

Data Sources: (King and Snohomish Counties, Cities of Seattle, Lynnwood, Shoreline, Mountlake Terrace and Edmonds, RCO, WSDOT)

<b>Streams, Wetlands, and Aquatic Habitats</b>			
<span style="color: red;">—</span> Chinook Salmon	<span style="color: orange;">—</span> Cutthroat Trout	Light Rail Route Alternatives	North Link Light Rail
<span style="color: blue;">—</span> Coho Salmon	Wetland	Bus Route Alternatives	North Link Station
<span style="color: yellow;">—</span> Sockeye Salmon	Stream	Potential Station Location	
<span style="color: purple;">—</span> Steelhead			

**Figure 5-21. Ecosystems** North Corridor Transit Project | Alternatives Analysis Report

The L3: SR 99 Elevated Light Rail Alternative would have similar effects to those of the primary L2: SR 99 Mixed Profile Light Rail Alternative.

The B2: Multi-Corridor BRT Alternative would have few effects on water resources except for minor increases in impervious surface.

### 5.3.4 Section 4(f) and Section 6(f) Resources

Section 4(f) is a U.S. Department of Transportation (USDOT) regulation that provides protections for publicly owned parks or recreation areas, wildlife and waterfowl refuges, Wild and Scenic Rivers, or any significant historic site. The regulation restricts the “use” of the resource by a transportation project. A use can include the conversion of land or other physical or environmental effects that adversely affect or substantially impair the qualities that make the resource eligible for Section 4(f) protection. There are some exceptions that can allow temporary, minor or de minimis effects, but in general the regulation requires transportation projects to avoid a use unless there are no other feasible and prudent alternatives available.

Section 6(f) resources are parks and recreation facilities that have been acquired or developed using Land and Water Conservation Fund (LWCF) grant money; if a project converts part of a Section 6(f) property to other uses, there are special requirements for how the conversion is evaluated and mitigated.

The sections below address Section 4(f) resources that may occur in the project area in two groupings. The first grouping focuses on parks and recreation resources, including resources that may qualify to be Section 4(f) resources, and the second focuses on historic resources that qualify as Section 4(f) resources.

#### **PARKS AND RECREATION AREAS, INCLUDING SECTION 4(F) AND SECTION 6(F) PROPERTIES**

Table 5-23 and Figure 5-22 show parks and recreation areas, including Section 4(f) and Section 6(f) properties, located within 0.25 mile of the four build alternatives. Table 5-23 shows the number of properties with the potential for direct effects due to potential acquisitions or alterations of the resources. These determinations are preliminary, which reflect the early stage of design information available and the proximity of alternatives to the resources. For Section 6(f) resources (parks and recreation facilities that were acquired or developed using LWCF grant money), a project would have an effect on a 6(f) property if some or all of the 6(f) property needed to be acquired for use by the project.

**Table 5-23.** Sections 4(f) and 6(f) Properties within 0.25 Mile of the Four Build Alternative Alignments

Alternative	Parks and Recreation Facilities- Section 4(f)		LWCF Properties-Section 6(f)	
	No. of Facilities within 0.25 Mile of Alignment	No. of Facilities with Potential for Direct Effects	No. of Properties within 0.25 Mile of Alignment	No. of Properties with Potential for Direct Effects
TSM/Baseline	7	1	0	0
L1: I-5 Light Rail	15	5	3	0
L2: SR 99 Mixed Profile Light Rail	14	4	3	0
L3: SR 99 Elevated Light Rail	14	3	3	0
B2: Multi-Corridor BRT	7	1	0	0

**Parks and Recreation Facilities with Potential for Direct Effect**

***TSM/Baseline Alternative***

- **Ronald Bog Park (ID#22)**—Expanded parking and minor roadway widening could encroach on this City of Shoreline park.

