative Evaluation and Screening Summary

Alternative	Areas of Poor Performance
A2: At-Grade/Elevated to NE 145th East Side and NE 185th West Side Stations	**Environmental Effects:** Higher potential for visual and historic impacts; west side alignment increases impacts into Segment B **Constructability:** Substantially more difficult due to staging constraints and traffic impacts related to crossing I-5; adds another I-5 crossing in Segment B
A4: Mostly Elevated to NE 145th East Side and NE 185th West Side Stations	**Environmental Effects:** Higher potential for visual and natural resources impacts; west side alignment increases impacts into Segment B **Constructability:** Substantially more difficult due to staging constraints and traffic impacts related to crossing I-5; adds another I-5 crossing in Segment B
A6: At-Grade/Elevated to NE 130th and NE 155th East Side and NE 185th West Side Stations	**Environmental Effects:** Higher potential for historic and visual impacts; west side alignment increases impacts into Segment B **Constructability:** Substantially more difficult due to staging constraints and traffic impacts related to crossing I-5; adds another I-5 crossing in Segment B
A8: Mostly Elevated to NE 130th and NE 155th East Side and NE 185th West Side Stations	**Environmental Effects:** Higher potential for noise, historic, and visual impacts; west side alignment increases impacts into Segment B **Constructability:** Substantially more difficult due to staging constraints and traffic impacts related to crossing I-5; adds another I-5 crossing in Segment B
A9: At-Grade/Elevated to 145th and 175th East Side Stations	**Transportation Performance:** Slower bus and auto travel times due to higher congestion at interchange, lower levels of bus access, and less desirable pedestrian and bicycle environments **Environmental Effects:** Higher congestion due to park-and-ride at an interchange; property and visual impacts to residential areas **Constructability:** More complex construction due to proximity with interchange
B3: East Side to Mountlake Terrace Transit Center to East Side	**Environmental Effects:** Higher potential for noise, visual, and ecosystems impacts due to section located through a greenbelt **Right-of-Way Implications:** More properties needed outside of I-5 right-of-way
B5: West Side to Mountlake Terrace Freeway Station to Median	**Transportation Performance:** Increased walk distance between station platform and parking/bus transfer at Mountlake Terrace; worse platform waiting environment **Ridership Potential:** Reduced due to longer walk distance **Environmental Effects:** Higher potential for visual and ecosystems impacts along west side from NE 185th and from second pedestrian bridge **Constructability:** Substantially more difficult due to necessary design deviations, reduced speeds, and median construction for proposed Mountlake Terrace freeway station
B6: West Side to Mountlake Terrace Transit Center to Median	**Environmental Effects:** Higher potential for visual impacts from sections along the west side of I-5 and at transition to the east side approaching Mountlake Terrace Transit Center **Constructability:** Substantially more difficult due to staging constraints and traffic impacts related to crossing I-5 **Right-of-Way Implications:** Higher potential for property impacts from the west-to-east I-5 crossing
B7: West Side to Mountlake Terrace Transit Center to West Side	**Environmental Effects:** Notably higher visual impacts along west side from NE 185th Street; higher ecosystems and noise impacts due to transition back to west side and along greenbelt; higher ecosystems impacts near S. 212th Street **Constructability:** Substantially more difficult due to additional crossing of I-5 **Right-of-Way Implications:** More properties needed outside of I-5 right-of-way
B7A: West Side to Mountlake Terrace Transit Center to West Side with 220th Street Station	**Environmental Effects:** Notably higher visual impacts along west side from NE 185th Street; higher ecosystems and noise impacts due to transition back to west side and along greenbelt; higher ecosystems impacts near S. 212th Street; potential for historic impacts due to 220th Street Station **Constructability:** Substantially more difficult due to additional crossing of I-5 **Right-of-Way Implications:** More properties needed outside of I-5 right-of-way
B8: West Side to Mountlake Terrace Transit Center to East Side	**Environmental Effects:** Notably higher visual and ecosystems impacts along west side from 185th; higher visual, ecosystems, and noise impacts due to transition across I-5 and along greenbelt **Constructability:** Substantially more difficult due to additional crossing of I-5 **Right-of-Way Implications:** More properties needed outside of I-5 right-of-way

Figure 2-10
Alternatives Eliminated by Sound Transit Board

Some comments received during scoping suggested different alternatives and/or station locations than those presented by Sound Transit. Sound Transit incorporated some of these suggestions into the alternatives evaluated in this Draft EIS, such as including NE 130th Street, NE 155th Street, and 220th Street SW stations. Other suggestions were not advanced because they either were not consistent with the project's purpose and need or they would have lower effectiveness and higher environmental impacts. These suggestions are summarized in Table 2-3.

Table 2-3. Other Alternatives Suggested During Environmental Scoping

Suggested Alternatives	Reason Not Advanced
Consider stations along 15th Avenue NE at NE 145th Street and NE 175th Street.	15th Avenue NE alignment was removed because it would have higher environmental impacts and lower effectiveness; the narrow avenue along a developed corridor would not accommodate the stations and access levels needed to support the regional service identified in Sound Transit's Long Range Plan.
Extend light rail to Alderwood Mall, Lynnwood Convention Center, 196th Street, Lynnwood City Center, or Ash Way, to serve more commuters or reduce traffic	An extension could be part of the future project, but it is not consistent with the current project scope, budget, or purpose and need. The project's limits from Northgate to the Lynnwood Transit Center were adopted by the Sound Transit Board and financing was approved by the voters in the region with the passage of the ST2 ballot measure in 2008.
Use Interurban Trail land for alignment.	The former Interurban right-of-way serves as a primary corridor for high voltage electrical transmission lines, and it has been developed as a trail for pedestrians and bicycles. These uses together with numerous areas where development has encroached on the right-of-way make it very difficult to integrate a light rail line without relocating the power lines, portions of the trail, and increasing environmental impacts compared to other available alternatives evaluated in the EIS.
Rebuild Northgate Park-and-Ride in the manner of Hammersmith Station in London with better connections, mixed uses, and amenities.	The Northgate Station is part of the Northgate Extension project, which has completed its environmental review process and is now under construction. The Northgate station is not part of the Lynnwood Link Extension.
Consider staggered stops, run more trains but skip some stations.	Lynnwood Link is an extension of a 2-track line from Northgate that passes through the Downtown Seattle Transit Tunnel. The tunnel must accommodate operations of a voter-approved light rail network that will extend from Federal Way on the south, Redmond on the east and Lynnwood on the north. While a skip stop operation between Northgate and Lynnwood might reduce travel times in this section by 90 to 120 seconds, it would significantly increase capital costs and right-of-way needs. In addition, more frequent train service would also tax operations through the Downtown Seattle Transit Tunnel.
Consider a mix of express bus on I-5 between Lynnwood and Northgate, in combination with a limited stop light rail route using SR 99 to connect Lynnwood to Northgate.	A SR 99 alignment as well as the use of express bus or Bus Rapid Transit as modes were removed because they would not provide the regional service identified in Sound Transit's Long Range Plan.

2.5.1 Factors Affecting the Range of Alternatives

In addition to Sound Transit's standard design considerations for light rail projects, several general planning, engineering, and environmental considerations shaped the development of alternatives for connecting Northgate and Lynnwood, from ST2 planning through to the alternatives evaluated in this Draft EIS. These factors

reflect the constraints posed by I-5 and its limited available right-of-way, as well as other community and environmental conditions along the project corridor. The major considerations are as follows:

- **Develop Alignment and Station Combinations that Minimize Environmental Impacts.** The general route and the specific alternative alignments were developed considering the location of the candidate station sites, along with environmental resources, such as major streams, wetlands, historic properties, and parks. The routes also maximized the use of available transportation right-of-way from I-5 as well as adjacent streets to minimize impacts on private property.
- **Avoid the Impacts of Repeated I-5 Crossings.** Repeated I-5 crossings would result in costly crossing structures and higher impacts on properties and environmental resources near the freeway, as well as on I-5 operations and maintenance.
- **Maximize the Advantages in Existing Transit Infrastructure in Potential Station Sites**. Siting stations at or near existing transit facilities makes efficient use of existing investments and optimizes connections between light rail and local bus services. Light rail stations need a section of straight and level track to hold four-car trains, which are 380 feet long. Station sites also need to be accessible, and ideally would provide opportunities for transit-oriented development.
- **Maximize the Advantages of Available Transportation Rights-of-Way.** A light rail route along I-5 provides environmental and cost advantages over routes in entirely new rights-of-way because much of the land immediately adjacent to I-5 has already been reserved for transportation-related purposes. Sound Transit and WSDOT collaborated on a plan to identify where I-5 right-of-way could be considered for use by Sound Transit for light rail, while retaining WSDOT's ability to make future highway improvements. They considered highway and light rail design standards, areas where modifications from design standards may be reasonable, and areas where the use of transportation-designated right-of-way would help minimize impacts on adjacent private property. These efforts produced the *I-5 Light Rail Compatibility Report* (Sound Transit 2012), signed by both Sound Transit and WSDOT, which is the basis for the conceptual engineering of the Draft EIS alternatives and their assumptions about the use of WSDOT right-of-way. Ultimately, the Federal Highway Administration (FHWA) must approve the use of Interstate highway right-of-way by the project.

In each of the three segments, the range of alternatives Sound Transit considered reflects the above factors. In Segment A, for instance, all the alternatives in this Draft EIS are on the east side. This is because the I-5 right-of-way is very limited on the west side in Segment A, and Sound Transit found more areas on the east side

where rights-of-way for I-5 and local streets could be combined to accommodate light rail. East side alignments thus helped reduce new right-of-way acquisition and possible related impacts on other uses. In addition, the existing Northgate Transit Center requires the project to start on the east side of I-5, and there were more potential station sites with existing infrastructure, access, and available rights-of-way on the east side from Northgate up to nearly NE 175th Street.

Also, the west side has more parks that could be affected, such as Northacres Park, Twin Ponds Park, and Ronald Bog Park. Several of these parks contain streams and wetlands, and Thornton Creek also runs adjacent to I-5 between NE 145th and NE 163rd streets.

Overall, alignments on the east side of I-5 have more advantages and would have fewer impacts than west side alignments or east-west crossings. Potential west side or east-west crossing alternatives would result in higher costs, environmental impacts, and operating concerns.

During the alternatives development, Sound Transit again applied its design standards and reviewed operating, impact, and cost factors to develop and refine alternatives. In Segments A and B, Sound Transit modified the design of alternatives to avoid impacts on historic properties. In Segment A at NE 155th Street, Sound Transit modified the siting of a parking garage for Alternatives A5 and A7 to avoid affecting a historic home. In Segment B, Sound Transit modified Alternatives B2 and B2A on the west side of I-5 to avoid affecting a historic school.

In Segment C, Sound Transit considered station and alignment concepts before defining the Segment C alternatives in this Draft EIS. These concepts included alternatives that bisected more of the Scriber Creek wetland area, crossed nearer to Scriber Creek Park, occupied more area of the Edmonds School District site, or placed stations and tail tracks in areas requiring more properties. After reviewing the estimated costs, effectiveness, and impacts with cooperating agencies, including the City of Lynnwood, Sound Transit proposed the current three Segment C alternatives for consideration.

2.5.2 Developing Details of the Alternatives

With the direction provided by the Sound Transit Board in Motion M2011-87, Sound Transit initiated further design and planning efforts to define a more detailed range of potential alignment and profile alternatives along the I-5 corridor. The Alternatives Analysis provided Sound Transit with a representative I-5 alternative and route that featured four stations. Sound Transit explored a variety of station and alignment design and siting choices along the I-5 corridor from Northgate to Lynnwood. The concepts reflected public and agency comments and suggestions made during the environmental scoping comment period. Sound Transit also

developed alignment, profile, and station siting concepts through work with local jurisdictions and WSDOT.

After developing several I-5 alternative concepts, Sound Transit evaluated how well these various concepts addressed the project's purpose and need or affected constructability, impacts, or costs (the same factors considered during the Alternatives Analysis). Other evaluation criteria considered consistency with the approved ST2 program, station access needs, development constraints, Sound Transit policies, and design guidance. The evaluation included the following factors:

- Transportation performance (light rail travel time, pedestrian/bicycle access, bus access, automobile access, and impacts to vehicular traffic)
- Ridership potential
- Environmental effects (noise and traffic; parks, recreation areas, and Section 4(f)/6(f) resources; historic and Section 106 resources; wetland, ecosystem, and water resources; visual quality and aesthetic resources; and environmental justice)
- Station area development potential (existing land use and transit-oriented development potential)
- Cost implications (capital and operations)
- Constructability (design deviations and I-5 impacts)
- Right-of-way and property implications (magnitude and types)

Definition of Potential Draft EIS Alternatives by Geographic Segment

From the I-5 corridor alternative concepts, Sound Transit developed a range of potential Draft EIS alternatives in three segments from Northgate to Lynnwood, and presented them in a draft Sound Transit Board Briefing Book in March 2012. The Sound Transit Board members suggested other alternatives and variations, and Sound Transit completed a final Briefing Book in April 2012 (included in Appendix K). The Briefing Books, which were publicly available, described each alternative under consideration and evaluated its relative performance.

After reviewing the Briefing Book and public comments, the Sound Transit Board passed Motion M2012-17 regarding the alignment and station alternatives to be considered in the Draft EIS. The Sound Transit Board removed a number of the potential alternatives from further consideration based on their higher impacts, costs, and/or lower benefits when compared to other alternatives (see Figure 2-10). It added a few alternatives that offered different pairings of alignments and stations for consideration. The alternatives identified in Motion M2012-17 are the alternatives

described in Section 2.4, Description of Light Rail Alternatives by Segment, and evaluated in this Draft EIS.

2.6 Environmental Practices and Commitments

As an agency that has now built and operated light rail, commuter rail, and regional express bus service in multiple Puget Sound communities, Sound Transit has established programs, best practices, and policies that are assumed as part of the Lynnwood Link Extension. These include the agency's design standards for light rail and its commitment to work collaboratively with other jurisdictions to obtain and comply with all required permits and approvals needed for construction and operation.

In 2011, Sound Transit adopted a *Sustainability Plan* establishing environmental action areas, priorities, and annual targets as the agency accomplishes its mission to build and operate the regional transit system (Sound Transit 2011b). The plan's targets and performance measures included areas such as energy use, water use, water management, wetland mitigation programs, greenhouse gas emissions, emissions of criteria pollutants, toxic materials, materials consumption, and solid waste. These areas are to be considered in all of the agency's activities, including planning, design, operation, and maintenance of investments such as the Lynnwood Link Extension.

> In 1987, the World Commission on Environmental Development defined sustainable development as "endeavors to meet the needs of present generations, without jeopardizing the ability of future generations, to meet their own needs with the intent of providing a better quality of life for everyone, now and for generations to come."

The *Sustainability Plan* builds on earlier environmental accomplishments and commitments, including Sound Transit's 2007 Sustainability Initiative. In addition, the agency achieved certification under the International Organization for Standardization 14001 standards for Environmental Management Systems in 2007.

The key goal of Sound Transit's sustainability and environmental management programs is to protect the environment and create a healthy community and economy. For Lynnwood Link Extension and other similar projects, this includes actions to:

- Carefully consider environmental impacts and protection when designing the transit system.
- Lessen the impacts of construction by providing mitigation for sensitive ecosystems.
- Keep the region clean and green by ensuring proactive compliance with all applicable environmental regulations and laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act.

Sound Transit's sustainability program and its light rail and station design standards incorporate voluntary guidelines from the United States Green Building Council's Leadership in Energy and Environmental Design (LEED). The sustainability

program also provides a checklist with specific, measurable standards to help maximize sustainability opportunities for the project during design, construction, and operation. The standards are categorized into eight areas: site design, station access, energy, water quality and stormwater, water efficiency and landscaping, materials and purchasing, air quality and emissions, and construction practices. While some of these sustainability opportunities may also support permit requirements or help mitigate environmental impacts, others can help maximize and extend the environmental and public benefits of the project.

2.7 Estimated Project Costs

With six alternatives in Segment A, four in Segment B, and three in Segment C, there are 72 possible segment combinations that could be linked to create the full 8.5-mile extension from Northgate to Lynnwood, with total capital costs between $1.2 billion and $1.7 billion. All of the alternatives are estimated to cost about $15 million per year to operate and maintain, varying by several hundred thousand dollars depending on how many stations are included. Chapter 5, Evaluation of Alternatives, has more details.

2.8 Other Project Area Activities

The Lynnwood Link Extension is being proposed in an area with vibrant, established urban communities. These communities, and the transportation systems that serve them and the region, will continue to change to accommodate additional people and jobs through 2040. There are no other major transportation projects that would span the full project corridor, but Sound Transit has a separate project, the Link Operations and Maintenance Satellite Facility, that includes an alternative in the project corridor. In addition, there is the potential for future tolling along I-5 and some local transportation projects will be developed nearby. The area jurisdictions have adopted plans that anticipate increased development in the corridor, and some land owners are considering redevelopment actions. Appendix H, Other Projects and Actions Considered in Cumulative Effects, lists the projects considered in the cumulative effects analysis. The EIS considers the cumulative effects of the Lynnwood Link Extension in conjunction with these and other plans and projects in Chapter 3, Transportation Impacts and Mitigation, and Chapter 4, Environmental Impacts and Mitigation.

2.8.1 Link Operations and Maintenance Satellite Facility

Sound Transit and FTA are preparing a separate NEPA/SEPA EIS for a proposed project called the Link Operations and Maintenance Satellite Facility. The Link Operations and Maintenance Satellite Facility EIS evaluates operations and maintenance needs across the Sound Transit district and is not focused on a specific

corridor. The Draft EIS for the Link Operations and Maintenance Satellite Facility is anticipated to be issued in late 2013 or early 2014. The new maintenance facility would operate in conjunction with Sound Transit's existing operations and maintenance facility (in South Seattle) to serve the larger fleet of light rail vehicles required to serve the system as expanded by ST2. Even if the Lynnwood Link Extension does not go forward, Sound Transit would provide additional operation and maintenance facilities to accommodate the ST2 Plan. Therefore, the Link Operations and Maintenance Satellite Facility is related to the Lynnwood Link Extension but it has *independent utility* under NEPA and SEPA. It is not dependent on Lynnwood Link for its purpose or justification.

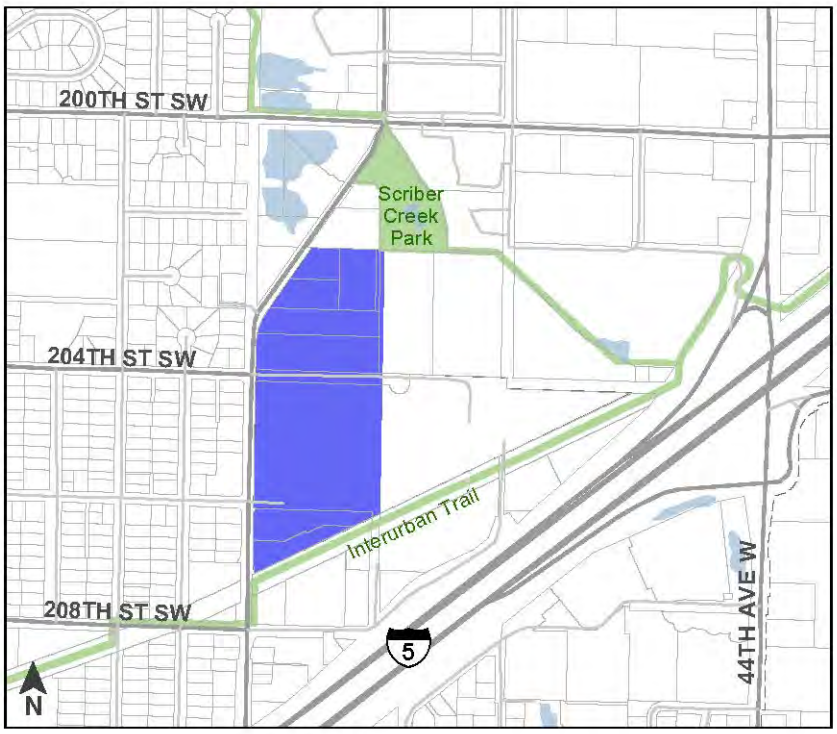


Figure 2-11
Location of Lynnwood Alternative in Sound Transit's Link Operations and Maintenance Satellite Facility EIS

The new operations and maintenance facility requires 20 to 25 acres of land to serve the system as expanded by ST2. The new location must be adjacent to an operating line in the north or the east to provide efficient and reliable system-wide service. In the Link Operations and Maintenance Satellite Facility EIS that FTA and Sound Transit are now preparing, the alternatives include one location in Lynnwood and three locations in Bellevue. The Lynnwood alternative is north of I-5, west of the Lynnwood Transit Center, and east of 52nd Avenue West/Cedar Valley Road (See Figure 2-11). Any of the Lynnwood Link Extension light rail alternatives could operate with the Lynnwood maintenance facility alternative. However, the Lynnwood Link Extension could also operate if the maintenance facility were in Bellevue.

The Lynnwood site alternative would occupy parcels of land needed for the planned Edmonds School District support center. If this site were selected, Sound Transit would work with the Edmonds School District to explore opportunities for shared use at this location.

This Lynnwood Link Extension Draft EIS analyzes the cumulative effects that could occur if the Link Operations and Maintenance Satellite Facility is built on the Lynnwood site, just as this EIS analyzes the potential cumulative effects of the Lynnwood Link Extension in combination with other reasonably foreseeable projects in the vicinity. For example, the light rail project's impacts on traffic at certain intersections could be worsened if the Lynnwood maintenance facility alternative were also built, or construction impacts could be worse if both projects were built at once. There are no reasonably foreseeable cumulative effects from the Lynnwood light rail project if the Link Operations and Maintenance Satellite Facility is built in Bellevue.