***L1: I-5 Light Rail Alternative***

- **Ridgecrest Park (ID#14)**—The alignment encroaches on the edge of this City of Shoreline park, placing light rail facilities near a ball field.
- **Veterans Memorial Park (ID#34)**—The alignment would be adjacent to this Mountlake Terrace park.
- **Shoreline Conference Center Recreation Areas (ID#24)**—The alternative would develop a multi-story park-and-ride on Shoreline Conference Center parking areas, adjacent to an athletic field. The property is owned by the Shoreline School District, but the recreation facilities are generally open to the public.
- **Scriber Creek Park (ID#39)**—One option to reach the Lynnwood Station alignment would cross a forested corner of this City of Lynnwood park, and would also remove forested and wetland areas bordering the park. Another option (related to a north/south station orientation) would avoid the park impact.
- **The Interurban Trail (shown as blue line in Figure 5-22), Lynnwood**—The alignment would cross over this regional multi-use trail, developed by the City of Lynnwood on right-of-way owned by the Snohomish County Public Utilities District.

***L2: SR 99 Mixed Profile and L3: SR 99 Elevated Light Rail Alternatives***

- **Shoreline Interurban Trail (shown as blue line in Figure 5-22), Shoreline**—The L2: SR 99 Mixed Profile Alternative would require the reconstruction of a bridge

overcrossing for this regional multi-use trail. The L3: SR 99 Elevated Light Rail Alternative would avoid replacing the bridge overcrossing but could affect ramps to the overcrossing.

- **Veteran’s Memorial Park (ID#34)**—Same potential effects as for the L1: I-5 Light Rail Alternative.
- **Scriber Creek Park (ID#39)**—Same potential effects as for the L1: I-5 Light Rail Alternative.
- **The Interurban Trail (shown as blue line in Figure 5-22), Lynnwood**—Same potential effects as for the L1: I-5 Light Rail Alternative.

#### ***B2: Multi-Corridor BRT Alternative***

- **North Acres Park (ID#4)**—Minor roadway widening and ramp realignment could encroach on this City of Seattle park.

#### **Section 6(f)-LWCF Properties with Potential for Direct Effect**

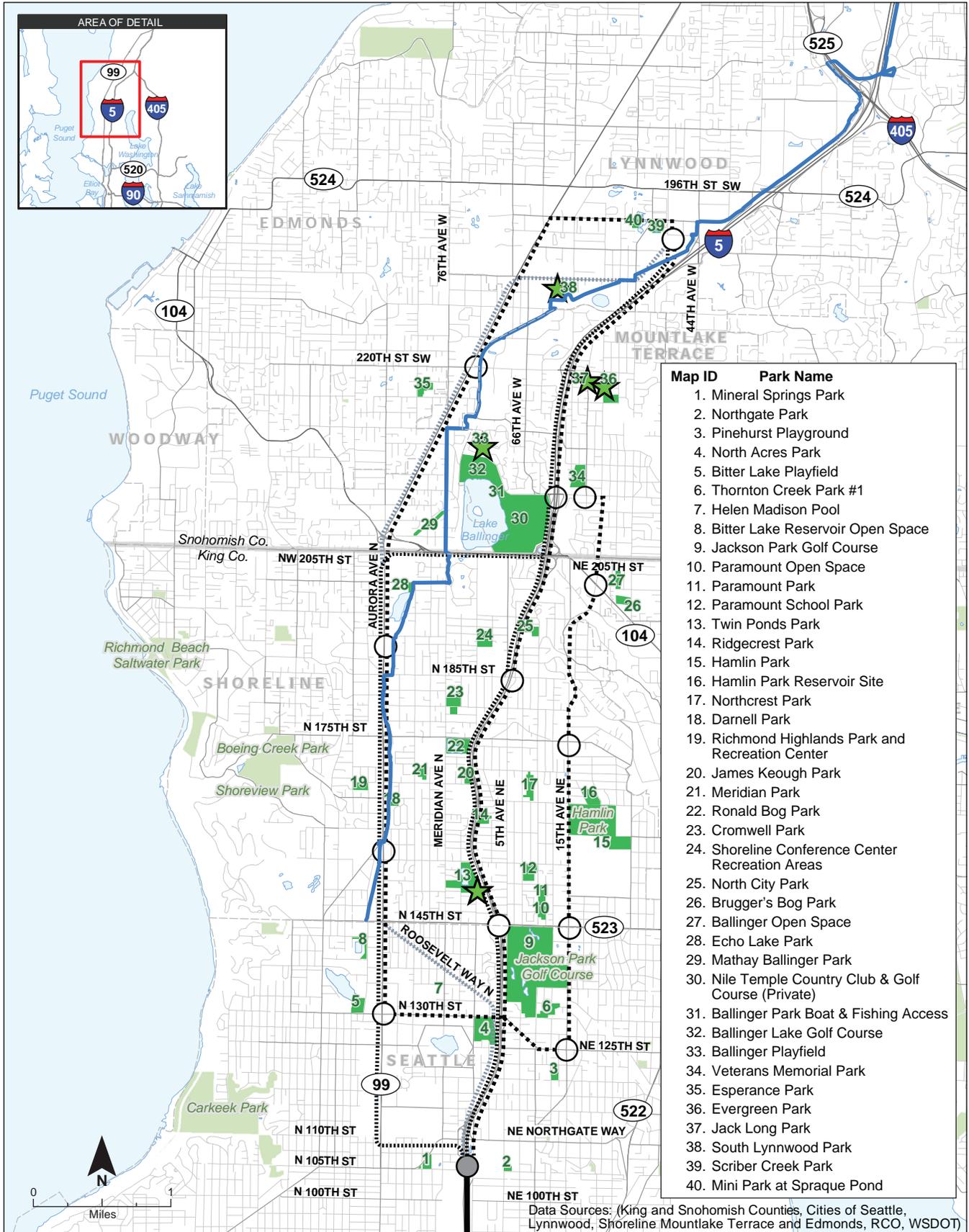
No parks or recreation facilities that used LWCF grant money for development or acquisition have the potential to be directly affected by any of the build alternatives.

### **5.3.5 Historic Resources**

No properties listed in the NRHP have been identified in the area within one block of the alternatives. There are also no properties designated as landmarks by either the City of Seattle or the City of Shoreline. Other jurisdictions along the corridor do not have ordinances for historic preservation, which also establish a landmark process.

Previous studies have identified four properties in the City of Shoreline that may be eligible for listing in the NRHP, although it is likely that further study during an EIS would identify other properties:

- Red Brick Road (Ronald Road, North 173rd to 179th Streets)
- Erickson House (19502 Aurora Avenue North)
- Melby's Echo Lake Tavern (19508 Aurora Avenue North)
- Auto Camp (17203 Aurora Avenue North)



**Figure 5-22. Parks and Recreation Facilities in the Project Area**

A visual review of these known properties indicates these four properties are still in existence with no apparent changes to alter their potential eligibility for listing in the NRHP. Of these four properties, only the Auto Camp at 17203 Aurora Avenue North would be in a location that could be directly affected by the L2: SR 99 Mixed Profile Light Rail Alternative or the L3: SR 99 Elevated Light Rail Alternative. The other three properties would not be directly affected by any alternative. Along SR 99, a small number of pre-World War II highway buildings remain. Most have been significantly altered and some are completely unrecognizable as older structures. Closer inspection may identify additional buildings that are potentially eligible for NRHP listing.

The No Build Alternative and the TSM/Baseline Alternative would have no direct effect on historic resources.

The L1: I-5 Light Rail Alternative involves property acquisitions along the east side of the freeway and at certain interchanges. Buildings in these areas date primarily from the 1940s to the 1960s, with some more recent apartment and commercial buildings. It is unlikely that any of them are eligible for listing in the NRHP, but further research and consultation with the DAHP would be needed to confirm the status of individual properties.

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives are likely to require full property acquisitions along their alignments. Development took place along the SR 99 corridor earlier than on the I-5 corridor, so there is a greater chance that older and more significant structures would be affected. One of the affected parcels is a property that is known to be potentially eligible for listing in the NRHP (the Auto Camp at 17203 Aurora Avenue North). The area also has several houses from the 1920s that may be intact and are potentially eligible.

The B2: Multi-Corridor BRT Alternative would have limited property acquisitions, and it does not appear that acquisitions would directly impact historic resources.

### 5.3.6 Archaeological Resources

A review of previously recorded archaeological sites on the DAHP online records system (WISAARD) suggests that no archaeological sites have been recorded in proximity to any of the build alternatives. However, unrecorded archaeological sites may exist throughout the project area for two reasons: 1) these areas have not been surveyed, or 2) surveys have been conducted, but did not include subsurface probing.