Because the two projects have independent utility, this Lynnwood Link Extension EIS does not analyze the impacts of the Link Operations and Maintenance Satellite Facility, either in Lynnwood or in Bellevue, as indirect impacts of the light rail project. Instead, consistent with NEPA and SEPA, the Link Operations and Maintenance Satellite Facility EIS will analyze and discuss that project's effects.

2.9 Key Planning Steps for this Project and the EIS

From September 24 through October 27, 2010, Sound Transit and FTA conducted an early scoping process for an Alternatives Analysis for the project; three public meetings were held to provide project information to the public. Early scoping is an optional step in the state and federal environmental review process and is meant to engage the public, agencies, and other stakeholders in the alternatives analysis process, which occurs before defining the alternatives evaluated in the EIS.

A year later, with completion of an *Alternatives Analysis Report and SEPA Addendum* (Sound Transit 2011a), Sound Transit and FTA conducted the environmental scoping process for the EIS from September 30 through October 31, 2011. Environmental scoping is required under SEPA and NEPA and allows the public, agencies, and tribes an opportunity to provide comments on the proposed project alternatives, Purpose and Need Statement, and potential environmental impacts. The comments received during environmental scoping helped Sound Transit and FTA refine the Purpose and Need Statement, define the scope of analysis for this EIS, and identify potential significant impacts resulting from the proposed project. Chapter 6, Public Involvement, provides additional details about the environmental scoping process and outreach for the project to date.

2.9.1 Next Steps

The next major steps in the development of the Lynnwood Link Extension are as follows:

Draft EIS

This Draft EIS will be available for an extended comment period of 60 days (45 days required) that will include public hearings and other opportunities for the public and agencies to comment in person or in writing. The Draft EIS Fact Sheet provides further details on how to comment.

After the close of the Draft EIS comment period, the Sound Transit Board will consider public and agency comments received, as well as the information in the Draft EIS. The Sound Transit Board will then identify a Preferred Alternative for the Final EIS, which will be evaluated in the Final EIS along with other alternatives. The final decision on the project to be built will not be made until after the Final EIS is issued.

Final EIS and Related Decisions

The Final EIS will analyze the Preferred Alternative, along with the other proposed light rail alternatives and the No Build Alternative, and it will respond to the comments received on the Draft EIS. Work on the Final EIS is expected to begin in late 2013, with publication scheduled for 2014. Following the review of the Final EIS, the Sound Transit Board will select the project alternative to be built. FTA also is expected to publish its Record of Decision (ROD) for the project, which will document findings by FTA that the project has met the requirements of NEPA and related environmental regulations. It will describe FTA's decision on the project, alternatives considered, the basis for the decision to approve the project, and mitigation measures required.

FTA is directed to issue a combined Final EIS and ROD document pursuant to Public Law 112-141, 126 Stat. 405, Section 1319(b) unless it determines, for statutory criteria or practicability reasons, that separate documents are appropriate. The Lynnwood Link Extension EIS is a joint NEPA and SEPA document consistent with 40 CFR 1506.2(c) and supports decision making by Sound Transit, FTA and other agencies. Sound Transit is not identifying a Preferred Alternative in the Draft EIS, which is one of the statutory criteria that would allow separate Final EIS and ROD documents. In addition, SEPA requires that the Sound Transit Board's final decision on the project to be built be informed by the Final EIS and cannot make a final decision until the Final EIS has been issued. The FTA ROD is required to describe the final project decisions and therefore must be issued after the Sound Transit Board's final decisions on the project. As a result of these regulatory requirements under SEPA and NEPA, it likely will not be practical to issue a combined Final EIS and ROD, and they likely will be separate documents.

The estimated project schedule is shown in Figure 2-12 below.

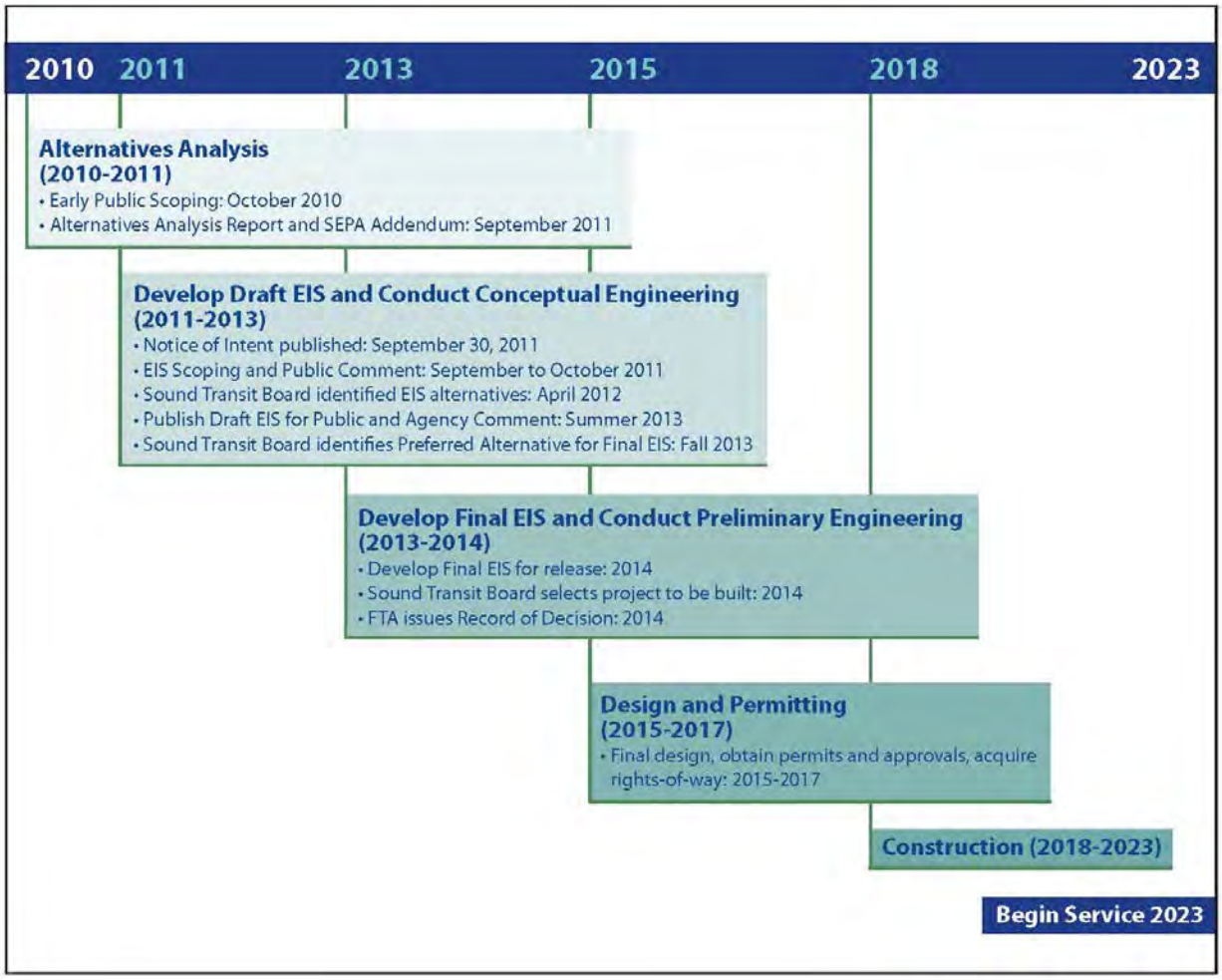


Figure 2-12
Estimated Project Schedule

3 TRANSPORTATION IMPACTS AND MITIGATION

This chapter summarizes the characteristics of the transportation system in the Lynnwood Link Extension study area and describes potential impacts and mitigation associated with the project alternatives.

The analysis of the transportation system considers the following transportation elements:

- Regional context and travel patterns
- Transit service and operations
- Freeway operations
- Arterial and local street operations
- Nonmotorized facilities
- Freight mobility and access
- Parking
- Safety

This chapter describes the existing transportation environment for each transportation element, and then presents the analysis results showing potential impacts and mitigation. A more detailed discussion of the transportation analysis and results is in the *Transportation Technical Report*.

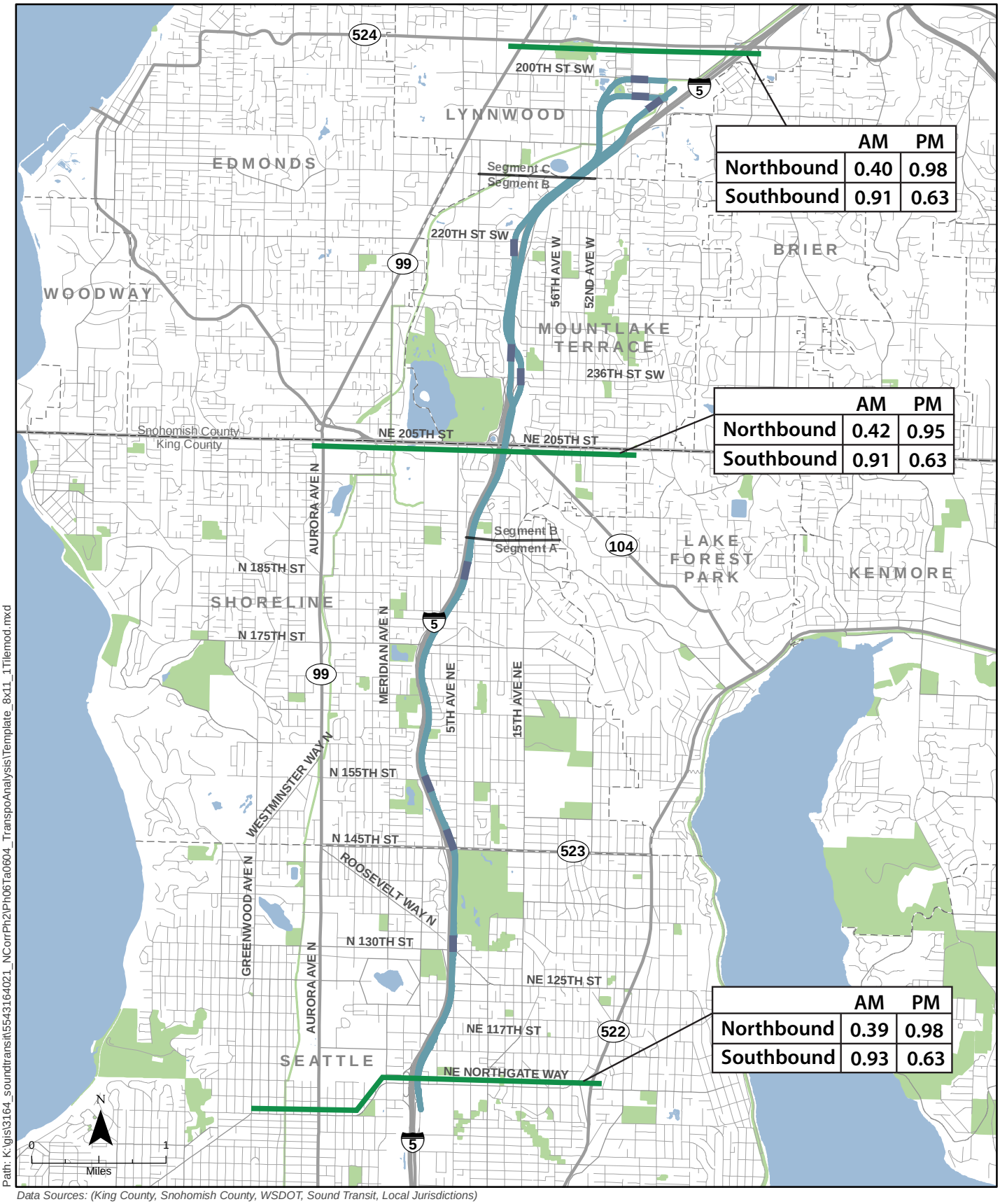
3.1 Affected Environment

3.1.1 Regional Context and Travel Patterns

Transportation Facilities

The project area is served by a network of roadways consisting of a major interstate route (I-5), state highways (State Route [SR] 99, SR 523, and SR 104), and other local arterials and roads. Figure 3-1 shows the street and highway network in the Lynnwood Link Extension study area, and screenline volume-to-capacity (v/c) ratios (described below under Travel Demand and Patterns).

The primary north-south freeway serving the project area is I-5, which provides regional and interstate movement and access to the project corridor's local communities. I-5 also serves regional express bus service in the corridor and is at or near capacity during many hours of the day. SR 99 (Aurora Avenue North), SR 523 (also known as North/NE 145th Street), SR 522, and SR 104 are other state highways located within the project area that provide access to bus transit, passenger rail, ferries, and the movement of freight through the area.



	AM	PM
Northbound	0.40	0.98
Southbound	0.91	0.63

	AM	PM
Northbound	0.42	0.95
Southbound	0.91	0.63

	AM	PM
Northbound	0.39	0.98
Southbound	0.93	0.63

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Data Sources: (King County, Snohomish County, WSDOT, Sound Transit, Local Jurisdictions)

Legend

Screenlines

$$\text{Volume-to-Capacity (V/C) Ratio} = \frac{\text{Total Peak Hour Traffic Volume}}{\text{Available Peak Hour Roadway Capacity}}$$

Figure 3-1
Existing Peak Hour Volume-to-Capacity (V/C) Ratios at Screenline Locations

Lynnwood Link Extension

Several of the north-south arterials that connect neighborhoods and commercial districts in the project area include Greenwood Avenue North, Westminster Way North, Aurora Avenue North (SR 99), Meridian Avenue North, 5th Avenue NE, 15th Avenue NE, SR 522, 52nd Avenue West, and segments of Roosevelt Way North. Some of the major east-west trips are served by NE 130th Street, NE 145th Street, and NE 175th Street—all of which access I-5 with interchanges where congestion occurs regularly. North 117th Street, NE 155th Street, and NE 185th Street cross I-5 and connect business districts on each side. Within Lynnwood, 200th Street SW provides an arterial connection between SR 99 and the Lynnwood Transit Center.

Travel Demand and Patterns

Regional Traffic

To help measure regional traffic conditions, Sound Transit set several screenlines in the study area and calculated traffic volumes and v/c ratios on the combined group of north-south freeways and arterials in the corridor. A v/c ratio above 0.90 (or 90 percent of capacity) typically represents congested conditions. A v/c ratio of 1.0 indicates that a corridor is operating at capacity and represents highly congested conditions. Figure 3-1 shows the screenline locations and results.

A "screenline" is an imaginary line across a section of freeway and/or arterials. Screenlines are often used in traffic analyses to determine how much volume is entering or exiting a particular area based on how much traffic crosses the screenline.

The corridor's peak period traffic follows typical commute patterns. These commuter trips are heavily oriented southward toward jobs in Seattle in the morning peak period and northward back to the cities with large residential bases in the evenings.

During the AM peak hour, the screenlines show the project corridor, including I-5 and north-south arterials, exceeds 90 percent of capacity in the peak southbound direction and is consistently congested. Traffic in the reverse direction in the morning is much lighter.

For the PM peak hour traveling northbound, the screenlines again show traffic volumes at up to 98 percent, which is nearly at capacity, reflecting highly congested conditions. The reverse peak direction in the evening is lighter but has high volumes as well, particularly on I-5.

Additional discussions regarding travel patterns across these north-south screenlines and an east-west screenline are provided in the *Transportation Technical Report*.

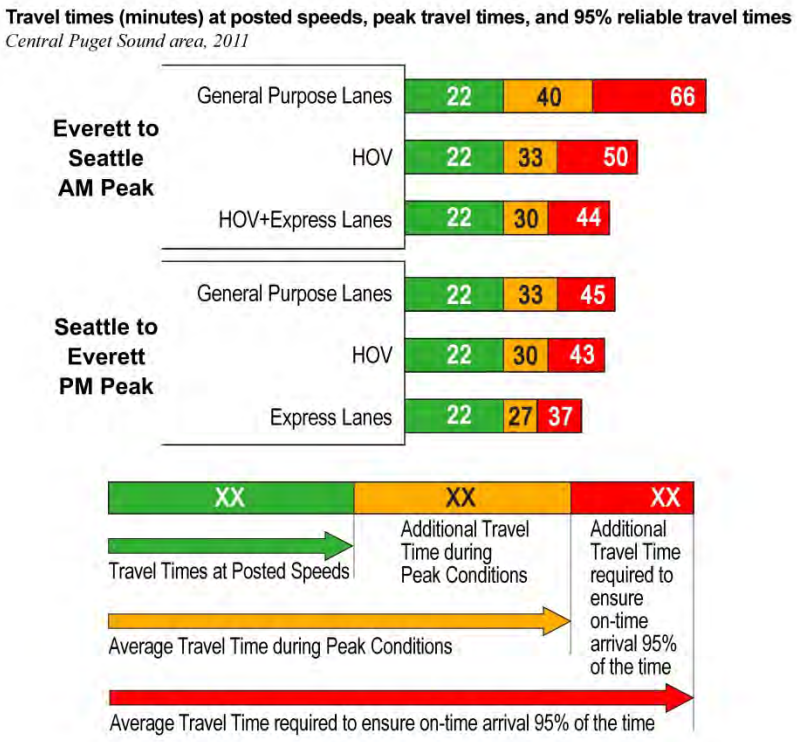
I-5 Congestion

I-5 is the most heavily traveled highway in the state, carrying from 159,000 to 196,000 vehicles on an average day in the project corridor.

PSRC's *Transportation 2040* and the *Washington Transportation Plan* do not include major expansions of highway capacity in the corridor. This is, in part, because there is little room to expand the existing roadway without high capital, societal, and environmental costs and impacts in comparison to the mobility benefits it would provide. Regional transportation planners expect the current high levels of travel demand to continue growing, and congestion and unreliability for travelers on I-5 will increase through 2040 (PSRC 2010b). As a result of the high volume of travel and limited capacity in the project corridor, peak period traffic is consistently congested and travel times are unreliable.

WSDOT's time reliability calculator (Figure 3-2) illustrates that a peak period trip between Everett and Seattle at free-flow speeds should take about 22 minutes on I-5 (WSDOT 2012), but it takes much longer to make the trip during peak travel periods. For example, in the morning peak period a driver must typically allow 66 minutes for the southbound trip; however, a vehicle trip in the high-occupancy vehicle (HOV) lane is calculated at 50 minutes—a saving of 16 minutes.

Reverse commutes are unreliable as well because of bottleneck locations at several points in the corridor where reversible lanes, HOV lanes, and interchanges create regular backups, particularly from NE 145th Street south to Northgate and toward downtown Seattle.



Source: The 2012 Congestion Report (WSDOT 2012)

Figure 3-2. Travel-Time Reliability for the Everett-to-Seattle Commute

Unreliable travel on I-5 HOV lanes during the peak period is a problem because that is when most transit service occurs. The WSDOT-adopted HOV lane policy calls for HOV lanes to maintain an average speed of 45 miles per hour (mph) or greater at least 90 percent of the time during the morning and afternoon rush hour. The I-5 HOV lanes in the project corridor do not currently meet this performance standard. In 2007, HOV lane speeds in the southbound direction fell below the 45-mph threshold up to 65 percent of the time in the AM peak period, and northbound HOV lanes fell below the threshold nearly 50 percent of the time in the PM peak period.

HOV lane reliability is also affected by the operation of the adjacent general purpose lanes. Travel on HOV lanes is often slowed when there is nearby slow traffic in the general purpose lane (i.e., "lane friction"). Drivers in the HOV lane are often reluctant to travel at faster speeds than vehicles in the next lane, and the different speeds make it difficult to move in and out of the HOV lanes.

3.1.2 Transit

Regional Transit

This subsection describes existing transit service in terms of service characteristics, ridership, and transit travel times. More detail is provided in the *Transportation Technical Report*.

Service Characteristics

Transit services within the study area are provided by Community Transit, King County Metro, and Sound Transit. Bus routes along I-5, operated by Sound Transit, Community Transit, and King County Metro, provide long-distance service between major transit centers in the study area and major urban centers in the region. Sound Transit's *ST Express* service provides two-direction, all-day service between major regional destinations. Community Transit and King County Metro services along I-5 in the study area are primarily peak-direction, peak-period, and oriented to commuters. *Swift*, Community Transit's bus rapid transit service, operates along the Snohomish County portion of the SR 99 corridor. King County Metro's RapidRide is expected to begin service on Aurora Avenue North in late 2014. The frequency and number of bus routes in service increases during the peak periods, primarily in the peak direction of travel. These routes connect park-and-rides and transit centers in Snohomish and north King counties with major employment centers in the city of Seattle.

Segment A in King County has two small park-and-ride lots. These facilities connect adjacent neighborhoods with King County Metro buses running along I-5 and regional arterials. These King County Metro routes provide service to a variety of destinations, including downtown Seattle, University District, Northgate Transit Center, Aurora Village, and Mountlake Terrace Transit Center. Snohomish County has 40 park-and-ride lots, ranging in size from 10 spaces to almost 1,400 spaces,

which provide connections to regional transit centers and employment areas, such as downtown Seattle, University District, and Northgate Transit Center. In the Lynnwood Link Extension study area, there are three transit centers with park-and-ride facilities, and two additional locations with smaller park-and-ride lots. These facilities are listed in Table 3-1.

Table 3-1. Existing Bus Transit Center and Park-and-Ride Facilities in the Lynnwood Link Extension Study Area

Transit Facility	Type of Facility	Park-and-Ride Stalls
Northgate Transit Center (includes adjacent facilities at Northgate Mall and Thornton Place)	Transit Center, Park-and-Ride	1,513
South Jackson Park Park-and-Ride (I-5 at NE 130th Street)	Park-and-Ride	46
North Jackson Park Park-and-Ride (I-5 at NE 145th Street)	Park-and-Ride	68
Mountlake Terrace Transit Center (I-5 at 236th Street SW)	Transit Center, Park-and-Ride	880
Lynnwood Transit Center	Transit Center, Park-and-Ride	1,378

Note: Transit routes and park-and-ride stalls listed as of summer 2012. Stall capacities do not include accessible spaces or spaces reserved for other uses.

Sources: http://www.communitytransit.org/parking/; http://metro.kingcounty.gov/tops/parknride/pr-north-seattle.html

Northgate Transit Center is accessed by general purpose ramps to and from the I-5 mainline and express lanes (to and from the south only) and via arterials. Freeway flyer stops at NE 145th Street are accessed from the outside general purpose lanes. Regional buses serving these flyer stops leave the inside HOV lane, weave through congested general purpose lanes to exit to the flyer stops, then weave again to re-enter the inside HOV lanes. Regional transit accesses the Mountlake Terrace Transit Center using an in-line freeway station. Regional transit service uses the I-5 HOV lanes and serves the Lynnwood Transit Center via a direct access ramp to the HOV lanes.

Ridership

Table 3-2 shows the daily bus ridership for regional bus routes on I-5 north of Northgate along with various locations on other key transit corridors in the region. Ridership on I-5 at the Ship Canal Bridge includes riders from north of Northgate, in addition to those boarding farther south between Northgate and the Ship Canal. This information shows that the project corridor currently carries the second highest bus ridership volumes in the region.

Table 3-2. Daily Bus Ridership on Select Regional Corridors—Base Year (2011)

	Bus Ridership
I-5—North of Northgate	19,400
I-5—Ship Canal Bridge	33,400
I-5—South of West Seattle Bridge	16,400
I-5—South of I-405	9,200
SR 520—Midspan	16,000
I-90—Between Seattle and Mercer Island	11,600
I-90—East of 148th/150th Avenue SE Interchange	4,000
I-405—North of SR 520	4,400
I-405—South of SR 520	4,000

Source: Sound Transit Ridership Forecasting Model.

Transit Travel Times

Table 3-3 shows scheduled transit travel times during the peak period from Shoreline and Lynnwood to regional destinations. There is a wide variation in the PM northbound travel time compared to the AM southbound travel time, even though they are both peak period trips. This variation occurs because the greater evening congestion in the I-5 general purpose and HOV lanes causes more inconsistency in travel time. In addition, the southbound (reverse peak direction) transit trips in the evening are slower than the northbound (peak direction) trips due to congestion and because the I-5 express lanes are operating in the peak direction. More detailed information on transit travel times is provided in the *Transportation Technical Report*.

Table 3-3. Peak Period Transit Travel Times (minutes)

	Southbound – AM Peak		Northbound – PM Peak		Southbound – PM Peak	
Destination/Origin	From Shoreline	From Lynnwood	To Shoreline	To Lynnwood	From Shoreline	From Lynnwood
Northgate	16	52[a]	7	70[a]	17	55[a]
University of Washington	25	37	30	32	47	39
Capitol Hill	30	48	62	60	40	66
Downtown Seattle	18	36	22	41	23	35
Sea-Tac Airport	66	79	75	93	66	79

Note: These transit travel times reflect the existing conditions on existing bus routes and include estimated transfer times where relevant. In addition to these travel times, the total transit travel time would include the time to access the bus as a pedestrian, bicyclist, passenger, or driver, along with the wait time for a bus. The wait time for a bus would be dependent on the service reliability (adherence to schedule). If a bus arrival is unreliable, then the riders must arrive prior to the scheduled time and wait until the bus arrives on time or late.

[a] Because the Northgate to Lynnwood route does not have direct service, travel times are longer than comparable trips.

Source: King County Metro Trip Planner, http://metro.kingcounty.gov/.

Transit Level of Service

Sound Transit evaluated the quality of transit service at major transit destinations and activity centers, including the proposed light rail stations for the project alternatives. The *Transportation Technical Report* quantitatively evaluates transit service in more detail; level of service (LOS) was analyzed for the following types of performance measures:

- Service frequency
- Hours of service
- Passenger load (passenger crowding)
- Reliability of service (on-time performance and headway adherence)

Similar to how LOS is typically measured for highway or arterial performance, transit LOS is measured using the letter grades A through F, with A denoting the best performance and F generally considered failing performance. Direct transit service is provided between many of the major urban centers in the region by one or more transit providers, with LOS ranging from A to D, but some proposed Lynnwood Link Extension station areas do not have direct bus service to or from many of the other destinations or urban centers. If no direct bus service was provided between two destinations, LOS was not calculated. Service hours also vary; many destinations with direct transit service provide hours of service at LOS A, while others are at LOS E or F. Passenger load LOS in the project corridor ranges from LOS A to B, with the highest passenger loads southbound in the AM peak period and northbound in the PM peak period. When buses are more crowded, they have longer delays at stops and have less reliable travel times. The LOS on Sound Transit routes in the project corridor ranges from LOS B to C. Along I-5, buses may get caught in reverse-peak (i.e., southbound) congestion in the afternoon hours, delaying the start of peak direction trips. While some of the regional bus routes usually operate on time, others experience lower reliability and can be late 15 percent of the time or more.

Local and Sub-regional Transit

Local and sub-regional transit services currently serving the project area are provided by King County Metro Transit and Community Transit. In addition to the sub-regional services provided by *Swift*, Community Transit's bus rapid transit service, and King County Metro's RapidRide, described above, local buses provide service to several transit centers, park-and-ride facilities, neighborhoods, and activity centers throughout the project area. While local bus routes provide frequent stops (e.g., every two blocks), sub-regional bus routes may have longer distances (such as 0.5 mile) between stops. In addition, dial-a-ride services are offered in many parts of the

project area. More details on local and sub-regional bus service are provided by segment in the *Transportation Technical Report.*

3.1.3 Freeway Operations

Freeway operations were evaluated using traffic simulation software along I-5 to analyze the NE 130th Street and NE 145th Street interchanges, where ramp modifications are proposed with the future light rail alternatives. Additional discussion specific to I-5 congestion is provided earlier in Section 3.1.1. The *Transportation Technical Report* provides more detail on I-5 congestion and freeway operations.

During the AM peak hour, average speeds along southbound I-5 range from 23 mph to 41 mph. These very congested conditions are caused by high volumes of merging traffic at both NE 130th Street and NE 145th Street. In the northbound (off-peak) direction, I-5 is generally uncongested, with an average speed of approximately 55 mph.

During the PM peak hour, average northbound peak period speeds range from 18 mph to 35 mph. I-5 is operating under very congested conditions with high volumes of merging and diverging traffic at both NE 130th Street and NE 145th Street. In the southbound (off-peak) direction, speeds on I-5 range from 40 mph to 58 mph. I-5 is operating relatively well, except for the area approaching NE 145th Street, where high southbound off-ramp volumes cause delays and queues that extend onto the freeway mainline. In areas south of the NE 130th Street interchange, at the Northgate interchange, and farther south, I-5 slows down in the PM peak hour, in part due to HOV lane traffic entering the general purpose lanes (due to the express lanes operating northbound during this time frame). This segment of I-5 can often be congested from this location through downtown Seattle and continuing to the south.

Approximately 50 bus trips operate in the HOV lane in the northbound direction during the PM peak hour. With an assumed passenger car equivalent of 2.5 cars per bus vehicle, these buses represent the capacity equivalent of approximately 125 passenger cars in the HOV lane.

3.1.4 Arterials and Local Streets

Traffic Operations

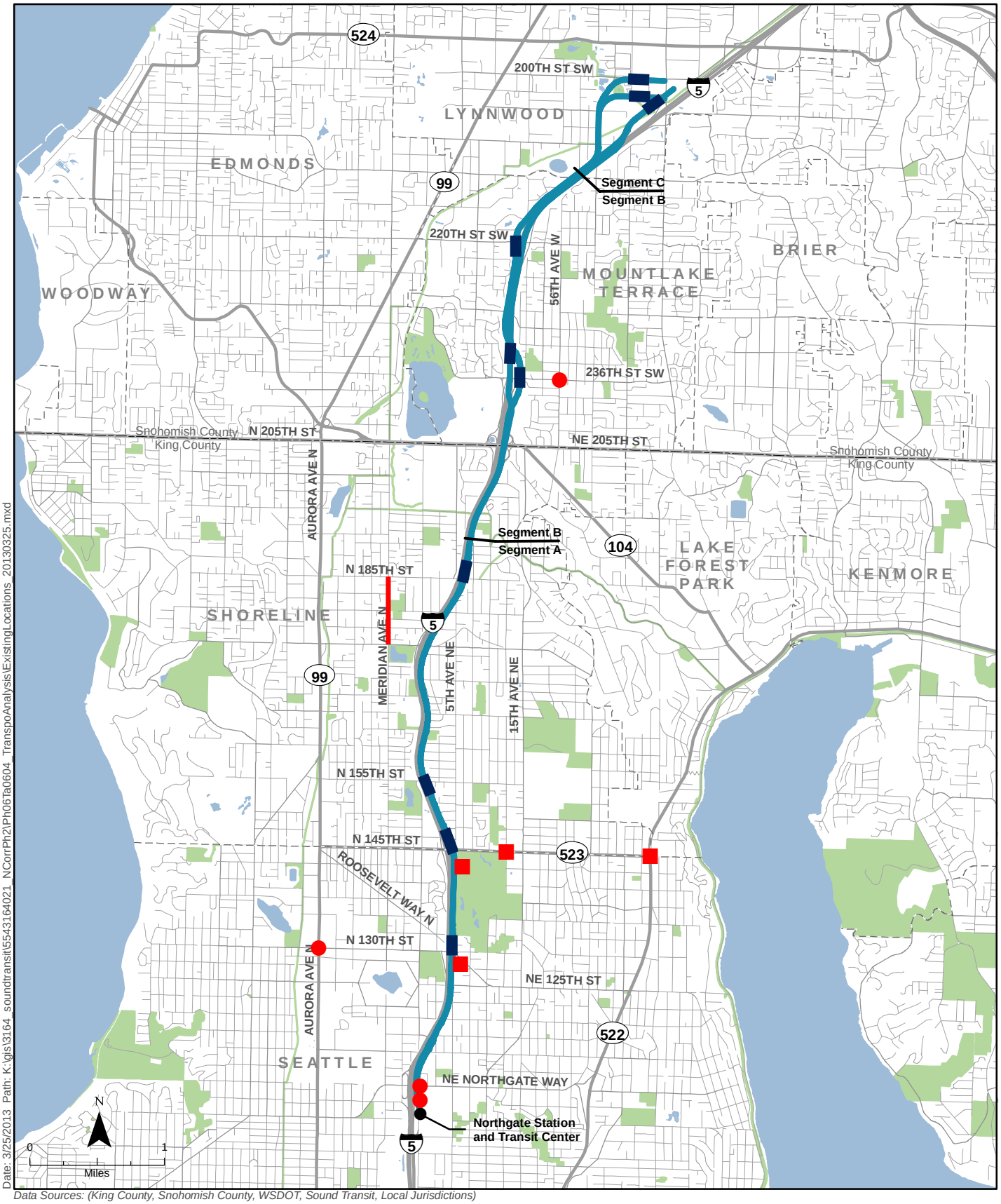
The quality of traffic operations is also described in LOS terms. Traffic volumes were analyzed using the Transportation Research Board's *Highway Capacity Manual* methodology to calculate peak hour LOS at signalized and unsignalized intersections (TRB 2000). LOS ratings range from LOS A to LOS F; LOS A represents the best operation and LOS F the poorest operation. LOS was calculated for all study area intersections. A complete list of the intersections is in the *Transportation Technical Report.*

Intersections were analyzed to determine whether they are currently operating at acceptable levels or failing. Arterials within the Shoreline city limits were also analyzed to determine whether they meet City of Shoreline concurrency standards, which are intended to ensure that adequate transportation facilities will be in place as new developments occur. Intersections and arterials are considered failing when they do not operate at or better than the governing jurisdiction's intersection LOS standard. Table 3-4 summarizes the LOS standard(s) for the relevant jurisdictional agency.

Sound Transit calculated LOS for existing traffic operations throughout the project corridor for the PM peak hour when traffic is highest. The agency also examined AM peak hour conditions for intersections with high volumes or intersections in critical locations, such as near a freeway interchange. Figure 3-3 shows the locations that currently do not meet LOS standards.

Table 3-4. LOS Standards in the Project Corridor

Agency	Minimum LOS Standard
WSDOT	LOS D for highways of statewide significance (HSS) LOS E/mitigated for regionally significant state highways (non-HSS)
City of Lynnwood	LOS E for city center arterials LOS D for non-city center arterials LOS C for local streets
City of Mountlake Terrace	LOS D for signalized intersections with the following exceptions (LOS E): • 212th Street SW • 244th Street SW • 220th Street SW between SR 99 and I-5 LOS E for unsignalized intersections
City of Shoreline	LOS D for signalized intersections LOS D for unsignalized intersecting arterials Volume-to-capacity ratio of 0.90 or lower for principal and minor arterials with the following exceptions: • 5th Avenue NE from NE 145th Street to the I-5 on-ramps; exempt from City concurrency standard • 15th Avenue NE from NE 150th Street to NE 175th Street; volume-to-capacity ratio of 1.10 or lower
City of Seattle	LOS D (goal)



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Data Sources: (King County, Snohomish County, WSDOT, Sound Transit, Local Jurisdictions)

- Signalized Intersection
- Two-Way Stop - Controlled Intersection
- Arterial Segment
- Light Rail Alternatives
- Station Location
- Roadway
- Local Street
- City Boundary
- County Boundary
- Park
- Waterbody

Figure 3-3
Existing Locations
Operating Below LOS standards

Lynnwood Link Extension

Segment A: Seattle to Shoreline

In Segment A, Sound Transit analyzed 31 intersections in Seattle and 38 intersections in Shoreline. The seven intersections listed below do not currently meet LOS standards during the AM and/or PM peak hour:

- 1st Avenue NE and I-5 ramps/Northgate Mall driveway (PM)
- 1st Avenue NE and NE Northgate Way (PM)
- 5th Avenue NE and I-5 northbound off-ramp south of NE 130th Street—eastbound approach (AM, PM)
- North 130th Street and Aurora Avenue North (PM)
- NE 145th Street and Bothell Way NE/Lake City Way NE (PM)
- NE 145th Street and 12th Avenue NE—northbound approach (PM)
- 5th Avenue NE and I-5 northbound off-ramp south of NE 145th Street—northbound approach (AM, PM)

In addition, the following arterial does not meet the City of Shoreline's concurrency standard of 0.90 or lower for principal and minor arterials during the PM peak hour:

- Meridian Avenue North from North 175th Street to North 185th Street—northbound

Segment B: Shoreline to Mountlake Terrace

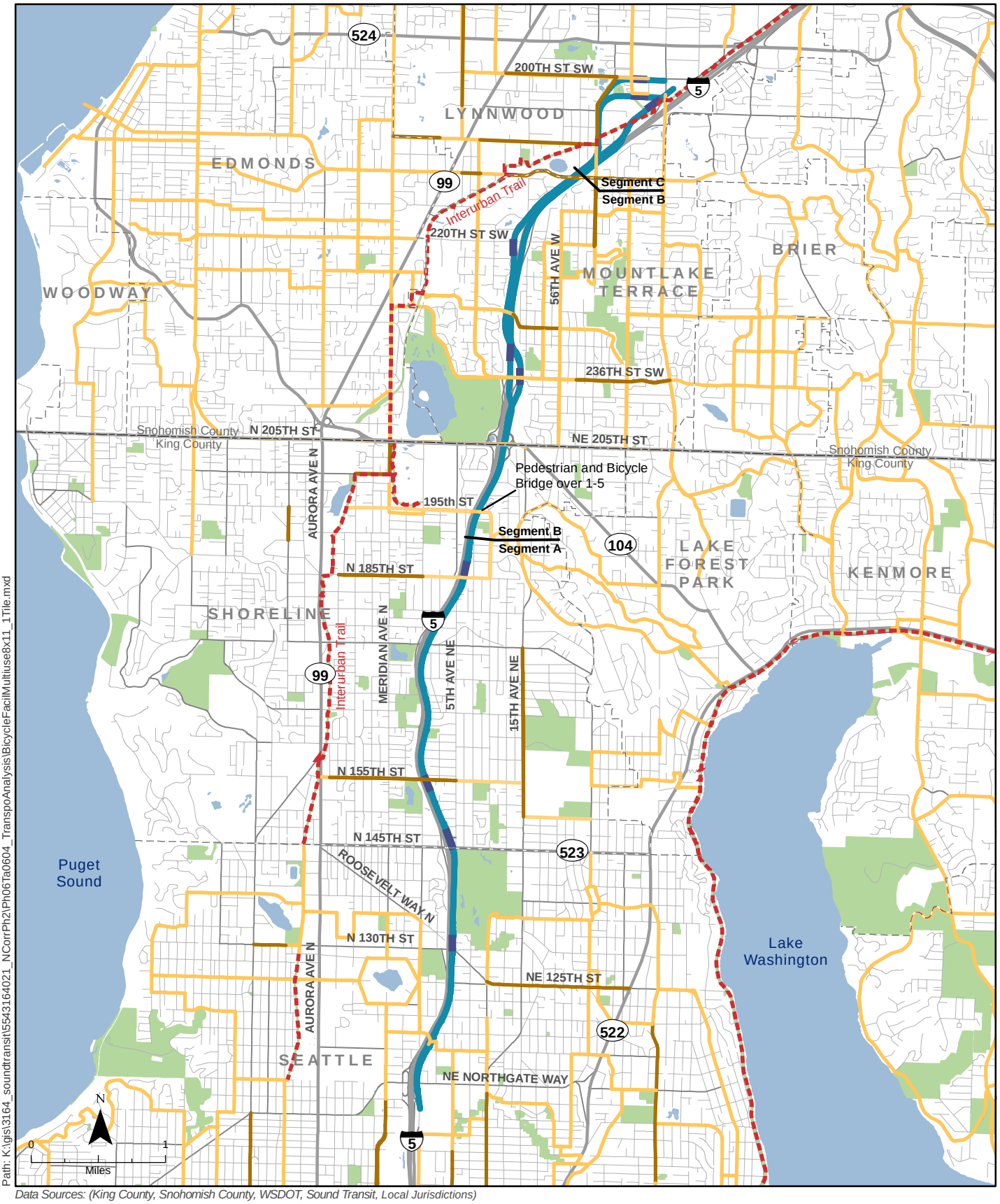
In Segment B, Sound Transit analyzed 19 intersections in Mountlake Terrace. Only one, the 236th Street SW and 56th Avenue West intersection, operates below standard during the AM peak hour.

Segment C: Mountlake Terrace to Lynnwood

In Segment C, Sound Transit analyzed 20 intersections in Lynnwood. All of these intersections currently meet LOS standards during the AM and PM peak hours.

3.1.5 Nonmotorized Facilities

The Cities of Seattle, Shoreline, Mountlake Terrace, and Lynnwood have detailed inventories of their pedestrian and bicycle facilities, which Sound Transit used, along with field visits, to define existing facilities and conditions. A general depiction of regional multi-use trails and bicycle facilities is shown in Figure 3-4, based on geographic information system (GIS) database information from King County, Snohomish County, WSDOT, and Sound Transit. A detailed inventory of pedestrian and bicycle facilities near each proposed station, including figures representing conditions near each proposed light rail station, is in the *Transportation Technical Report*.



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Data Sources: (King County, Snohomish County, WSDOT, Sound Transit, Local Jurisdictions)

- Light Rail Alternatives
- Station Location
- Roadway
- Local Street
- City Boundary
- County Boundary
- Park
- Waterbody
- Paved Regional Trail
- On Street Bike Lane
- Shared Roadway

Figure 3-4
Bicycle Facilities and Regional Multi-Use Trails

Lynnwood Link Extension

Note: This map represents general shared roadways as identified by Data Sources. It does not reflect adopted inventories and planned projects by local jurisdictions. Refer to the Transportation Technical Report for inventory of sidewalks and bicycle facilities in the vicinity of each station.

Pedestrian Facilities

The inventory of pedestrian facilities covers all arterials within 0.5 mile of each proposed station to identify missing sidewalk sections on city arterial streets.

Segment A: Seattle to Shoreline

Most primary arterials in Segment A near the NE 130th Street or NE 145th Street Stations have sidewalks or paths along one or both sides of the street; however, some locations have gaps in the sidewalk network, and others do not meet the current Americans with Disabilities Act (ADA) standards. In this segment, sidewalks are provided on most arterials within 0.5 mile of the proposed NE 145th Street, NE 155th Street, and NE 185th Street Stations, but there are some areas with gaps or with shoulders. Some intersection locations have been upgraded to current ADA standards, but most have not yet been upgraded.

Segment B: Shoreline to Mountlake Terrace

In Segment B, sidewalks exist on one or both sides of nearly all arterials within the 0.5 mile radius of the Mountlake Terrace and 220th Street SW Station. There is a pedestrian and bicycle overcrossing of I-5 at NE 195th Street. There is also a 0.25-mile segment of paved multi-use trail along NE 195th Street between 1st Avenue NE and Meridian Avenue North. In addition, a soft-surface pedestrian trail connects the existing Mountlake Terrace Park-and-Ride to the City's library through the Veterans Memorial Park. The north-south Interurban Trail is within 1 mile of the Mountlake Terrace Transit Center as well as the 220th Street SW Station area.

Segment C: Mountlake Terrace to Lynnwood

In Segment C, there are sidewalks on all of the streets in downtown Lynnwood and in the vicinity of the station alternatives. The Interurban Trail passes through Lynnwood, generally following the Snohomish County Public Utility District (PUD) power line right-of-way. A segment of this trail is on-street for a short segment on 52nd Avenue West, then along 208th Street SW between 54th Avenue West and 52nd Avenue West, and along a short segment of 52nd Avenue West between 208th Street SW and the power line corridor just north of 208th Street SW. The City of Lynnwood is currently in the predesign phase of a project to complete this missing link in the off-street trail. From 52nd Avenue West, the trail rejoins the power line corridor, then crosses over 44th Avenue SW on a pedestrian/bicycle bridge and continues adjacent to the west side of I-5.