Using GIS, the build alternatives were overlaid on DAHP's GIS-driven archaeological probability model for the project area. This assessment helps measure how the location and amount of construction needed to build a given alternative can affect its risk for encountering archaeological resources. DAHP's model uses archaeological sensitivity factors common to most archaeological probability models (e.g., distance to water sources, landform type/slope) to predict the archaeological sensitivity of all the lands in the state for the purpose of recommending further study. Archaeological field surveys that include subsurface probing would be required to further refine DAHP's model outputs in the project area, and to provide more detailed information required for some areas, particularly high sensitivity zones.

Based on DAHP's model, all of the alternatives include low, moderate, and at least some areas of higher risk, generally in areas that have not been previously developed. DAHP "recommends" an archaeological field survey for areas identified as having a moderate risk for encountering archaeological materials, and "highly advises" that a survey be conducted for areas of high and very high risk.

The L1: I-5 Light Rail Alternative would travel through High- and Moderate-risk areas as defined in DAHP's archaeological probability model, and it has more areas that appear to have had limited development compared to the SR 99 alternatives. The northern part of the L2: SR 99 Mixed Profile Light Rail Alternative covers the same area as the L1: I-5 Light Rail Alternative; the southern part traverses moderate-risk areas to the west, and more of its immediate areas have been previously developed. Risks of encountering archaeological resources from the SR 99 variations would be similar to the L2: SR 99 Mixed Profile Light Rail Alternative. Risks for the L3: SR 99 Elevated Light Rail Alternative would be similar to the L2: SR 99 Mixed Profile Light Rail Alternative. Although the TSM/Baseline and B2: Multi-Corridor BRT Alternatives run through moderate- and high-risk areas, construction for both alternatives would be minimal, lowering their risk.

### 5.3.7 Air Quality and Greenhouse Gas Emissions

This measure assesses the ability to support air quality management goals and maintain conformity with the State Implementation Plan. Both air quality effects and greenhouse gas emissions were evaluated on a regional scale and include all the vehicle movements occurring in King, Pierce, Snohomish, and Kitsap counties.

This analysis identifies the potential for alternatives to improve or worsen air quality for criteria pollutants and affect the region's ability to meet or maintain air quality standards. Pollutant emission factors for vehicles in the region traveling on an arterial or highway were estimated using the latest version of the U.S. Environmental Protection Agency (EPA) emission factor algorithm (MOBILE6.2.03). Greenhouse gas emissions, discussed in terms of carbon dioxide equivalents (CO<sub>2</sub>e) were estimated using EPA's MOVES emission factor program, as is recommended by EPA. Sound Transit's Regional Forecasting Model, in conjunction with PSRC's Regional Travel Demand Model, was applied to generate 2030 forecasts for the No Build, TSM/Baseline, and each of the build alternatives (Sound Transit 2010d, 2010e). Potential change in regional vehicle miles traveled (VMT) and vehicle hours traveled (VHT) were used to estimate the criteria pollutants and greenhouse gases emitted in the region. The 2030 build alternative conditions were compared to the 2030 No Build Alternative conditions.

Most project alternatives are predicted to have positive effects on regional air quality and greenhouse gas emissions. While on a regional scale the percentage change is relatively small, the reductions would provide measurable environmental benefits. The light rail alternatives would result in decreases in both regional air pollutant emissions and greenhouse gas emissions compared to the No Build Alternative. The L1: I-5 Light Rail Alternative would reduce greenhouse gas emissions by about 235 tons daily, and the L3: SR 99 Elevated Light Rail Alternative would reduce greenhouse gases by about 223 tons daily. Similar reductions in

pollutants would also occur for these alternatives. Smaller to minimal reductions in greenhouse gas emissions would result with the L2: SR 99 Mixed Profile Light Rail Alternative and the TSM/Baseline and B2: Multi-Corridor BRT Alternatives. In all cases, the build alternatives would have lower VMT and VHT than the No Build Alternative; therefore, they are expected to have a beneficial effect on regional air quality and greenhouse gas emissions, compared to the No Build Alternative.