Bicycle Facilities

The inventory for bicycle facilities or multi-use trails covers 1 mile of the proposed station locations.

Segment A: Seattle to Shoreline

In Seattle, arterials such as 1st Avenue NE, NE 117th Street, and 5th Avenue NE have wide curb lanes adjacent to sidewalks or paved shoulders. However, many of the roadways surrounding the proposed NE 130th Street and NE 145th Street Stations lack constructed bicycle facilities. There are sharrows along portions of 1st Avenue NE, Roosevelt Way NE, and NE 125th Street. In Shoreline, bicycle lanes or striped and paved shoulders exist on parts of North 155th Street, 15th Avenue NE, NE 185th Street, 10th Avenue NE, and NE Perkins Way. A planned project by the City of Shoreline will provide sharrows along 10th Avenue NE, and on NE 180th Street between 10th Avenue NE and 15th Avenue NE.

Segment B: Shoreline to Mountlake Terrace

A pedestrian and bicycle overcrossing of I-5 exists at NE 195th Street, and a paved multi-use trail runs along NE 195th Street from 1st Avenue NE to Meridian Avenue North. The Interurban Trail, a regional facility, is approximately 1 mile west of the Mountlake Terrace Transit Center and connects Lynnwood with Mountlake Terrace. There are bicycle lanes on parts of 228th Street SW and 230th Street SW, but no bicycle facilities are available on arterials in the 220th Street SW area.

Segment C: Mountlake Terrace to Lynnwood

In Segment C, bicycle lanes are available on 52nd Avenue West and Cedar Valley Road from 208th Street SW north to 200th Street SW. There is also a shared-lane bicycle facility on 200th Street SW. The Interurban Trail passes through Lynnwood generally following the Snohomish County PUD power line right-of-way, and then it becomes an on-street facility adjacent to 52nd Avenue West between 208th Street SW and the power line segments (where the City of Lynnwood has a planned trail improvement). Continuing north, the trail follows the power line, crosses over 44th Avenue SW on a pedestrian/bicycle bridge, and then continues adjacent to the west side of I-5.

The Cities of Seattle and Shoreline use a pavement marking called a "sharrow" to define streets that should be shared with bicycles.

3.1.6 Freight Mobility and Access

Freeways, arterials, and local roadways carry freight in and through the study area. The Washington State Freight and Goods Transportation System (FGTS) classifies highways, county roads, and city streets according to the average annual gross truck tonnage they carry. Classifications range from T-1, which includes roadways that carry over 10 million tons per year, to T-5, which includes roadways that carry over 20,000 tons in 60 days.

I-5 is the principal freight route (classified as T-1) through the Puget Sound region. In Segment A, most arterial streets are also identified as Major Truck Streets within the city of Seattle or Truck Routes in the city of Shoreline—all are FGTS routes. Segment B also includes arterial streets identified as Truck Routes in the city of

Shoreline, as well as Truck Routes in the city of Mountlake Terrace—all the cities' routes are in the FGTS. In Segment C, the FGTS defines freight routes and includes the major arterials in the study area.

3.1.7 Parking

Parking surveys were conducted to inventory the available on- and off-street parking within approximately 0.25 mile of the proposed station locations. Table 3-5 lists the existing unrestricted on-street and off-street parking and supply information near the proposed stations. For further detail and maps showing the area that was inventoried for each station, refer to the *Transportation Technical Report*.

Table 3-5. Existing Unrestricted On-Street and Off-Street Parking Supply and Midday Utilization by Station

	On-Street			Off-Street[a]		
Station	Supply	Utilization	Percent Utilization	Supply	Utilization	Percent Utilization
Segment A: Seattle to Shoreline						
NE 130th Street[b]	430	60	14	290	40	14
NE 145th Street	450	120	27	350	250	71
NE 155th Street	580	100	17	200	50	25
NE 185th Street	700	80	11	300	130	43
Segment B: Shoreline to Mountlake Terrace						
Mountlake Terrace Transit Center	440	70	16	990	870	88
Mountlake Terrace Freeway Station	640	50	8	990	870	88
220th Street SW	610	70	11	1300	680	52
Segment C: Mountlake Terrace to Lynnwood						
Lynnwood Park-and-Ride	0	0	Not applicable	3020	2050	68
Lynnwood Transit Center	10	10	100	3720	2410	65
200th Street SW Station	90	40	44	4420	2510	57

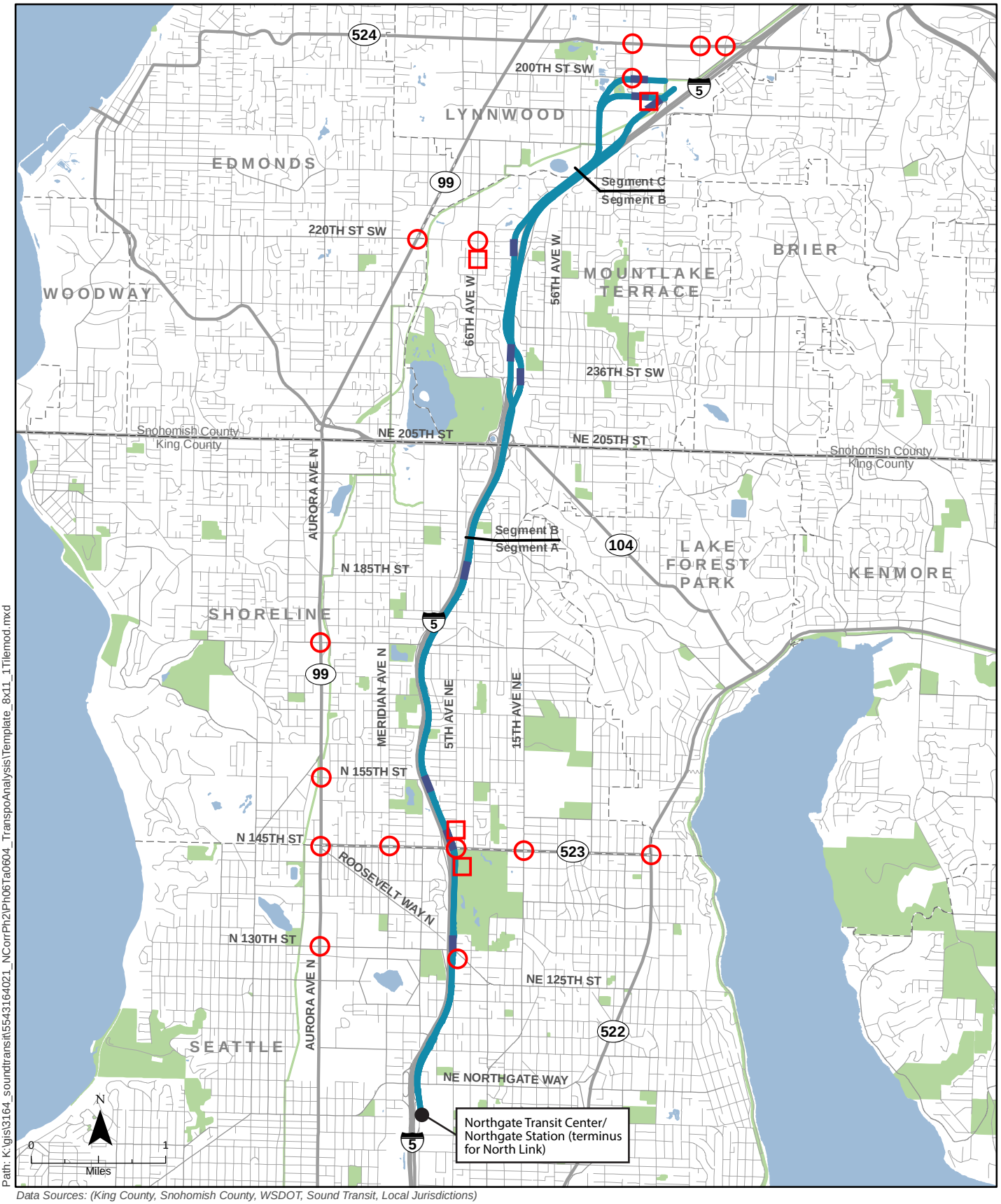
Note: Data were collected in May 2012 on all roads within 0.25-mile radius of the stations. Utilization was counted between 9 am and 11 am and between 1 pm and 4 pm.

[a] Off-street parking supply and utilization includes parking on private property.

[b] On-street parking supply in the NE 130th Street Station area includes 400 unrestricted parking spaces and 30 time-restricted spaces.

3.1.8 Safety

To describe safety conditions in the study area and to identify locations with higher rates of accidents, Sound Transit collected accident data from local jurisdictions and WSDOT for the intersections and roadway segments identified for operational analysis. Figure 3-5 shows the areas of concern the analysis identified. These locations are concentrated around the following areas: 196th Street SW, 220th Street SW, Aurora Avenue North, North/NE 145th Street, and North/NE 130th Street. Details of the full analysis are in the *Transportation Technical Report*.



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Data Sources: (King County, Snohomish County, WSDOT, Sound Transit, Local Jurisdictions)

Legend

High Accident Locations

- Signalized locations with greater than 10 collisions per year and/or 1.0 accidents per million entering vehicles (MEV)
- Unsignalized locations with greater than 5 collisions per year and/or 1.0 accidents per million entering vehicles (MEV)

Figure 3-5
Existing High Accident Locations in Study Area

Lynnwood Link Extension

3.2 Long-Term Impacts

3.2.1 Regional Travel

Miles Driven and Hours Spent in Travel

By 2035, ridership on the light rail alternatives would help reduce automobile travel in the region by more than 300,000 miles per day, compared to the No Build Alternative, and about 30,000 fewer hours per day would be spent traveling by automobile. A significant portion of this reduction is expected to occur within the project corridor as new riders shift from automobile to transit. Table 3-6 shows the systemwide vehicle miles of travel (VMT) and vehicle hours of travel (VHT) in the Puget Sound region for the No Build Alternative and light rail alternatives in forecast year 2035.

Table 3-6. Daily Vehicle Miles of Travel and Vehicle Hours of Travel in the Puget Sound Region for Forecast Year 2035

Alternative	VMT	VHT
No Build Alternative	98,870,000	3,080,000
Light Rail Alternatives	98,550,000 – 98,560,000	3,050,000

Vehicles Traveling through the Corridor

During the AM and PM peak hours, the improved transit service provided by the light rail alternatives would attract more trips to transit, and hence slightly reduce vehicle volumes and congestion in the corridor. Table 3-7 shows year 2035 peak hour vehicle volumes and peak hour v/c ratios at north-south screenlines crossing the project corridor. This reflects, in part, the additional HOV lane capacity made available for other vehicles with the truncation of bus routes that currently operate in the I-5 HOV lanes. Daily vehicle volumes and v/c ratios for these north-south screenlines and an additional east-west screenline are also provided in the *Transportation Technical Report*.

Table 3-7. Screenline Volumes and Volume-to-Capacity Ratios

	2035 No Build Alternative				2035 Light Rail Alternative			
	AM Peak Hour V/C[a]		PM Peak Hour V/C[a]		AM Peak Hour V/C[a]		PM Peak Hour V/C[a]	
Screenline Location	NB	SB	NB	SB	NB	SB	NB	SB
North of Northgate Way NE	0.46	1.04	1.12	0.71	0.44	1.00	1.07	0.69
	(8,700)	(19,400)	(20,900)	(13,200)	(8,200)	(18,800)	(20,000)	(12,800)
South of North 205th Street	0.42	1.00	0.97	0.72	0.40	0.97	0.93	0.71
	(7,100)	(15,000)	(16,500)	(10,900)	(6,700)	(14,600)	(15,800)	(10,500)
South of 196th Street SW	0.49	1.01	1.07	0.72	0.48	0.99	1.05	0.71
	(5,800)	(11,800)	(12,600)	(8,500)	(5,700)	(11,500)	(12,400)	(8,300)

[a] Peak hour traffic volumes shown in parentheses ( ).

V/C = volume-to-capacity ratio, NB = northbound, SB = southbound

People Traveling through the Corridor

Compared to the No Build Alternative, the light rail alternatives would allow the project corridor to carry more people (person throughput) during the peak periods, as measured by screenlines across the corridor.[1] The PM peak (northbound) direction would have the largest increase (Table 3-8) in total trips by all modes on I-5, SR 99, and other north-south arterials. The total person throughput in both directions would increase by approximately 1.5 percent north of Northgate Way and by 5 percent south of North 205th Street. On I-5 only, up to a 10 percent increase in person throughput is expected with the light rail alternatives, increasing from approximately 69,000 to 76,000 north of Northgate Way.

Table 3-8. Person Throughput—PM Peak Period for Forecast Year 2035

Screenline Location	Alternative	Northbound	Southbound	Total
North of Northgate Way NE	No Build Alternative	87,000	49,000	136,000
	Light Rail Alternatives	89,000	49,000	138,000
South of North 205th Street	No Build Alternative	67,000	39,000	106,000
	Light Rail Alternatives	70,000	41,000	111,000

Sources: Sound Transit Ridership Model and Lynnwood Link Extension Highway Model (2012).

3.2.2 Transit

Regional Transit

Transit use from Snohomish County to King County would increase by as much as 55 percent with the light rail alternatives compared to the No Build Alternative. There would be direct light rail service from Lynnwood to Northgate, the University District, Capitol Hill, downtown Seattle, south of downtown Seattle, the Rainier Valley, and Sea-Tac Airport. Light rail connections would also be provided to Bellevue, Bel-Red, and Overlake. In addition, light rail in the I-5 corridor would substantially improve transit service reliability to LOS A compared to LOS C or worse with the No Build Alternative. The frequency of transit throughout the day would also improve because light rail would operate with midday headways of 5 to 10 minutes, compared to midday headways of 15 minutes on the most frequent bus routes. Light rail would also provide service for more hours of the day and to more destinations, such as Shoreline and the Mountlake Terrace Transit Center.

Transit Facility and Service Characteristics

With the light rail alternatives, a number of transit facility improvements would be implemented, including new light rail stations and new or expanded park-and-ride and bus layover facilities at some of the stations. Proposed park-and-ride facilities are

[1] Lynnwood Link Extension Highway Model is based on the version of the Puget Sound Regional Council (PSRC) regional model used for major WSDOT projects (e.g., SR 520 Bridge Replacement and HOV Project Final EIS).

discussed in Section 3.2.7. Other bus facility improvements are identified in the *Transportation Technical Report*.

Before the project would begin operation, Sound Transit would work with the other transit providers in the project area to revise service plans to avoid duplicating service and provide improved or new connections to the Lynnwood Link Extension. However, to evaluate the effects of potential service changes for the EIS, Sound Transit worked with King County Metro, Community Transit, and Sound Transit Express to outline conceptual bus operations plans that could be used to serve the Lynnwood Link Extension stations. Detailed service planning would be conducted before the system opens to the public, and any changes to service would go through a public comment process before each agency would proceed with service changes. The conceptual bus operations plans developed by the transit providers have low and high service scenarios, covering a range of potential future revenue scenarios the providers might experience. The low service scenarios were assumed for the ridership forecasting effort to avoid over-predicting the number of people taking buses to the station, while the higher service scenarios were used to size the bus facilities at each station to conservatively establish the levels of space that would be needed. More details on these plans are provided in the *Transportation Technical Report* and the *Ridership Forecasting Technical Report*.

Ridership

From 60,000 to 70,000 daily trips would be made on the Lynnwood Link Extension in 2035 (the total of all three segments with any combination of alternatives), which would be more than double the bus ridership in the No Build Alternative. Table 3-9 shows daily trips in the project corridor for buses in 2011 compared with buses (the No Build Alternative) and light rail alternatives in 2035. Total daily trips (ridership) account for riders on the Lynnwood Link Extension, regardless of where they board the train. The forecasts for the light rail alternatives assume there would be no bus service on I-5 north of Northgate because light rail would replace I-5 routes serving areas between Northgate and Lynnwood, and I-5 routes north of Lynnwood would feed to the Lynnwood Transit Center station.

Table 3-9. Daily Corridor Ridership in Base Year (2011) and Forecast Year (2035)

	Bus Trips		Light Rail Project Trips
Bus Route/Light Rail Ridership (measured by individual trips)	**Base Year (2011)**	**No Build Alternative (2035)**	**Light Rail Alternatives (2035)**
I-5 Bus Routes North of Northgate	19,400	33,800	---
Daily Light Rail Riders	---	---	60,000 to 70,000

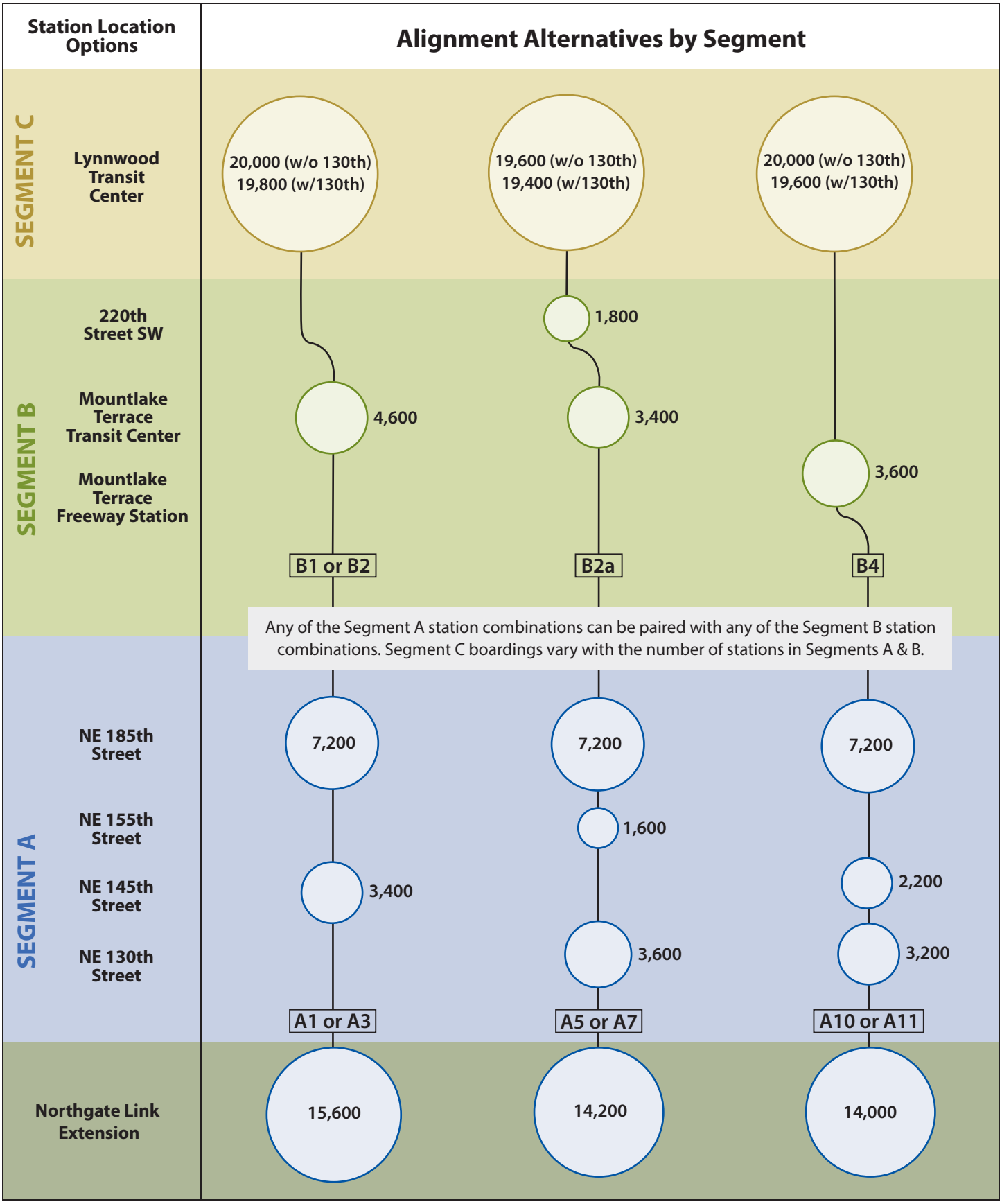
Source: Sound Transit Ridership Model.

Figure 3-6 shows the average weekday boardings in 2035 by station under different segment alternative combinations, including at the Northgate Station (which would already be in place under all alternatives) to show how boardings at stations to the north would affect boardings at Northgate. These boardings show only the trips starting at each Lynnwood Link Extension station, while the total trips shown in Table 3-9 count all trips to or from any station for the project. Figure 3-6 shows how the number of boardings at several of the stations would vary depending on the combination of segment alternatives and how many total stations would be in place. All Segment A alternatives can be paired with all Segment B and C alternatives, resulting in nine combinations of stations across all segments.

There would not be big differences in ridership among the alternatives, but there would be some minor ridership trade-offs among the different station combinations that are possible with the light rail alternatives:

- Adding the 220th Street SW Station to the project route would reduce daily boardings at the Lynnwood Transit Center Station by 400, while adding the NE 130th Street Station would reduce boardings by 200. Part of the reason for this net loss at the Lynnwood, compared to a project with four stations, is that adding the stations would increase travel time for the light rail trip, which would be less attractive for riders to and from Lynnwood. In addition, approximately 200 of the forecasted boardings at 220th Street SW would shift from Lynnwood.
- Adding a station at 220th Street SW (for a total of five station in the project) would increase net corridor ridership by 200 daily boardings because it would improve access at a new location, attracting new riders. Some Lynnwood and Mountlake Terrace station boardings would move to the 220th Street SW Station.
- Moving the Mountlake Terrace Transit Center Station into the freeway median would reduce daily boardings by 1,000 at the station and for the corridor as well due to increased walking distance to the station platform.
- Adding a third Segment A station would result in a net increase of 400 daily boardings in the segment. Some Northgate Station boardings would move to stations farther north in the segment.
- For the alternatives with three stations in Segment A, moving the station from NE 145th Street to NE 155th Street would reduce daily boardings by 200 for the segment, but would increase the Northgate Station boardings by 200.