### 5.3.8 Aesthetics

The potential aesthetic effects were identified by evaluating the visibility of the proposed alternatives from nearby viewing locations, including from residential, commercial, and civic land uses. The proposed alternatives were evaluated for changes in scale and character from the existing visual context, and for the potential sensitivity of viewers to the changes in the visual character of the landscape.

Under the No Build Alternative, the project area would be expected to see incremental redevelopment of individual sites. Although these areas could change over time, in most locations the analysis assumes the future conditions would have similar visual character and scale to existing development, particularly in residential areas.

The build alternatives vary in the scale and potential character of proposed built elements. For the TSM/Baseline and B2: Multi-Corridor BRT Alternatives, changes are generally limited to station development or direct access ramps. Under the TSM/Baseline Alternative, visual effects could be associated with expanded park-and-ride facilities at NE 175th Street, where the proposed lot would be a large scale addition, and at NE 145th Street, where a relatively small existing park and ride lot would be replaced with a much larger lot, and mature conifers screening the site would be removed.

For the TSM/Baseline and B2: Multi-Corridor BRT Alternatives, the proposed park and-ride structure at the Shoreline Park-and-Ride adjacent to SR 99 would be larger than the nearby commercial development existing on the highway.

The L1: I-5 Light Rail Alternative generally follows the east edge of the I-5 right-of-way up to Mountlake Terrace. In these areas, the light rail alignment would generally replace mature landscape and would result in transportation infrastructure closer to existing homes. This could reduce visual quality for residences along the route.

In most locations along the alignment, adjacent homes are single story, and do not have direct views of vehicles on I-5. Where the light rail structures or train cars are visible, it represents a qualitative change in the type of view from the home. Elevated segments tend to be the most visible. Where the facility can be developed below the top of the current freeway depression, the current noise walls would often serve to block the views from adjacent homes and the visual effects would typically be limited to removal of existing vegetation and visible power lines.

Several stations proposed for the I-5 Light Rail Alternative would also be adjacent to residential development. The station that has a higher potential for visual effects is the NE 145th Street Station, where the platforms and associated infrastructure are elevated above the roadway, and the proposed parking facility would be visible from surrounding single family residences. Multi-story park-and-ride structures near residential properties also could occur at NE 185th Street in Shoreline.

The L1: I-5 Light Rail Alternative could result in changes in the character of the visual environment for the residents nearest to I-5; they would experience the effects frequently and over a long period. In some cases, the limited right-of-way may not allow reestablishment of a vegetative buffer, reducing opportunities for mitigation through replanting or screening.

The L2: SR 99 Mixed Profile Light Rail or L3: SR 99 Elevated Light Rail Alternatives would be largely or fully elevated along SR 99. They both would result in changes to the visual character of the urban fabric in the corridor, with at-grade sections of the L2: SR 99 Mixed Profile Light Rail Alternative resulting in less visual impact than elevated sections of either SR 99 light rail alignment. There are two cemetery properties where there could be greater sensitivity to visual effects of the facilities. Other changes (indirect) are likely to be from redevelopment along the corridor to infill the property where existing structures would be removed to accommodate light rail. For the east-west transitions between I-5 and SR 99, the elevated structure would be near some residences and would change the visual character of these areas.

The Roosevelt Way Variation for the L2: SR 99 Mixed Profile Light Rail Alternative would be out of scale and character with the neighborhood setting, with a high potential for visual quality effects.

Effects along the SR 99 portion of the SR 99 North Variation would be similar to the primary L2: SR 99 Mixed Profile Light Rail Alternative. A light rail facility along 208th Street SW would be a major change of scale and character from the existing conditions.

### 5.3.9 Noise

Potential noise effects were identified based on the general location of noise-sensitive land uses relative to the alternative alignments and modal elements. The project used FTA and the FHWA guidance for analyzing categories of noise-sensitive land uses. The most sensitive category is for land uses where quiet is essential to their intended purpose such as amphitheaters and historic landmarks. Noise at residences, hospitals, hotels, and other buildings where people sleep are in the second sensitive category. The third general category of noise-sensitive land uses includes schools, libraries, churches, cemeteries, and recreational facilities. Multiple units in buildings such as hotels, motels, and apartments are considered individually.

Noise-sensitive land uses located along the North Corridor include residences, schools, recreation areas, hotels, churches, libraries, cemetery lands, and medical facilities.

The project examined the noise-sensitive land uses within 100 feet of the alternatives to help measure the potential for noise effects to occur. Noise-sensitive sites at greater distances from

project alignments were also considered, because some locations could have noise effects at a greater distance due to topography, alternative design, existing noise conditions, and the operation of the alternatives.

The project then provided a qualitative assessment of potential noise effects to help compare how each alternative could change the existing noise environment. The assessment also considered existing noise mitigation in place along I-5, as well as potential property acquisitions along all alternatives.

Under the No Build Alternative, the project area would experience development patterns similar to those seen currently, which would likely result in minor changes to the existing noise environment.

Potential noise effects anticipated under the TSM/Baseline Alternative would be the lowest of all build alternatives due to the limited construction area and facility improvements. Noise effects may occur near the expanded park-and-ride facilities at NE 175th Street and NE 145th Street.

A large number of noise-sensitive land uses are located along the L1: I-5 Light Rail Alternative. This alignment runs alongside I-5 where nearby noise-sensitive sites (residences, parks, and churches) currently experience high traffic noise levels from vehicles traveling on I-5. Noise barriers are located intermittently along this alignment to partially shield highway noise and could serve to shield future at-grade light rail noise if relocated. The elevated sections of the L1: I-5 Light Rail Alternative could require additional mitigation measures to prevent noise effects from occurring at close proximity to the alignment and further from the alignment. Areas with the highest potential to experience noise effects are single-family residences located east of I-5 from NE 116th Street to NE 130th Street and from NE 148th Street to 232 Street SW.

The L2: SR 99 Mixed Profile Light Rail Alternative is also located near a large number of noise sensitive land uses. As with the I-5 alternative, noise-sensitive sites along the northern portion of the alignment are primarily single-family residences with limited multi-use apartments and hotels. The southern portion of the L2: SR 99 Mixed Profile Light Rail Alternative is located near more commercial areas, but it also has single-family residences and hotels, motels, and apartment buildings with a higher concentration of noise-sensitive living units. Residential areas located along North 110th Street and along NE 205th Street, where the alignment shifts to and from I-5, have the highest potential to experience noise effects from the L2: SR 99 Mixed Profile Light Rail Alternative. Apartments, hotels, and motels located along SR 99 also have the potential to experience noise effects from the L2: SR 99 Mixed Profile Light Rail Alternative with areas located nearest the elevated light-rail alignment having a higher potential for noise effects and changes to the existing noise environment. Noise mitigation along SR 99 would be more difficult than along I-5 due to the high frequency of existing driveways and cross-streets located along SR 99.

The L2: SR 99 Mixed Profile Light Rail Alternative Roosevelt Way Variation is located near a large number of single-family residences located both east and west of Roosevelt Way North from NE

130th Street to North 145th Street. Residents living along Roosevelt Way North would likely experience noise effects due to a high potential for changes to the existing noise environment. Noise mitigation along the Roosevelt Way Variation would be restricted to noise barriers located along the elevated guideway, which increases the scale of the guideway. Otherwise, noise insulation for home interiors would be needed. Noise walls would be less effective due to the high frequency of existing driveways and cross-streets located along Roosevelt Way North.

The SR 99 North Variation of the L2: SR 99 Mixed Profile Light Rail Alternative is located near a large number of apartment buildings, hotels and motels, and areas of single-family residences located east and west of SR 99 from NW 205th Street to 208th Street SW. This alignment follows 208th Street SW and runs near a large number of single-family and multi-family residential units. Noise-sensitive sites located along SR 99 and 208th Street SW would likely experience noise effects. A potential for changes in the existing noise environment is likely along the entire SR 99 North Variation, with a higher likelihood at residences located along 208th Street SW because this area does not currently experience high traffic noise levels. Noise mitigation along the SR 99 North Variation could include noise barriers located along the elevated guideway, but mitigating impacts to at-grade sections could potentially require residential sound insulation. Noise walls along the roadway would be less effective because of the high frequency of existing driveways and cross-streets located along SR 99 and 208th Street SW.