The difference in boardings between alternatives is influenced by a combination of factors. These factors include the density of population and employment near stations, the amount of parking available at stations, local bus service connections at stations, and distance between stations.



x,xxx Daily Station Boardings
(Size of circle represents relative magnitude)

Figure 3-6
2035 Daily Boardings

Lynnwood Link Extension

Transit Travel Times

Travel times to all regional destinations would be shorter with the light rail alternatives, compared to the No Build Alternative. Tables 3-10 and 3-11 show estimated peak period transit travel times in forecast year 2035 between Shoreline and Lynnwood and regional destinations for the AM and PM peak periods for the No Build Alternative and light rail alternatives. Travel times under the No Build Alternative are expected to increase compared to existing conditions, which would have increased congestion. Travel time ranges are shown for the project alternatives with four, five, and six stations. The low end of the range represents travel times for the alternatives with fewer stations, and the higher end represents the alternatives with the most stations.

Table 3-10. Transit Travel Times from Shoreline and Lynnwood—AM Peak Period Southbound (minutes) for Forecast Year 2035

	From Shoreline		From Lynnwood	
Destination	No Build Alternative	Light Rail Alternatives	No Build Alternative	Light Rail Alternatives
Northgate	10	3-4	26	14-16
University of Washington	22	11-12	38	22-24
Capitol Hill	26	14-15	42	25-27
Downtown Seattle	22	16-17	43	27-29
Sea-Tac Airport	63	51-52	79	62-64
Downtown Bellevue	53	41-42	55	52-54
Overlake	63	51-52	79	62-64

Note: The No Build Alternative transit travel times include estimated transfer times where relevant. Actual total transit travel times would vary based on how people access transit, as well as their wait times.

Sources: King County Metro Trip Planner (http://metro.kingcounty.gov/) modified to reflect expected future traffic congestion; Lynnwood Link Extension Project Highway Model, light rail travel time estimates.

Table 3-11. Transit Travel Times to Shoreline and Lynnwood—PM Peak Period Northbound (minutes) for Forecast Year 2035

	To Shoreline		To Lynnwood	
Destination	No Build Alternative	Light Rail Alternatives	No Build Alternative	Light Rail Alternatives
Northgate	10	3-4	24	14-16
University of Washington	22	11-12	36	22-24
Capitol Hill	26	14-15	40	25-27
Downtown Seattle	26	16-17	42	27-29
Sea-Tac Airport	63	51-52	77	62-64
Downtown Bellevue	53	41-42	64	52-54
Overlake	63	51-52	77	62-64

Note: The No Build Alternative transit travel times include estimated transfer times where relevant. Actual total transit travel times would vary based on how people access transit, as well as their wait times.
Sources: King County Metro Trip Planner, http://metro.kingcounty.gov/, Lynnwood Link Extension Project Highway Model, light rail travel time estimates.

Transfers

When transit riders need to transfer to make a trip, they may see the transit system as being too complex and their travel times can feel longer or more unpredictable. As a result, they may choose not to use transit for the trip. However, the quality of transfers, whether between buses or between bus and rail, has a dramatic impact on how a rider views a transfer. Some of the factors that riders find important are the distances between the transfer points, wait time, waiting area conditions, reliability, safety and security, and availability of real-time arrival information.

Overall, future transfer rates with the light rail alternatives would be slightly lower than the No Build Alternative. There would be fewer transfers because the Lynnwood Link Extension would connect with the Northgate Link Extension (under construction) and provide a no-transfer, one-seat transit trip between more destinations, including Shoreline/Lynnwood and the University District or downtown Seattle. Transfers may be required to travel to destinations to the east, including downtown Bellevue and Overlake. Also, transfers in some parts of the regional system could increase as more riders use light rail for a part of their trip because it could reduce their overall travel times.

Transit Level of Service

Sound Transit analyzed transit service performance by using the *Transit Capacity and Quality of Service Manual*, 2nd Edition, Part 3, which is a nationally recognized resource for the measurement of transit capacity and quality of service (TRB 2003).

Service Frequency

When transit service is frequent, riders typically have shorter wait times before they board, and this translates into a high level of transit service. Bus routes that have headways of less than 10 minutes are considered ideal, while headways above 60 minutes are undesirable.

The light rail alternatives would provide headways under 10 minutes for service connecting North Seattle, Shoreline, Mountlake Terrace Transit Center, and Lynnwood Transit Center to downtown Seattle, eastside communities, and south King County, which would markedly improve service to these locations compared with the No Build Alternative. Also, travel times would improve between these station areas and other light rail stations, such as Sea-Tac Airport, Capitol Hill, and the University District.

Hours of Service

Hours of service is another measure of transit service quality. The longer that transit service is provided throughout a 24-hour period, the more available it is to riders, resulting in better levels of service. Service that covers 19 or more hours in a day is optimal, and service of less than 3 hours a day is undesirable.

The light rail alternatives would provide more than 19 hours of service daily for North Seattle, Shoreline, Mountlake Terrace Transit Center, and Lynnwood Transit Center, giving them higher level of service ratings compared to the No Build Alternative. The station at 220th Street SW (Alternative B2A) would also improve service levels at that location.

Passenger Load

To measure passenger comfort and how easily a rider can find a seat, transit operators can calculate the passenger load. When the load exceeds the number of seats or available standing space, transit is overcrowded and offers a poor level of service (LOS E or F) for the passenger load; therefore, the service provider may need to increase service frequency. Lighter loads with readily available seats or ample standing room are given high ratings (LOS A or B).

With the light rail alternatives, the passenger loads on buses and light rail would improve compared to the No Build Alternative. Table 3-12 shows the passenger load LOS ratings for transit on I-5, SR 99, and other north-south facilities at the three screenlines during the weekday evening peak period. With the No Build Alternative, the passenger load LOS for bus routes is expected to be at LOS E or F, while the light rail alternatives would improve conditions to A in most locations.

Table 3-12. PM Peak Hour Passenger Load Level of Service in Forecast Year 2035

		No Build Alternative	Light Rail Alternatives	
Screenline Location	**Direction**	**Bus**	**Bus**	**Light Rail**
North of NE Northgate Way	Northbound	E	A	C
	Southbound	F	A	A
South of North 205th Street	Northbound	E	A	A
	Southbound	F	A	A
North of 212th Street SW	Northbound	E	A	A
	Southbound	E	B	A

Source: Sound Transit Ridership Model, 2011.

Reliability and On-time Performance

Under the No Build Alternative, bus service would be less reliable than today as traffic congestion grows on freeways and arterials in the corridor (see Section 3.2.3). Forecasts show future speeds will decrease along I-5 as congestion increases. Buses would be less reliable and would often arrive close together (bunched) rather than at scheduled times and intervals. In contrast, light rail would operate very reliably within the corridor because it would operate entirely outside of traffic in the corridor, although delays elsewhere in the system could still affect occasional trips.

Local and Sub-regional Transit

With the light rail projects, Sound Transit would work with King County Metro and Community Transit to consider local or regional service revisions integrated with light rail service. A large number of light rail riders would access the system via local and/or sub-regional bus service. General traffic congestion in the vicinity of light rail stations could cause delays for local or sub-regional bus services.

3.2.3 Freeway Operations

Freeway operations for the No Build and light rail alternatives were evaluated in detail using traffic simulation software for I-5 between NE 130th Street and NE 145th Street, where ramp modifications are proposed with the light rail alternatives. This level of analysis was not conducted elsewhere in the study corridor where changes to the freeway system were not proposed. Freeway traffic volumes for 2035 used for this analysis were estimated using growth rates derived from the Lynnwood Link Extension Travel Demand Model. Additional discussion, including traffic volume forecasts and traffic operations analysis results, is in the *Transportation Technical Report*.

No Build Alternative

By 2035, freeway operations would worsen over today's already congested conditions. I-5 traffic volumes between the NE 130th Street interchange and the NE 145th Street interchange are expected to increase by approximately 4 percent over existing conditions except for the off-peak, northbound direction in the AM peak hour, which would increase by approximately 12 percent over existing conditions. These forecasts reflect higher growth in the northbound direction during the AM peak hour because this section of I-5 is currently not operating at full capacity.

During the AM peak hour, average speeds along southbound I-5 would be approximately 25 mph and the freeway would operate at LOS F. These very congested conditions would continue to be caused by high volumes of merging and diverging traffic at NE 130th Street and NE 145th Street as well as congested downstream conditions. In the northbound (off-peak) direction, I-5 would continue to be relatively uncongested with average speeds ranging from 51 mph to 56 mph and would operate at LOS C.

During the PM peak hour, average northbound peak period speeds would range from approximately 15 mph south of the NE 130th Street off-ramp to approximately 50 mph north of this interchange. I-5 would continue to operate under very congested conditions (LOS E and F) with high volumes of merging and diverging traffic at both NE 130th Street and NE 145th Street. Some of the northbound speeds would increase from existing operations in certain sections due to bottlenecks along I-5, which effectively meter traffic that can pass through so that

once through the bottleneck, traffic speeds up. This would likely occur in the northbound direction due to the bottleneck caused by the northbound NE 130th Street off-ramp that intersects 5th Avenue NE as a stop-controlled approach; traffic stopped at this approach could spill back onto I-5 during peak congested conditions.

In the southbound (off-peak) direction, speeds on I-5 would range from approximately 30 mph to 60 mph. I-5 would operate relatively well (LOS C) except for the area approaching NE 145th Street, where high southbound off-ramp volumes would cause delays and queues that extend onto the freeway mainline. These delays and queues are compounded by the high eastbound left-turn volumes from NE 145th Street onto northbound 5th Avenue NE, which would likely cause spillbacks on NE 145th Street to the intersection with the southbound off-ramp. Similar to typical existing operations, I-5 traffic south of the NE 130th Street interchange, beginning near the Northgate interchange, would slow down in the PM peak hour.

Finally, HOV lane performance is also expected to degrade, particularly in the peak direction, which would affect reliability and travel times for buses.

Light Rail Alternatives

While systemwide VMT and VHT in the Puget Sound region may decrease with the light rail alternatives (as described in Section 3.2.1), peak hour volumes along the I-5 mainline and ramps would be similar to the No Build Alternative. Traffic traveling to and from the proposed park-and-ride lots would come primarily from the local street system and would not create noticeable increases in I-5 volumes or affect AM peak hour freeway speeds and LOS.

Some minor slowdowns could occur along southbound I-5 approaching the NE 145th Street off-ramp. Increased local street traffic would cause additional delay for vehicles using the southbound off-ramp and on-ramp at NE 145th Street, both for alternatives with and without a station. However, delays would be higher for alternatives with a NE 145th Street Station (Alternatives A1, A3, A10, and A11). Speeds and LOS on the I-5 mainline and ramps in the northbound direction would remain similar with or without the proposed light rail alternatives.

During the PM peak hour, the three at-grade alternatives (Alternatives A1, A5, and A10) would provide improved freeway operations along northbound I-5 due to the reconfiguration of the northbound NE 130th Street off-ramp. The speeds just south of the ramp would improve by approximately 5 mph. Although the freeway level of service would remain at LOS F, the traffic density would improve under these alternatives. However, speeds north of this off-ramp may decrease because more traffic would be able to get through the improved configuration at the NE 130th Street off-ramp; this increased volume could add to congestion near the NE 145th Street off-ramp. Alternatives A7 and A11, with a station at NE 130th Street but without the

updated off-ramp reconfiguration, would experience slightly slower speeds on I-5 south of the NE 130th Street off-ramp.

In the southbound direction, speeds on I-5 could decrease, and freeway densities could increase under alternatives with a NE 145th Street Station (Alternatives A1, A3, A10, and A11). This speed reduction could occur because the increased local street traffic using the park-and-ride would cause increased delay on the arterials within the interchange system, including at the intersection of NE 145th Street and the I-5 southbound off-ramp. This delay would affect the ability of the southbound NE 145th Street off-ramp to accommodate the demand, potentially causing spillbacks to I-5. This increased delay on the arterials, however, is not anticipated to change the operations of the northbound I-5 ramps at NE 145th Street. Despite the potential reduction in speed, the southbound freeway LOS, which is estimated to be LOS F under the No Build Alternative, would not worsen as a result of the light rail alternatives. However, the travel time along southbound I-5 from north of NE 145th Street to the Northgate interchange could potentially experience a minimal increase of less than a minute. In addition, the project would be likely to reduce the number of buses in the I-5 HOV lanes, which would create additional HOV capacity and improve HOV operations and speeds compared with the No Build Alternative. The benefits to the HOV lane would be similar for all alternatives.

3.2.4 Arterials and Local Streets

This subsection describes the effects of the No Build Alternative and Lynnwood Link Extension light rail alternatives on arterial and local street operations. The project's potential effects on traffic volumes, intersection LOS, and property access and circulation are also discussed. A detailed discussion of impact analysis assumptions and results is presented in the *Transportation Technical Report*.

Traffic Forecasts and Station Trips

To evaluate the impacts of the No Build Alternative and light rail alternatives on arterials and local streets, Sound Transit forecasted traffic conditions in 2035 to determine the number of vehicles on local roadways with or without the project. Forecast year 2035 traffic volumes were developed using the Lynnwood Link Extension Travel Demand Model, which reflects PSRC's current population and land use forecasts. Growth projections from the travel demand model were augmented with traffic forecast data provided by the Cities of Shoreline and Lynnwood.

Overall, by 2035, peak hour traffic volumes for the No Build Alternative are predicted to increase by an average 0.6 percent to as high as 1.3 percent per year. The Lynnwood Link Extension could increase trips to station areas, but at the same time it could reduce automobile trips in other parts of the study area as people shift from private automobiles to light rail.

For the light rail alternatives, Sound Transit predicted the number of trips that would be generated by each station, including automobile trips to and from the park-and-ride facilities, passenger drop-off/pick-up trips, and new bus trips. Park-and-ride spaces would be provided at all stations except at the NE 130th Street Station with Alternative A10. The traffic analysis assumes all park-and-rides would be full. The predicted trip rates to the stations are consistent with survey data from Central Link stations as well as national sources. The Sound Transit Ridership Model also predicted which mode people were likely to use to access each station.

In general, the most trips would be at stations with the highest number of new park-and-ride spaces. These include the NE 145th Street, NE 155th Street, NE 185th Street, and Lynnwood Transit Center stations. The Lynnwood Transit Center Station options had the highest number of trips. This station would be the northern terminus of the project, with the highest overall number of park-and-ride spaces and the most light rail patrons.

Traffic Operations

The traffic operations analysis compares the No Build Alternative and light rail alternatives in forecast year 2035 in the study area. The analysis locations were selected in coordination with local jurisdictions and include intersections in areas most likely to experience changes in traffic. These changes would likely be due to a change in channelization, access or signal control, or increased traffic to light rail stations. The light rail stations that would have new or larger park-and-rides or anticipated passenger pick-up and drop-off activity would be most likely to increase traffic.

The analysis found most intersections would operate at an LOS similar to that of the No Build Alternative. Some intersections around each station may degrade below the jurisdiction's LOS standard if not effectively mitigated. The impact would be caused by traffic to and from park-and-ride facilities and by passenger drop-off/pick-up activity. Figures 3-7a, 3-7b, 3-8a, and 3-8b summarize the PM and AM peak hour LOS analysis results for the No Build Alternative (in forecast year 2035), and indicate where the light rail alternatives would cause LOS to degrade below standards. Locations where LOS is expected to operate below standards in 2035 are indicated in the following subsections and are further described in the *Transportation Technical Report*.

Segment A: Seattle to Shoreline

Tables 3-13 and 3-14 list the locations in Segment A that would operate below LOS standards in forecast year 2035 with the No Build Alternative and/or light rail alternatives during the PM and AM peak hours, respectively. As shown in Table 3-13, 15 of the 31 intersections evaluated in Segment A would operate below LOS standards with the No Build Alternative during the PM peak hour. An additional eight intersections would degrade below LOS standards during the PM peak hour with at least one of the light rail alternatives. For the AM peak hour (Table 3-14), only two intersections would operate below LOS standards with the No Build Alternative. Two additional intersections would degrade below LOS standards during the AM peak hour with at least one of the light rail alternatives.

Table 3-13. Segment A Intersections not Meeting LOS Standards for Forecast Year 2035 During PM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative						
		No Build	A1	A3	A5	A7	A10	A11
NE 130th Street Station					**Opt. 1**	**Opt. 2**	**Opt. 1 (no Park-and-Ride)**	**Opt. 2**
North 130th Street and Aurora Avenue North	D	E	-	-	E[a]	E[a]	E[a]	E[a]
5th Avenue NE and I-5 Northbound Off-ramp	D	F	-	-	-	**F**	-	**F**
NE 125th Street and 15th Avenue NE	D	E	-	-	E[a]	E[a]	E[a]	E[a]
NE 145th/NE 155th Street Stations			**Opt. 1**	**Opt. 2**	**155th**	**155th**	**Opt. 1 (650-space Park-and-Ride)**	**Opt. 2**
North 145th Street and Aurora Avenue North	D	E	E[a]	E[a]	-	-	E[a]	E[a]
NE 145th Street and 5th Avenue NE	E	E	**F**	**F**	-	-	**F**	**F**
5th Avenue NE and I-5 Northbound Off-ramp	D	F	**F**	**F**	-	-	**F**	**F**
NE 145th Street and 6th Avenue NE	E	E	-	**F**	-	-	**F**	**F**
NE 145th Street and 12th Avenue NE	E	F	**F**	**F**	-	-	**F**	**F**
NE 145th Street and Lake City Way NE	D	F	F[a]	F[a]	-	-	F[a]	F[a]
North 155th Street and Aurora Avenue North	D	D	-	-	**E**	**E**	-	-
North 155th Street and Meridian Avenue North	D	D	-	-	**E**	**E**	-	-
North 155th Street and 1st Avenue NE	D	E	-	-	**F**	**F**	-	-
NE 155th Street and 8th Avenue NE	D	F	-	-	**F**	**F**	-	-
NE 155th Street and 15th Avenue NE	D	E	-	-	E[a]	E[a]	-	-
NE 165th Street and 5th Avenue NE	D	E	-	-	**F**	**F**	-	-
NE 185th Street Station			**Opt. 1**	**Opt. 2**	**Opt. 3**	**Opt. 2**	**Opt. 3**	**Opt. 2**
North 185th Street and SR 99	D	E	E[a]	E[a]	E[a]	E[a]	E[a]	E[a]
North 185th Street and Meridian Avenue North	D	F	**F**	**F**	**F**	**F**	**F**	**F**
NE 185th Street and 2nd Avenue NE	D	D	**F**	**F**	**F**	**F**	**F**	**F**

Table 3-13. Segment A Intersections not Meeting LOS Standards for Forecast Year 2035 During PM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative						
		No Build	A1	A3	A5	A7	A10	A11
NE 185th Street and 5th Avenue NE (north)	D	D	C[b]	C[b]	**E**	C[b]	**E**	C[b]
NE 185th Street and 5th Avenue NE (south)	D	F	D[b]	D[b]	**F**	D[b]	**F**	D[b]
NE 185th Street and 8th Avenue NE	D	D	-	**F**	**E**	**F**	**E**	**F**
NE 185th Street and 10th Avenue NE	D	C	-	-	**E**	-	**E**	-
North 175th Street and Meridian Avenue North	D	E	E[a]	E[a]	E[a]	E[a]	E[a]	E[a]

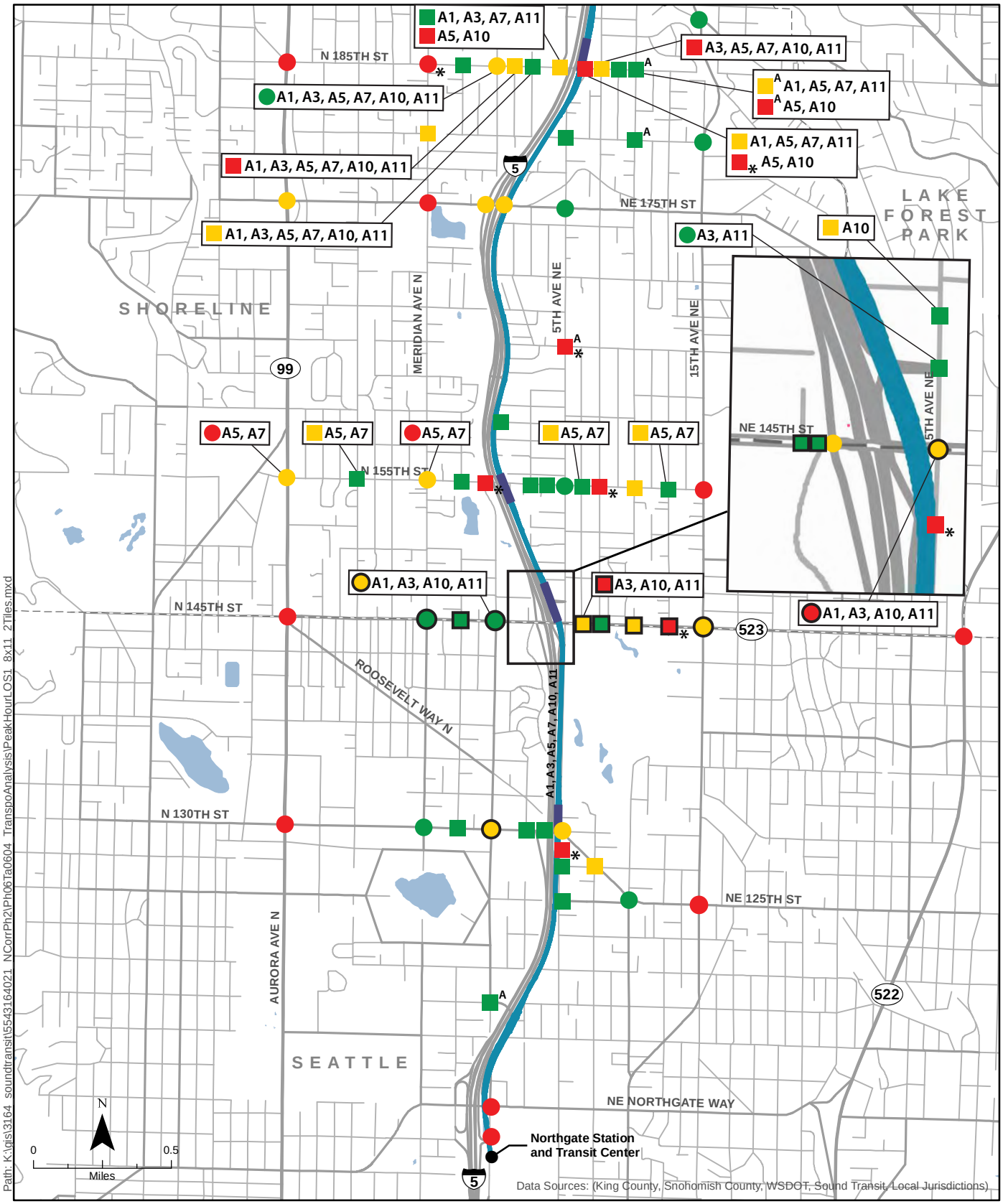
Notes:
LOS results highlighted in **BOLD** indicate intersection locations where LOS with the specified light rail alternatives, compared with the No Build Alternative, would degrade to levels that do not meet the jurisdiction's LOS standard and may require mitigation (see Section 3.6.4).
– Intersection LOS would not degrade below the LOS standard due to the specified alternative.
Opt. = Option
[a] – Intersection would operate below LOS standard but with similar delay as the No Build Alternative.
[b] – Intersection improvements were assumed to be in place with the specified alternative.