Anticipated noise effects and changes to the existing noise environment from the L3: SR 99 Elevated Light Rail Alternative would be similar to those detailed for L2: SR 99 Mixed Profile Light Rail Alternative, with noise from the elevated light-rail trains extending farther east and west of SR 99 from approximately North 120th Street to North 143rd Street, and approximately North 155th Street to North 173rd Street. If mitigation is needed, the most likely noise mitigation along SR 99 would likely be noise barriers located along the elevated guideway.

The B2: Multi-Corridor BRT Alternative is near a large number of noise-sensitive sites, but it involves less change to existing features or facilities than the light rail alternatives. This alignment primarily follows existing I-5, SR 99, and 15th Avenue NE corridors where nearby noise-sensitive sites currently experience high traffic noise levels and frequent bus operations. Noise barriers are located along several areas of the I-5 alignment that partially shield highway noise and would serve to shield future noise from BRT operations. While noise effects could still occur with the B2: Multi-Corridor BRT Alternative, this alternative would likely result in the second-lowest noise effects and would result in limited changes to the existing noise environment along much of the alignment. The area currently experiences high traffic noise levels from vehicles traveling on I-5, SR 99, and 15th Avenue NE. If mitigation is required for the B2: Multi-Corridor BRT Alternative, there would be the option to place or improve noise barriers along the I-5 corridor. However, mitigation along the SR 99 and 15th Avenue NE corridors would be more difficult due to high frequencies of side-streets and driveways along these routes.

Noise effects from construction of the project would also be a factor for all alternatives. Noise generated by heavy equipment would be as close as 50 feet from existing structures along several of the alignments. In a number of areas along all the light rail alternatives, many of the

adjacent structures are residential, which would be sensitive to noise from construction. The light rail alternatives would generate more construction noise than the TSM/Baseline and B2: Multi-Use Corridor BRT Alternatives because construction under the non-light rail alternatives would not occur along the entire length of the corridor.

### 5.3.10 Property Acquisitions and Displacements

Implementing transit improvements in the corridor will require acquisition of property for right-of-way, including alignments, stations, and other facilities. This would result in displacing and relocating some of the existing uses. This section summarizes estimates of the amount of right-of-way that would be needed outside of existing transportation rights of way, the effects here are based on the current conceptual designs. There are two types of property acquisitions:

- A partial acquisition would acquire part of a parcel but would not necessarily dislocate the existing use.
- A full acquisition would acquire the full parcel and displace the current use.

Table 5-24 summarizes the potential number of affected properties and the acreage of right-of-way needed for each alternative, and also discusses the types of land use potentially affected. Other effects associated with right of way are discussed in Section 5.2, Land Use and Economic Development Potential and Section 5.4, Community Equity.

The project corridor is a highly developed urban area with a high number of business/commercial and residential properties. With the exception of the No Build Alternative, each of the other alternatives would need new right-of-way, which would affect properties owned by others.

The alternative with the lowest right-of-way needs would be the TSM/Baseline Alternative, which would have very limited impacts. Under the TSM/Baseline Alternative, station improvements at Northgate, 175th Street/Meridian Avenue, and 175th Street/15th Avenue NE may require some minor property acquisitions and easement rights. Design details of these improvements have not been determined, but it is assumed that improvements would range from minor parking area acquisitions to approximately 4 to 5 acres of new right-of-way. Up to five properties could have potential full or partial acquisition impacts.

The L1: I-5 Light Rail Alternative would require 21 to 22 acres for new right-of-way. While details on the specific properties potentially affected would require a higher level of design, 140 to 170 properties could be affected by full or partial acquisitions, and more of the affected properties would be residences.

The L2: SR 99 Mixed Profile Light Rail Alternative and its two route variations would require the most right-of-way with the highest potential for acquisitions and displacements. The primary L2: SR 99 Mixed Profile Light Rail Alternative would require approximately 43 to 44 acres. Although details on the specific properties potentially affected would require a higher level of design, 320 to 370 properties could be affected by full or partial acquisitions. Most of these likely affected properties are businesses along the SR 99 corridor and involve larger parcels than the affected properties along the I-5 light rail alignment.