Table 3-14. Segment A Intersections not Meeting LOS Standards for Forecast Year 2035 During AM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative						
		No Build	A1	A3	A5	A7	A10	A11
NE 130th Street Station					**Opt. 1**	**Opt. 2**	**Opt. 1 (no Park-and-Ride)**	**Opt. 2**
5th Avenue NE and I-5 Northbound Off-ramp	D	F	-	-	-	**F**	-	**F**
NE 145th/NE 155th Street Stations			**Opt. 1**	**Opt. 2**	**155th**	**155th**	**Opt. 1 (650 Park-and-Ride)**	**Opt. 2**
NE 145th Street and 5th Avenue NE	E	E	-	-	-	-	**F**	-
5th Avenue NE and I-5 Northbound Off-ramp	D	F	**F**	**F**	-	-	**F**	**F**
NE 185th Street Station			**Opt. 1**	**Opt. 2**	**Opt. 3**	**Opt. 2**	**Opt. 3**	**Opt. 2**
North 185th Street and Meridian Avenue North	D	D	**E**	**E**	-	**E**	-	**E**

Notes:
LOS results highlighted in **BOLD** indicate intersection locations where LOS with the specified light rail alternatives, compared with the No Build Alternative, would degrade to levels that do not meet the jurisdiction's LOS standard and may require mitigation (see Section 3.6.4).
– Intersection LOS would not degrade below the LOS standard due to the specified alternative.
Opt. = Option

In the NE 145th Street Station vicinity, Sound Transit conducted further traffic analysis to evaluate the relationship between I-5 operations and local street operations. In 2035, the northbound left turn from 5th Avenue NE onto the I-5 northbound on-ramp would have operating problems with some movements. As summarized in Figures 3-7a and 3-8a, this intersection overall would operate within the LOS standard in 2035 during both the AM and PM peak hours, but the northbound left-turn movement would operate at LOS E with the No Build Alternative and LOS F with the NE 145th Street Station Option 1 during the AM peak hour. Queues from this intersection would also spill back to NE 145th Street and affect operations at the intersection of NE 145th Street and 5th Avenue NE, and at the NE 145th Street and I-5 southbound off-ramp. A similar effect would be expected during the PM peak hour.



Path: K:\gis\3164_soundtransit\5543164021_NCorrPh2\Ph06Ta0604_TranspoAnalysis\PeakHourLOS1_8x11_2Tiles.mxd

Legend

Light Rail Alternatives

Intersection Type

- Signalized
- Two-Way Stop Controlled
- A All-Way Stop Controlled

Intersection Level of Service

Seattle, Shoreline & WSDOT HSS[1]	WSDOT non-HSS[1]
A-C	A-D
D	E
E-F	F

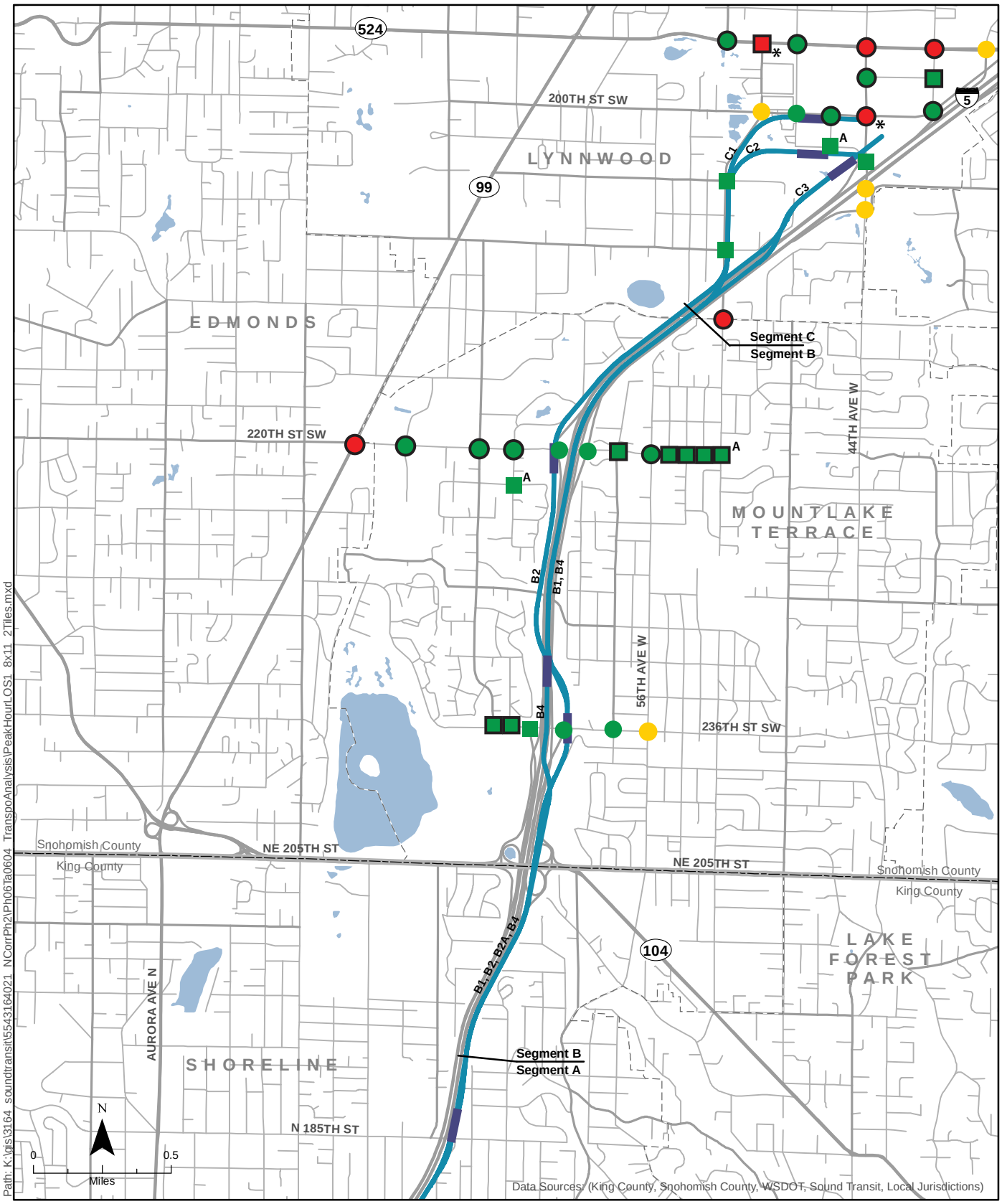
[1]HSS = Highways of Statewide Significance

Project LOS (If different from No Build) — No Build LOS

Alt(s)

* Intersection exceeds agency LOS standard with No Build Alternative and Project Alternative(s) increase delay. May require mitigation.

Figure 3-7a.
Segment A
Seattle to Shoreline
2035 PM Peak Hour
Intersection LOS



Legend

Light Rail Alternatives

Intersection Type

- Signalized
- Two-Way Stop Controlled
- A All-Way Stop Controlled

Intersection Level of Service

Seattle, Shoreline & WSDOT HSS[1]	WSDOT non-HSS[1]
A-C	A-D
D	E
E-F	F

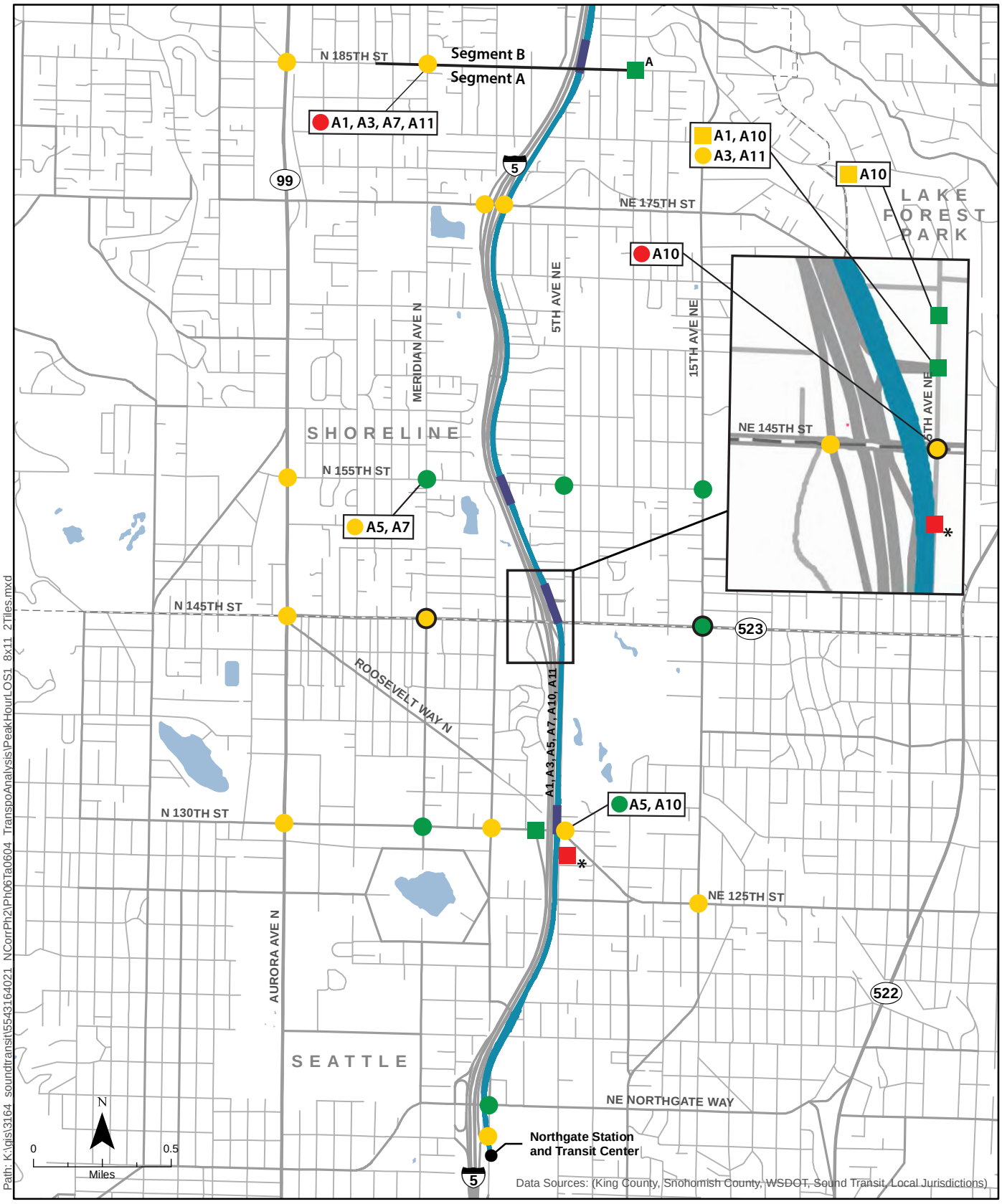
[1]HSS = Highways of Statewide Significance

Project LOS (If different from No Build) — Alt(s)

No Build LOS

* Intersection exceeds agency LOS standard with No Build Alternative and Project Alternative(s) increase delay. May require mitigation.

Figure 3-7b.
Segments B and C
Shoreline to Lynnwood
2035 PM Peak Hour
Intersection LOS



Legend

Light Rail Alternatives

Intersection Type

- Signalized
- Two-Way Stop Controlled
- All-Way Stop Controlled

Intersection Level of Service

Seattle, Shoreline & WSDOT HSS[1]	WSDOT non-HSS[1]
A-C	A-D
D	E
E-F	F

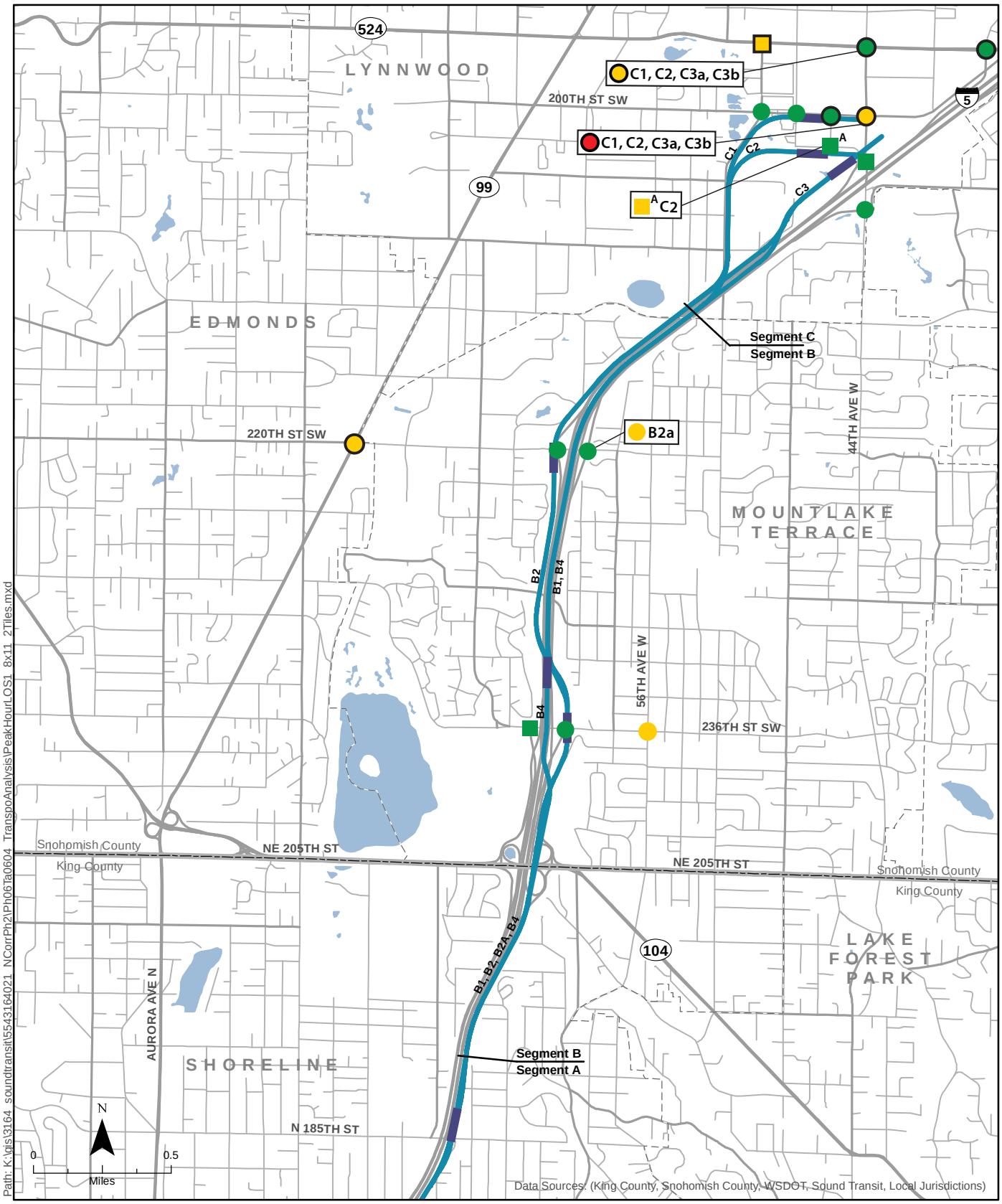
[1]HSS = Highways of Statewide Significance

Project LOS (If different from No Build) — Alt(s)

No Build LOS

* Intersection exceeds agency LOS standard with No Build Alternative and Project Alternative(s) increase delay. May require mitigation.

Figure 3-8a.
Segment A
Seattle to Shoreline
2035 AM Peak Hour
Intersection LOS



Legend

Light Rail Alternatives

Intersection Type

- Signalized
- Two-Way Stop Controlled
- A All-Way Stop Controlled

Intersection Level of Service

Seattle, Shoreline & WSDOT HSS[1]	WSDOT non-HSS[1]
A-C	A-D
D	E
E-F	F

[1]HSS = Highways of Statewide Significance

Project LOS (If different from No Build) — Alt(s)

No Build LOS

* Intersection exceeds agency LOS standard with No Build Alternative and Project Alternative(s) increase delay. May require mitigation.

Figure 3-8b.
Segments B and C
Shoreline to Lynnwood
2035 AM Peak Hour
Intersection LOS

City of Shoreline Arterial LOS

For the City of Shoreline, several arterials were also evaluated for forecast year 2035 PM peak hour v/c ratios to ensure consistency with City concurrency standards. The following arterial segments would not meet the City of Shoreline's concurrency standard for principal and minor arterials with the No Build Alternative:

- Meridian Avenue North from North 155th Street to North 185th Street—northbound
- 5th Avenue NE from north of North 145th Street to NE 165th Street—northbound
- 15th Avenue NE south of and north of NE 155th Street—northbound
- NE 175th Street west of 15th Avenue NE—westbound
- NE 185th Street west of 1st Avenue NE—eastbound
- NE 185th Street east of 1st Avenue NE—westbound

The arterial segments listed above would further degrade with the Lynnwood Link Extension. In addition, the following arterial segments would also degrade to levels below the City of Shoreline's concurrency standards during the PM peak hour:

- NE 185th Street east of Meridian Avenue NE—westbound (all Segment A Alternatives)
- NE 185th Street from 2nd Avenue NE to 5th Avenue NE (all Segment A Alternatives)

Mitigation may be required for these segments; however most of the intersections within these segments are already discussed as needing mitigation. Improvement of these intersections will likely mitigate this overall segment as well.

Segment B: Shoreline to Mountlake Terrace

Table 3-15 lists the one location out of the 19 intersections evaluated in Segment B that would operate below LOS standards in 2035 with the No Build Alternative and/or light rail alternatives during the PM peak hour. All of the evaluated intersections would meet LOS standards in the AM peak hour. The intersection of 220th Street SW and SR 99 would operate at LOS F in the PM peak hour with both the No Build Alternative and Alternative B2A.

Table 3-15. Segment B Intersections not Meeting LOS Standards for Forecast Year 2035 During PM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative				
		No Build	B1	B2	B2A	B4
220th Street SW Station					**220th Street SW**	
220th Street SW and SR 99	E	F	-	-	F[a]	-

Notes: – Intersection LOS would not degrade below the LOS standard due to the specified alternative.
[a] – Intersection would operate below LOS standard but with negligible change in delay (less than 5 seconds) compared with the No Build Alternative.

Segment C: Mountlake Terrace to Lynnwood

Tables 3-16 and 3-17 list the locations in Segment C that would operate below LOS standards in 2035 with the No Build Alternative and/or light rail alternatives during the PM and AM peak hours, respectively. As shown in Table 3-16, 5 out of the 20 intersections evaluated in Segment C would operate below LOS standards with the No Build Alternative during the PM peak hour. With the light rail alternatives, most of these intersections would operate with delays similar to the No Build Alternative. The two exceptions are the intersection at 196th Street SW and 50th Avenue West and the intersection at 200th Street SW and 44th Avenue West, which would have higher delays than the No Build Alternative with all of the light rail alternatives. For the AM peak hour (Table 3-17), none of the intersections would operate below LOS standards with the No Build Alternative, but the intersection of 200th Street SW and 44th Avenue West would degrade below LOS standards during the AM peak hour with all of the light rail alternatives.

Table 3-16. Segment C Intersections not Meeting LOS Standards for Forecast Year 2035 During PM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative				
		No Build	C1	C2	C3a	C3b
Lynnwood Station			**200th Street SW**	**Transit Center**	**Park-and-Ride Opt. 1**	**Park-and-Ride Opt. 2**
196th Street SW and 50th Avenue West	E	F	**F**	**F**	**F**	**F**
196th Street SW and 44th Avenue West	E	F	F[a]	F[a]	F[a]	F[a]
196th Street SW and 40th Avenue West	E	F	F[a]	F[a]	F[a]	F[a]
200th Street SW and 44th Avenue West	E	F	**F**	**F**	**F**	**F**
52nd Avenue West and 212th Street SW	E	F	F[a]	F[a]	F[a]	F[a]

Notes:

LOS results highlighted in **BOLD** indicate intersection locations where LOS with the specified light rail alternatives, compared to the No Build Alternative, would degrade to levels that do not meet the jurisdiction's LOS standard and may require mitigation (see Section 3.6.4).

Opt. = Option

[a] – Intersection would operate below LOS standard but with negligible change in delay (less than 5 seconds) compared with the No Build Alternative.

Table 3-17. Segment C Intersections not Meeting LOS Standards for Forecast Year 2035 During AM Peak Hour

Nearest Station and Intersection	LOS Standard	Alternative				
		No Build	C1	C2	C3 Opt. 1	C3 Opt. 2
Lynnwood Station			**200th Street SW**	**Transit Center**	**Park-and-Ride Opt. 1**	**Park-and-Ride Opt. 2**
200th Street SW and 44th Avenue West	E	E	**F**	**F**	**F**	**F**

Notes:

LOS results highlighted in **BOLD** indicate intersection locations where LOS with the specified light rail alternatives, compared to the No Build Alternative, would degrade to levels that do not meet the jurisdiction's LOS standard and may require mitigation (see Section 3.6.4).

Opt. = Option

Property Access and Local Circulation

The alignment and station locations for some light rail alternatives could modify access for certain nearby properties, but these properties would still retain functional access. All light rail alternatives would require some reconstruction of roadways adjacent to the elevated or at-grade alignments, but these areas are limited because most of the alternatives are along I-5, and no long-term closures of existing roads are anticipated.

There is some potential for cut-through traffic on neighborhood streets to access the stations via local streets. This could occur near stations where there is more congestion on the primary arterials serving the station, and where neighborhood streets could offer an alternative route, such as at the NE 155th Street Station, the NE 185th Street Station, and near the 220th Street Station. More discussion is in the *Transportation Technical Report*.

3.2.5 Nonmotorized Facilities

With the No Build Alternative, pedestrian and bicycle activity near station areas would modestly increase over time as planned changes in land use occur and as future pedestrian and bicycle improvements are implemented.

Impacts on Pedestrian Facilities

The Lynnwood Link Extension would increase the number of pedestrians in and around the station areas, based on a typical 0.5-mile walk distance. These increases would include walk trips to and from the following areas: light rail station platforms, park-and-ride facilities, designated passenger drop-off/pick-up areas, nearby bus stops, and on-street parking in surrounding neighborhoods. The new pedestrian trips to and from stations would be adequately served by the station area's wide plazas and sidewalks and by other sidewalk improvements on reconstructed roadways. Sound Transit would meet current standards for the pedestrian facilities fronting the station area and roadways reconstructed with the project. The agency also will work with local jurisdictions to assess the need for improvements to pedestrian access routes farther out from the station.

A more detailed description of pedestrian use near station areas, including the results of a pedestrian LOS analysis, is in the *Transportation Technical Report*.

Impacts on Bicycle Facilities

The light rail alternatives would increase the number of bicycles in the station areas, but they would not remove or otherwise adversely affect any of the existing or planned bicycle routes or facilities in the study area. This includes existing and planned facilities in the June 2007 *City of Seattle Recommended Bicycle Facilities, Seattle Bicycle Master*

Plan and the City of Shoreline 2011 *Bicycle System Plan, City of Shoreline Transportation Master Plan* (City of Seattle 2007; City of Shoreline 2011). Activity centers within 1 mile of the station that would generate an increase in bicycle travel to and from the stations were also included in the analysis. Activity centers included multifamily housing, commercial areas, community centers, and community colleges. Secure and covered bicycle parking and access would be provided at each station. In general, existing and planned bicycle facilities, implemented with reconstructed roadways, would sufficiently serve the increased levels of bicycle trips to the stations.

3.2.6 Freight Mobility and Access

No changes to freight mobility and access are expected with the No Build Alternative beyond the increases in delay and roadway congestion that could occur over time.

With the light rail alternatives, freight truck traffic is expected to continue using designated FGTS and city streets for the movement of freight. In some locations, designated truck routes would travel alongside at-grade light rail profiles, but roadway and intersection conditions with the Lynnwood Link Extension would be similar to those with the No Build Alternative. Some intersection operations may improve through mitigation for the project alternatives (see Section 3.6.4), which could benefit freight movement. Beyond these potential project effects, the *Transportation Technical Report* describes the modifications to the roadway network associated with the alternatives that could result in changes to freight mobility and access for each segment. These modifications are not anticipated to negatively affect truck circulation or change the truck route designations on the regional and local street network.

3.2.7 Parking

Both on-street and off-street parking spaces are anticipated to be removed due to the placement of the light rail stations, surrounding roadway modifications, and modifications along the light rail alignment. As described in Chapter 2, Alternatives Considered, additional park-and-ride lots are proposed near most stations based on anticipated parking demand. These park-and-ride lots have generally been sized to accommodate forecasted parking demand. However, there is some potential for parking spillover to occur at these stations if demand exceeds their capacity, particularly at the NE 130th Street Station, where limited new parking supply is proposed. At the NE 145th Street, NE 155th Street, and NE 185th Street stations, a relatively large amount of unrestricted on-street parking exists in the vicinity of the stations; however, the potential for spillover parking is low due to the relatively large supply of parking spaces proposed for the park-and-rides. In station areas that currently lack available on-street parking supply, such as near the Lynnwood, 220th Street SW, and Mountlake Terrace station options, the potential for "hide-and-ride" parking activity would be limited. In these cases, if spillover parking occurred, it would likely be on privately

owned off-street parking facilities. The amount of parking provided at each station may be further refined in future phases of the project. More discussion of the potential for spillover parking impacts is in the *Transportation Technical Report*.

Parking impacts and proposed park-and-ride parking spaces for each segment and alternative are described below. As part of this analysis, Sound Transit considered parking supplies within approximately 0.25 mile of each proposed station. Additional detail, including maps showing the area that was inventoried for each station, is in the *Transportation Technical Report*.

Segment A: Seattle to Shoreline

Between 44 and 111 parking spaces would be removed by Segment A light rail alternatives. Table 3-18 summarizes the parking impacts along Segment A by alternative, not including removal of any existing park-and-ride lots and any off-street parking spaces associated with properties that might be acquired by the project. Table 3-19 shows the proposed change in park-and-ride capacity at stations under each light rail alternative.

Table 3-18. Segment A Parking Impacts

Alternative	Parking Spaces Removed[a]		
	On-Street	Off-Street[b]	Total
Alternative A1	29	0	29
Alternative A3	73	0	73
Alternative A5	89	0	89
Alternative A7	77	0	77
Alternative A10	96	0	96
Alternative A11	84	0	84

[a] Includes parking spaces removed for column placement where applicable.
[b] Off-street does not include park-and-ride spaces.

Table 3-19. Segment A Park-and-Ride Impacts and Proposed New Parking Spaces

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spaces[a]	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
NE 130th Street Station - Option 1, with park-and-ride	A5	46	46	100[b]	100[b]	+54
NE 130th Street Station - Option 1, no park-and-ride	A10	46	46	0	0	-46
NE 130th Street Station - Option 2	A7, A11	46	4	100	142	+96
NE 145th Street Station - Option 1	A1	68	68	500	500	+432
NE 145th Street Station - Option 1	A10	68	68	650	650	+582
NE 145th Street Station - Option 2	A3, A11	68	68	500	500	+432
NE 155th Street Station	A5, A7	0	0	500	500	+500
NE 185th Street Station - Option 1	A1	0	0	500	500	+500
NE 185th Street Station - Option 2	A3, A7, A11	0	0	500	500	+500
NE 185th Street Station - Option 3	A5, A10	0	0	350	350	+350

[a] Includes parking spaces removed for column placement where applicable.
[b] Possible surface parking lot available for lease located adjacent to the station.

All Segment A alternatives would remove on-street parking spaces due to column placement for the guideway.

With Alternatives A5 and A10, the South Jackson Park Park-and-Ride lot (46 spaces) would be removed with construction of the NE 130th Street Station. A nearby surface lot could be available for lease, which would replace the removed park-and-

ride lot. Other nearby leased parking options could also be investigated if the identified lot is not available for lease. Alternatives A7 and A11 would also result in the loss of four parking spaces at this location. With Alternatives A1, A3, A10, and A11, the North Jackson Park Park-and-Ride lot would also be removed (68 spaces) with construction of the NE 145th Street Station.

Segment B: Shoreline to Mountlake Terrace

Table 3-20 summarizes the parking impacts along Segment B by alternative. Alternative B2 would result in the loss of 7 on-street parking spaces and B2A would result in the loss of 11 spaces; the remaining Segment B alternatives would not affect any on-street or off-street spaces. Table 3-21 shows the proposed changes in park-and-ride capacity at stations under each alternative.

Table 3-20. Segment B Parking Impacts

	Parking Spaces Removed[a]		
Alternative	On-Street	Off-Street[b]	Total
Alternative B1	0	0	0
Alternative B2	7	0	7
Alternative B2A	11	0	11
Alternative B4	0	0	0

[a] Includes parking spaces removed for column placement where applicable.
[b] Off-street does not include park-and-ride spaces.

Table 3-21. Segment B Park-and-Ride Impacts and Proposed New Parking Spaces

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spaces	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
Mountlake Terrace - Transit Center Station	B1, B2, B2A	880	0	0	880	0
Mountlake Terrace - Freeway Station	B4	880	0	0	880	0
220th Street SW Station	B2A	0	0	200	200	+200

None of the Segment B alternatives would have any parking impacts at the Mountlake Terrace Transit Center Station because the station design would maintain the existing 880 park-and-ride parking spaces. With Alternative B2A, a new 200-space surface park-and-ride lot is proposed for the 220th Street SW Station.

Segment C: Mountlake Terrace to Lynnwood

Table 3-22 summarizes the parking impacts along Segment C by alternative, not including removal of any existing park-and-ride spaces. There are several locations along Segment C where the alignment or light rail station would acquire a building. The parking associated with these locations was not considered a parking impact. Table 3-23 shows the proposed changes in park-and-ride capacity at stations under each alternative.

Table 3-22. Segment C Parking Impacts

	Parking Spaces Removed[a]		
Alternative	On-Street	Off-Street[b]	Total
Alternative C1	0	8	8
Alternative C2	0	4	4
Alternative C3	0	0	0

[a] Includes parking spaces removed for column placement where applicable.
[b] Off-street does not include park-and-ride spaces.

Table 3-23. Segment C Park-and-Ride Impacts and Proposed Parking Spaces

Station	Alternative	Total Existing Parking Spaces	Removed Parking Spaces[a]	Proposed New Parking Spaces	Parking Spaces after Project	Net Change in Parking Spaces
Lynnwood Transit Center—200th Street SW Station	C1	1,370	370	900	1,900	+530
Lynnwood Transit Center—Lynnwood Transit Center Station	C2	1,370	670	1,200	1,900	+530
Lynnwood Transit Center—Lynnwood Park-and-Ride Station - Option 1	C3	1,370	1,170	1,700	1,900	+530
Lynnwood Transit Center—Lynnwood Park-and Ride Station - Option 2	C3	1,370	1,370	1,900	1,900	+530

[a] Includes parking spaces removed for column placement where applicable.

With the Segment C alternatives, few off-street parking spaces would be removed due to column placement in existing surface lots. All of the alternatives would also remove existing park-and-ride spaces at the Lynnwood Transit Center; these parking spaces would be replaced with new parking for a net total of 1,900 park-and-ride spaces.

3.2.8 Safety

The light rail alternatives would have minimal effects on traffic safety in the project corridor. The light rail alignment would be completely grade-separated from the street and highway networks, and the station areas would be designed for multimodal access and to minimize the potential for traffic conflicts. Accident rates under the light rail alternatives would likely remain similar to those under existing and No Build Alternative conditions due to similar or improved roadway conditions. Pedestrian and bicycle volumes are expected to increase at intersections near the proposed stations, which could result in an increased potential for pedestrian/vehicle, bicycle/vehicle, or pedestrian/bicycle conflicts. Bus trips would also increase near stations. Through careful design in station areas, the potential for conflicts would be minimized.

Alternatives A1, A5, and A10 could improve safety with the reconstruction of the NE 130th Street interchange and grade separation at the northbound off-ramp from I-5 to 5th Avenue NE, thereby addressing a high accident location. Alternatives A3 and A11 could also improve safety with modifications at the NE 145th Street interchange and relocation of the I-5 northbound on-ramp at 5th Avenue NE; these proposed changes would also address an existing high accident location.

While none of the alternatives would affect travel lane widths, Alternative B4 near 236th Street SW would reduce shoulder widths, which would require a deviation from current design standards for federal interstate highways. A reduced shoulder width decreases the ability of disabled vehicles or stopped vehicles to clear the roadway, and this in turn could affect traffic operations and safety. There are also

some locations along the corridor in King County that currently do not meet federal interstate design standards. In the area from Northgate to approximately NE 130th Street, the existing highway infrastructure and right-of-way already limit the ability of future highway improvements to meet current standards. The light rail alternatives in this portion of Segment A would present additional limitations. North of NE 130th Street the light rail alternatives do not limit future improvements to meet standards. Ultimately, FHWA must approve any deviations, and safety is a key consideration in its decision.

3.3 Construction Impacts

Where the light rail alignment is adjacent to I-5 or in the median, access to construction areas may be from an I-5 shoulder. Highway shoulders could be closed periodically to provide space for construction activities and construction access points. Access points would be located to provide adequate acceleration and deceleration for trucks and to minimize impacts on I-5 general purpose traffic and interchange operations. Management plans for effectively managing construction traffic would reduce the need for shoulder closures and lane reductions to minimize the duration and impact. However, freeway capacity could be reduced due to the loss of shoulder width for refuge, breakdowns, or incidents, resulting in impacts on travel time reliability. The loss of shoulders also impacts safety. A Maintenance of Traffic Plan that addresses all modes will be prepared at final design for agency approval.

All light rail alternatives could have some impacts on traffic operations on I-5 during installation of the girders for the guideway bridges. Construction impacts would involve nighttime closures in each direction of mainline I-5 and traffic detours where the guideway crosses the freeway. Vertical clearance would be maintained on I-5. Construction access points, closures, and changes in I-5 operations will require approval from FHWA and WSDOT.

Some loss of available parking at park-and-ride lots is expected during construction, particularly at the Lynnwood Park-and-Ride lot. Because the facility is currently fully utilized, the lower parking supply could temporarily reduce accessibility for patrons, increase travel times, shift demand to other park-and-rides, or increase the potential for transit patrons to park in other locations in the vicinity.

Reconstruction of I-5 overcrossings and overcrossing closures during construction would require detours. All alternatives would require reconstruction of the pedestrian bridge over I-5 at NE 195th Street. Detours would have secondary impacts on general purpose traffic, bus transit, bicyclists, and pedestrians. Phasing of overcrossing closures would minimize the cumulative impacts of closures; construction phasing will be addressed in the construction specifications.

Generally, construction truck traffic to station construction sites would use city streets. The *Transportation Technical Report* includes figures showing potential construction staging

areas and truck haul routes. Most of these areas are adjacent to where alignment construction would occur. Peak truck trips are expected to occur during earthwork operations and during concrete delivery for both guideway and station construction. For at-grade construction, 4 to 12 trucks per hour are estimated from each work zone. For elevated guideway construction, peak truck trips are estimated at 4 to 8 trucks per hour for the concrete delivery. Multiple work zones may be used during peak operations that would result in higher total project peak truck trips; however, these trips would generally not overlap with each other on the same local streets. Parking by construction workers will be provided on-site where possible. Parking could occur on city streets where parking is unrestricted.

All light rail alternatives may require utility relocations along the alignment and near the stations. Utility relocations may require temporary lane closures and traffic control plans to maintain property access and circulation.

Impacts on general purpose traffic, transit operations, nonmotorized travel, and parking are summarized in Table 3-24 and discussed for each segment following. Also refer to the *Transportation Technical Report* for more detail on construction impacts.

Segment A Alternatives

Construction of all Segment A alternative alignments would primarily be conducted from staging spaces within the freeway/WSDOT right-of-way and city streets between Northgate and NE 145th Street. For construction adjacent to I-5, the shoulder width could be temporarily reduced to a 2-foot minimum width. Travel lanes could be modified to incorporate barrier and work zone areas for the contractor.

Overpass bridge or ramp reconstruction affecting I-5 is expected at NE 117th Street, NE 130th Street, and NE 185th Street, and could require closure of one lane in each direction of I-5 for approximately 1 month. Several of the Segment A alternatives involve rebuilt overpass bridges or ramps at one or more locations: Alternative A1, would rebuild the NE 117th Street overcrossing and the NE 185th Street overcrossing. Alternatives A1, A5, and A10 would rebuild the NE 130th Street overcrossing and northbound off-ramp. The closure of a freeway lane that these alternatives may require would increase congestion and delay.

On local streets, construction may close lanes during the work day, such as along 1st Avenue NE (North 113th Street to North 117th Street), NE 117th Street, and 5th Avenue NE. All light rail alternatives would require the construction of an elevated guideway over 1st Avenue NE, Northgate Way, and NE 145th Street. Crossings above the arterials would require nighttime closures of the streets, which would also affect interchange traffic. Local access would be maintained.

Table 3-24. Summary of Construction Impacts

Alternative	Roadway Closure[a]			Construction Truck Traffic[c]	Parking Loss		Regional Bus Facilities	Multi-modal Neighborhood Mobility[d]
	I-5 Mainline	I-5 Interchanges	Arterial/Local Streets[b]		Park-and-Ride spaces	On-street (Yes/No)		
Segment A								
A1 At-grade/Elevated	Partial (short), Nighttime[e]	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate
A3 Mostly Elevated	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low
A5 At-grade/Elevated	Partial (short, Nighttime	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate
A7 Mostly Elevated	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low
A10 At-grade/Elevated	Partial (short), Nighttime	Nighttime	Nighttime – Partial (long)	Low	46	Yes	Minor	Moderate
A11 Mostly Elevated	Nighttime	Nighttime	Nighttime	Low	46	Yes	Minor	Low
Segment B								
B1 East Side I-5 to Median	Nighttime	Nighttime	Nighttime	Low	230	No	Short-term closure of transit ramps	Moderate[f]
B2/B2A East Side of I-5 to West Side	Nighttime	Nighttime	Partial, short term	Low	230	No	Long-term closure of transit ramps	Moderate[f]
B4 East Side of I-5 to Freeway Station/Median	Partial (short)	Nighttime	Nighttime	Low	0	No	Permanently closed when construction starts	Low[f]
Segment C								
C1: 52nd Avenue West to 200th Street SW	Nighttime	None	Nighttime	Low	250	No	Minor	Low[g]
C2: 52nd Avenue West to Transit Center	Nighttime	None	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low[g]
C3: I-5 to Park-and-Ride	Nighttime	Nighttime	Nighttime	Low	560	No	Nighttime closure, direct access ramp	Low[g]

a Partial road closure assumes one lane is closed to traffic. Short-term duration is 2 months or less. Long-term duration is 2 months to 12 months.

b Local access will be maintained throughout construction.

c Peak truck traffic is 4 to 12 trucks per hour at construction sites.

d Mobility impacts includes local transit route impacts and access to transit, pedestrian and bicycle mobility, traffic impacts due to construction, and neighborhood intrusion due to construction activities and parking.

e Nighttime periodic closures for the placement of the bridge girders.

f Moderate due to 6-month closure of NE 195th Street pedestrian/bicycle bridge over I-5.

g Detours required of Interurban Trail.

Bus operations and transit riders traveling northbound on I-5 could be affected by the decrease in capacity and increase in delay that would result from the narrower lanes and shoulder width. Bus schedules could also be less reliable as congestion and delay increase. During lane closures of I-5 for replacement bridges over I-5, transit would have increased travel time impacts, although maintaining an HOV lane could reduce the impacts.

There would be no impacts on nonmotorized traffic due to construction within the I-5 alignment. However, nonmotorized travel would be affected in the vicinity of station construction as well as from reconstruction of freeway overcrossings.

The movement of trucks carrying freight would be affected similarly to general purpose traffic.

On-street parking would be lost temporarily along reconstructed street segments that have on-street parking and along roadways adjacent to the guideway construction. There would be a small amount of on-street parking loss on 5th Avenue NE just north of NE 145th Street and on NE 185th Street.

Construction activities and the guideway route may reduce or restrict property access and the contractor would need to maintain access during construction.

Segment B Alternatives

All Segment B alternatives would have construction adjacent to I-5 on the east side (south of the Mountlake Terrace Transit Center), and shoulder widths could be temporarily reduced to a 2-foot minimum, and a concrete barrier installed to define the work zone along the freeway, with openings in the barrier for truck and construction traffic ingress and egress.

Bridge reconstruction at the NE 195th Street pedestrian/bicycle overcrossing in all alternatives would close one lane in each direction of I-5 for approximately 1 month for construction in the median. This would cause long periods of congestion and delays.

All alternatives require construction in the median of I-5 to varying degrees, as described below by alternative.

Construction through the SR 104 interchange area would include construction staging and work within the cloverleaf interchange. This activity is expected to have some impacts on traffic operations due to proximity of the construction near the freeway and interchange.

Alternatives B1, B2, and B2A would require reconstruction of 236th Street SW adjacent to the new station. This could require lane restrictions but could be constructed keeping one lane in each direction open throughout construction. Construction of the elevated guideway near the traffic signal on 236th Street SW could affect signal operations.

Each alternative would require crossing I-5; nighttime closures would likely be required to install girders and construct the guideway bridges to cross to the median or to the west side of I-5. Detours to local streets would be developed for these nighttime closures. Median construction would require staging and possible lane closures or nighttime full closures on 212th Street SW under I-5.

Bus operations and transit riders traveling northbound on I-5 could be affected by the decrease in capacity and increase in delay that would result from the narrower lanes and shoulder width where the light rail alignment is adjacent to I-5 on the east side (south of the Mountlake Terrace Transit Center). There would be short-term closures of the direct access ramps to the freeway station with Alternative B1 and a longer term closure with B2/B2A to construct the alignment within the median north of the freeway station. Alternative B4 would permanently close the direct access ramps at the beginning of construction. With the closure of the freeway bus ramps to the Mountlake Terrace Freeway Station under Alternative B4, buses may be rerouted to the park-and-ride, increasing travel time. However, some buses could remain on I-5 and skip the Mountlake Terrace Freeway Station.

All Segment B alternatives would require replacement of the NE 195th Street pedestrian bridge over I-5. The reconstruction of the NE 185th Street overcrossing or approach, located approximately 0.5 mile south of the NE 195th Street pedestrian bridge, would need to be completed before closure of the NE 195th Street bridge.

There is currently no on-street parking along Segment B alignments; therefore, no on-street parking impacts are expected.

Segment C Alternatives

The elevated guideway along the I-5 median would require shoulder and possibly lane width reductions along both northbound and southbound I-5 to provide the median work zone. To cross over the southbound lanes of I-5, the elevated guideway would have a multi-foundation support system (using straddle bents); as a result, nighttime closures of southbound I-5 lanes would be needed. Nighttime closures on I-5 would require detours onto surface streets. Closures would also be expected where the guideway crosses over local streets: 208th Street SW, 206th Street SW, 204th Street SW, 44th Avenue NE and its on-ramp, and the Interurban Trail.

Some loss of available parking at park-and-ride spaces during construction would affect the Lynnwood Park-and-Ride. Because this facility is currently fully utilized, the lower parking supply could temporarily reduce accessibility for patrons, increase travel times, shift demand to other park-and-rides, or increase the potential for transit patrons to park in other locations in the vicinity.

There is currently no on-street parking on streets that would be affected by the Segment C alignments; therefore, no impacts on on-street parking are anticipated during construction of any of the three Segment C alternative alignments.

3.4 Indirect and Secondary Impacts

The completion of the Lynnwood Link Extension would result in fast and reliable rail service. Light rail service would help facilitate potential increases in residential and employment uses around the stations. This could lead to changes in regional and local travel patterns, as trips both to and from these areas increase for all modes, affecting transit, freeway and local traffic volumes, parking demand, and nonmotorized users. The light rail extension could also affect ridership on other transit service in the corridor, particularly parallel bus rapid transit service in the SR 99 corridor, where longer distance trips could decrease as some riders shift to the light rail lines, and shorter trips could increase as more riders use other transit service to access light rail. Other changes in transit service in the project corridor in response to the light rail extension that are not yet planned or anticipated could also result in shifts in ridership. These could include the potential for Community Transit, Sound Transit, and King County Metro to redeploy and/or reinvest in bus service that is replaced by light rail service. Also, ridership on the Sounder North commuter rail service could be affected by the extension.

3.5 Cumulative Impacts

The future transportation impacts discussed in Section 3.2, Long-Term Impacts, was based on the results of traffic and ridership modeling that incorporates past, present, funded, and approved future actions, as well as projected growth that would generate development in the region.

Sound Transit is evaluating potential sites for a Link Operations and Maintenance Satellite Facility as described in Chapter 2, Alternatives Considered. One of the sites under consideration is located in Segment C north of I-5 and east of 52nd Avenue West/Cedar Valley Road in Lynnwood. The transportation effects of this maintenance facility would be limited. The light rail trains would enter and leave the facility via a grade-separated dedicated light rail guideway. While employees, service vehicles, and shipments would arrive using local streets, the traffic would not be likely to change conditions because the maintenance facility would occupy an area that is already largely developed with office and light industrial uses, and trips related to the displaced facilities would no longer occur. There would be no notable difference in the transportation effects of this maintenance facility related to Segment C alternatives—all of which have stations and park-and-rides that would largely be accessed using different streets than 52nd Avenue West, the street access point for the maintenance facility.

The Edmonds School District owns a property and has a master plan to develop it for a school district support services center. This facility will include administrative functions and an operations base with storage, maintenance, and fueling for the Edmonds' school bus fleet. This development would conflict with the Lynnwood

alternatives for the Link Operations and Maintenance Satellite Facility and, if developed, could increase traffic volumes along 52nd Avenue West, including during the morning peak period and in afternoons when the school buses are deployed.

Other unfunded regional and local transportation projects and development projects could have some localized effects on transit ridership and travel patterns within the project area, including traffic operations near the proposed stations. However, potential plans such as new managed or tolled lanes in the I-5 corridor could alter transportation conditions beyond what the No Build or light rail alternatives are anticipating. Otherwise, the transportation conditions would remain similar to those already described, with few additional cumulative effects.

3.6 Potential Mitigation Measures

3.6.1 Regional Travel

The completion of the Lynnwood Link Extension would not require mitigation for regional travel because highways and arterials are not expected to experience adverse changes in operations.

3.6.2 Transit

Mitigation for transit would likely not be required because the project would improve the regional transit system and, by freeing up existing bus service resources, may allow King County Metro's and Community Transit's integration plans to provide coordinated bus service with the light rail system. In addition, major park-and-ride lots in the study area would be expanded to accommodate the increase in transit ridership with the project.

3.6.3 Freeway Operations

No mitigation would be necessary along the I-5 mainline. However, mitigation may be required at local intersections near the proposed light rail stations where the LOS with the light rail alternatives would degrade to levels that do not meet the jurisdiction's LOS standards and/or may affect adjacent freeway ramp operations. Potential mitigation measures for local streets that could affect freeway operations, including areas around NE 145th Street, are described in Section 3.6.4 below. For example, suggested improvements along NE 145th Street and on 5th Avenue NE where it interfaces with the northbound I-5 ramps would restore southbound I-5 operations to conditions similar to the No Build Alternative.

3.6.4 Arterials and Local Streets

For impacts on arterials and local streets, mitigation is potentially required at intersections where the intersection LOS with the light rail alternatives, compared with the No Build Alternative, would degrade to levels that do not meet

jurisdictional LOS standards. Potential mitigation measures for improvements at intersections are described below.

The intersection improvements described would improve the AM and PM peak hour intersection delay to meet LOS standards, or to achieve the same level of service or better for intersections that would be below standards with the No Build Alternative.

Sound Transit would provide these improvements or other improvements as agreed to by the local jurisdiction. Sound Transit could also contribute to a local jurisdiction's project to improve intersection performance where the No Build Alternative would already be below standards. Measures to address cut-through traffic impacts could include signage, traffic calming measures or other cut-through restrictions, and would be determined in conjunction with local jurisdictions.

Segment A

In Segment A, several intersections in the cities of Seattle and Shoreline could potentially require improvements to adjust for additional trips and changes in travel patterns to and from the proposed light rail stations. Tables 3-25 and 3-26 summarize the potential improvements required to improve intersection operations to acceptable levels in the PM and AM peak hours, respectively. Intersection LOS results without the potential mitigation improvements are summarized in Tables 3-13 and 3-14.

Table 3-25. Forecast Year 2035 PM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment A

Nearest Station/ Intersection	LOS Standard	Alternative							Potential Improvements
		No Build	A1	A3	A5	A7	A10	A11	
NE 130th Street Station					**Opt.1**	**Opt.2**	**Opt.1 (no park-and-ride)**	**Opt.2**	
5th Avenue NE and I-5 northbound off-ramp	D	F[a]	-	-	-	B	-	B	Opt. 2 – signalize intersection
NE 145th/NE 155th Street Station			**Opt.1**	**Opt.2**	**155th**	**155th**	**Opt.1 (650-space park-and-ride)**	**Opt.2**	
5th Avenue NE and I-5 northbound on-ramp	D	B	A	B	-	-	A	B	Opt. 1– signalize intersection
NE 145th Street and 5th Avenue NE	E	E	E	E	-	-	E	E	All Opts. – add a protected northbound right turn phase
5th Avenue NE and I-5 northbound off-ramp	D	F[a]	C	C	-	-	C	C	All Opts. – signalize intersection
NE 145th Street and 12th Avenue NE	E	F[a]	D	D	-	-	D	D	All Opts. – add two-way left-turn lane or short refuge area on NE 145th Street

Table 3-25. Forecast Year 2035 PM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment A

Nearest Station/ Intersection	LOS Standard	Alternative							Potential Improvements
		No Build	A1	A3	A5	A7	A10	A11	
North 155th Street and Aurora Avenue North	D	D	-	-	D	D	-	-	Change eastbound right-turn lane to a shared through-right-turn lane
North 155th Street and Meridian Avenue North	D	D	-	-	C	C	-	-	Add left-turn pockets to the northbound and southbound approaches
North 155th Street and 1st Avenue NE	D	E[a]	-	-	D	D	-	-	Add a right-turn pocket to the northbound approach
NE 155th Street and 8th Avenue NE	D	F[a]	-	-	C	C	-	-	Add a two-way left-turn lane or refuge area on NE 165th Street
NE 165th Street and 5th Avenue NE	D	E[a]	-	-	B	B	-	-	Add a second northbound through lane
NE 185th Street Station			**Opt. 1**	**Opt. 2**	**Opt. 3**	**Opt. 2**	**Opt. 3**	**Opt. 2**	
North 185th Street and Meridian Avenue North	D	F[a]	F[b]	F[b]	F[b]	F[b]	F[b]	F[b]	All Opts. – add protected-permissive phasing to the northbound and southbound left turns.
NE 185th Street and 2nd Avenue NE	D	D	C	C	C	C	C	C	All Opts. – add a two-way left-turn lane or refuge area on NE 185th Street
NE 185th Street and 5th Avenue NE (north)	D	D	-	-	C	-	C	-	Opt. 3 – add a two-way left-turn lane or refuge area on NE 185th Street
NE 185th Street and 5th Avenue NE (south)	D	F[a]	-	-	C	-	C	-	Opt. 3 – add a two-way left-turn lane or refuge area on NE 185th Street
NE 185th Street and 8th Avenue NE	D	D	-	C	C	C	C	C	Opts. 2 and 3 – add a two-way left-turn lane or refuge area on NE 185th Street
NE 185th Street and 10th Avenue NE	D	C	-	-	C	-	C	-	Opt. 3 – add a right-turn pocket to the eastbound approach

Notes:

a – Intersection requires improvement with the No Build Alternative. The project would increase intersection delay and may be required to contribute a proportionate share of costs for improvements at this intersection.

b – Intersection would operate at the same LOS as the No Build Alternative but with improved delay.

- No mitigation required.

Opt. = Option

Table 3-26. Forecast Year 2035 AM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment A

Nearest Station/ Intersection	LOS Standard	Alternative							Potential Improvements
		No Build	A1	A3	A5	A7	A10	A11	
NE 130th Street Station					**Opt. 1**	**Opt. 2**	**Opt. 1 (no park-and-ride)**	**Opt. 2**	
5th Avenue NE and I-5 northbound off-ramp	D	F[a]	-	-	-	A	-	A	Opt. 2 – signalize intersection
NE 145th/NE 155th Street Station			**Opt. 1**	**Opt. 2**	**155th**	**155th**	**Opt. 1 (650-space park-and-ride)**	**Opt. 2**	
5th Avenue NE and I-5 northbound on-ramp	D	C	C	-	-	-	C	-	Opt. 1– signalize intersection
NE 145th Street and 5th Avenue NE	E	E	-	-	-	-	E	-	All Opts. – add a protected northbound right phase
5th Avenue NE and I-5 northbound off-ramp	D	F[a]	B	B	-	-	B	B	All Opts. – signalize intersection
NE 185th Street Station			**Opt. 1**	**Opt. 2**	**Opt. 3**	**Opt. 2**	**Opt. 3**	**Opt. 2**	
North 185th Street and Meridian Avenue North	D	D	D	D	-	D	-	D	All Opts.– add protected-permissive phasing to the northbound and southbound left turns

Notes:

a – Intersection requires improvement with the No Build Alternative. The project would increase intersection delay and may be required to contribute a proportionate share of costs for improvements at this intersection.

- No mitigation required.

Opt. = Option

In addition to the intersection improvements described above, capacity improvements, such as the addition of a two-way left-turn lane, may be needed by 2035 on NE 185th Street between Meridian Avenue NE and 5th Avenue NE to meet the City of Shoreline's concurrency standards during the PM peak hour. Sound Transit may also be responsible for contributing a proportionate share of costs to improve this roadway segment.

Access and circulation could be affected near the NE 130th Street interchange due to station placement and/or proposed modifications to the interchange configuration, as well as I-5 overcrossings. These impacts could require a break in the continuous median on 5th Avenue NE north of NE 130th Street (Alternatives A1, A5, A7, A10, and A11) and/or the addition of a U-turn location south of NE 130th Street (Alternatives A1, A5, and A10). Additional detail on the configuration of these improvements is in the *Transportation Technical Report*.

Segment B

In Segment B, there are no intersections in Mountlake Terrace that would require improvements to adjust for additional trips and changes in travel patterns to and from the proposed light rail stations.

Segment C

In Segment C, two intersections in Lynnwood could potentially require improvements to adjust for additional trips and changes in travel patterns to and from the proposed light rail stations. Tables 3-27 and 3-28 summarize the potential improvements required to improve intersection operations to acceptable levels in the PM and AM peak hours, respectively. Intersection LOS results without the potential mitigation improvements are in Tables 3-16 and 3-17.

Table 3-27. Forecast Year 2035 PM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment C

Nearest Station/ Intersection	LOS Standard	Alternative					Potential Improvements
		No Build	C1	C2	C3	C3	
Lynnwood Station			**200th**	**Transit Center**	**Park-and-Ride Opt. 1**	**Park-and-Ride Opt. 2**	
196th Street SW and 50th Avenue West	E	F[a]	C	C	C	C	Change from two-way stop control to signal control.
200th Street SW and 44th Avenue West	E	F[a]	F[b]	F[b]	F[b]	F[b]	Restripe northbound approach to two left turns, one through lane, and one shared through-right lane.

Notes:

a – Intersection requires improvement with the No Build Alternative. The project would increase intersection delay and may be required to contribute a proportionate share of costs for improvements at this intersection.

b – Intersection would operate at the same LOS as the No Build Alternative but with improved delay.

Opt. = Option

Table 3-28. Forecast Year 2035 AM Peak Hour Intersection LOS with Potential Mitigation Improvements—Segment C

Nearest Station / Intersection	LOS Standard	Alternative					Potential Improvements
		No Build	C1	C2	C3	C3	
Lynnwood Station			**200th**	**Transit Center**	**P&R Opt. 1**	**P&R Opt. 2**	
200th Street SW and 44th Avenue West	E	E	E	E	E	E	Restripe northbound approach to two left turns, one through lane, and one shared through-right lane

Notes:

Opt. = Option

3.6.5 Nonmotorized Facilities

Light rail operations would not result in any adverse impacts on nonmotorized facilities; therefore, no mitigation is proposed. Sound Transit would provide pedestrian and bicycle improvements at Lynnwood Link Extension stations consistent with its current *System Access Policy* and FTA's New Starts criteria, to safely accommodate projected increases in pedestrian and bicycle travel associated with the project. Sound Transit would also work with local agencies to determine which pedestrian and bicycle improvements would be most appropriate to support station access and safety. Any new facilities would be designed and constructed to meet or exceed local jurisdictional standards for pedestrian and bicycle mobility.

3.6.6 Freight Mobility and Access

The Lynnwood Link Extension is not expected to require mitigation during operation to improve freight mobility and access because truck routes would be maintained and mobility would be maintained or improved with the project.

3.6.7 Parking

Mitigation may be required where there are potential impacts on parking around stations. The potential exists for hide-and-ride activities near stations, and the best ways to mitigate such activities are specific to each station area. Sound Transit would work with local jurisdictions to develop a plan to evaluate and, if necessary, implement hide-and-ride mitigation. With this approach, Sound Transit would inventory on-street parking around each station before the start of light rail revenue service. Based on the inventories, Sound Transit and the local jurisdiction would work with the affected stakeholders to identify and implement appropriate mitigation measures, if necessary. Parking control measures could consist of parking meters, restricted parking signage, passenger and truck load zones, and residential parking zone programs and associated signage. Other parking mitigation strategies could include promotion of alternative transportation services (for example, encouraging use of buses, vanpool or carpool services, walking, or bicycling). For parking controls agreed to with the local jurisdiction, Sound Transit would be responsible for the cost of installing the signage or other parking controls for 1 year after opening the light rail system. The local jurisdictions would be responsible for monitoring the parking controls and providing all enforcement and maintenance.

3.6.8 Safety

The Lynnwood Link Extension alternatives would have minimal effects on transportation safety in the corridor. With careful design of station areas and right-of-way features, no additional mitigation would be required to improve transportation safety.

3.6.9 Construction

Transit

During construction, the existing South Jackson Park, North Jackson Park, Mountlake Terrace Transit Center, and Lynnwood Transit Center park-and-ride lots could either be partially or fully closed. Measures to mitigate the loss of parking at these locations could include the following:

- Consider service increases or other measures to encourage transit trips that do not require automobile access.
- Route transit riders that use these locations to available spaces at nearby park-and-ride lots.
- Lease parking lots and/or new parking areas within the vicinity of the closed park-and-ride lots.

During construction, transit service mitigation measures for partial or full closures of the Mountlake Terrace Transit Center and Lynnwood Transit Center could include the following:

- Relocate transit stops to adjacent streets.
- Provide a temporary transit center at a nearby off-street location.
- Revise transit services.

During construction of alternatives within street rights-of-way, buses would be rerouted to nearby arterials, where appropriate, to maintain transit service. Transit service modifications would be coordinated with King County Metro, Community Transit, and private transit service providers to minimize construction impacts and disruptions to bus facilities and service. These measures could include posting informative signage before construction at existing transit stops that would be affected by construction activities.

Freeway Operations

During Lynnwood Link Extension construction, Sound Transit would work with WSDOT to develop a written plan to coordinate construction with incident management, construction staging, and traffic control where the light rail construction would affect freeway traffic. Sound Transit would also coordinate with WSDOT to disseminate construction closure information to the public as needed.

Arterials and Local Streets

The adverse transportation impacts that would occur during construction include temporary lane or roadway closures during peak hours, temporary increase in truck traffic, and temporary loss of parking in some construction staging areas. Mitigation measures associated with constructing the Lynnwood Link Extension would comply

with local regulations governing construction traffic control and construction truck routing. Sound Transit would finalize detailed construction mitigation plans in close coordination with local jurisdictions and WSDOT during the final design and permitting phases of the project. Mitigation measures for traffic impacts due to light rail construction could include the following practices:

- Conform to the *Manual on Uniform Traffic Control Devices* (MUTCD) and jurisdictional agency requirements for all traffic plan maintenance.
- Use lighted or reflective signage to direct drivers to truck haul routes to ensure visibility during nighttime work hours.
- Use temporary reflective truck prohibition signs on streets with a high likelihood of cut-through truck traffic.
- Prepare a written plan to communicate public information through tools such as print, radio, posted signs, Web sites, and email to provide information regarding street closures, hours of construction, business access, and parking impacts. Sound Transit would provide this plan.
- Obtain written permission to close access to affected businesses and residents. The contractor would be required to perform this task in coordination with Sound Transit staff. If access closures are required, property access to residences and businesses would be maintained to the extent possible. If access to the property cannot be maintained, the specific construction activity would be reviewed to determine if it could occur during non-business hours, or if the parking spaces and users of this access (for example, deliveries) could be provided at an alternative location.
- Provide parking areas for construction workers, where necessary, which would be the responsibility of the contractor. This may include the provision of remote parking with shuttle service to and from the construction site if sufficient on-site parking cannot be provided.
- Post advance notice signs prior to construction in areas where surface construction activities would affect access to surrounding businesses.
- Provide regular, written updates to schools, emergency service providers, local agencies, solid waste utilities, and postal services, and assist public school officials in providing advance and ongoing notice to students and parents concerning construction activity near schools.
- Schedule traffic lane closures and high volumes of construction truck traffic during off-peak hours to minimize delays during periods of higher traffic volumes as much as possible.
- Cover potholes and open trenches, where possible, and use protective barriers to protect drivers from trenches remaining open.
- Provide temporary parking to mitigate loss due to construction staging or work activities, as appropriate.
- Provide signed detour routes for pedestrians and bicycles through construction areas. If required, use skid-resistant steel plates.

Nonmotorized Facilities

During construction, Sound Transit would minimize potential impacts on pedestrian and bicycle facilities by providing detours within construction areas, such as protected walkways, and notify the public as determined appropriate by the project team. Multi-use trails that might be affected by construction would generally be kept open for use, but detours would be provided when trails are closed, unless they are closed for short durations or in areas where a detour option is not feasible. Public notification efforts would be conducted for temporary trail closures during construction.

Freight Mobility and Access

To minimize impacts due to delays and restricted access for business deliveries on arterials and local streets near surface construction activities, Sound Transit would work with local jurisdictions to develop construction traffic control plans and would coordinate with affected businesses before and during the construction period to maintain business access as much as possible.

For construction associated with I-5, Sound Transit would coordinate with freight stakeholder groups by providing construction information to WSDOT for use in the state's freight notification system. Sound Transit would provide information in a format required by WSDOT.