**Table 5-24. Summary of Right-of-Way Needs and Affected Property Types**

Alternative	Percent Commercial/Industrial	Percent Public/Institutional	Percent Residential Single Family	Percent Residential Multi-Family	Percent Parking/Vacant	Total Property Acquisitions*	Total Percent Partial Acquisitions	Total Percent Full Acquisitions	Total Affected Acres
TSM/Baseline	25%	25%	0%	25%	25%	0-5	100%	0%	4-5
L1: I-5 Light Rail	10-15%	5%	60-65%	5-10%	10%	140-170	45-50%	45-50%	21-22
L2: SR 99 Mixed Profile Light Rail	80%	0-5%	5%	5%	5-10%	320-370	70-75%	25-30%	43-44
L2: with SR 99 North Variation	70%	0-5%	10%	5%	5-10%	420-440	70-75%	25-30%	70-71
L2: with SR 99 Roosevelt Way Variation	60%	0-5%	20-25%	5%	5-10%	240-270	60-65%	35-40%	39-40
L3: SR 99 Elevated Light Rail	80%	0-5%	5-10%	5%	5-10%	200-230	65-70%	30-35%	39-40
B2: Multi-Corridor BRT	25%	0%	30%	15%	30%	20-30	55-60%	40-45%	7-8

\*These numbers represent a range of properties that could be affected by full or partial acquisitions. Details on the specific properties potentially affected would require a higher level of design.

For the Roosevelt Way Variation, the total acreage would be reduced by about 3 acres because the route would be shorter. This would also reduce the total number of affected properties to about 240 to 270 parcels if it were used for the L2: SR 99 Mixed Profile Alternative. While this option would avoid some impacts to commercial properties, it would increase the number of residential properties affected, with potentially 30 to 60 more residential properties being affected along Roosevelt Way.

The SR 99 North Variation would increase the total acreage for new right-of-way by about 25 acres, including commercial properties along SR 99, but also including some residential uses. Up to 100 more properties could be affected, compared to the primary alignment following I-5 from the Mountlake Terrace Station and to the north.

The L3: SR 99 Elevated Light Rail Alternative would require about 39 to 40 acres of right of way and its smaller footprint along SR 99 avoids some of the effects of the L2: SR99 Mixed Profile Alternative. About 200 to 230 properties could have potential full or partial acquisition impacts.

The B2: Multi-Corridor BRT Alternative would require approximately 7 to 8 acres, including areas for expanded transit centers and park-and-rides. Between 20 and 30 properties could be affected by full or partial acquisitions.

### 5.3.11 Transportation

The transportation system was evaluated for each alternative based on general purpose traffic operations, transit operations, pedestrian and bicycle travel, safety, and travel during construction.

#### GENERAL PURPOSE TRAFFIC OPERATIONS

Effects on general purpose traffic operations for each alternative were assessed based on changes in 2030 traffic volumes and operations of the freeway and arterials. General purpose traffic operations were evaluated along each alternative alignment, including consideration of the modifications required to achieve acceptable LOS operation, as well as assessments of effects on local traffic circulation and property access. The following measures were used to assess each alternative's effects on general purpose traffic operations:

- **I-5 Operation:** Effects on I-5 freeway traffic operation were measured through consideration of changes in volume-to-capacity (v/c) ratios at freeway screenlines, changes in operation in the HOV lanes, and changes in operation at interchange ramps and ramp areas.
- **Arterial Operation:** Effects on arterial traffic operation were measured based on intersection LOS along the alternative routes, intersection LOS near park and-ride lots and transit stations, effects along arterial BAT lanes, and the level of modification to maintain arterial operation. Changes in signal phasing and timing, turn lane storage, intersection volumes, and transit priority treatments are expected to influence intersection operation.
- **Local Traffic Circulation and Property Access:** The effects of the alternatives on local circulation and property access were measured by the amount of change in access that would be required with the alternative, including control of side-street and driveway access along at-grade light rail alignments.

A summary of the anticipated effects on general purpose traffic operations with each alternative is presented in Table 5-25.

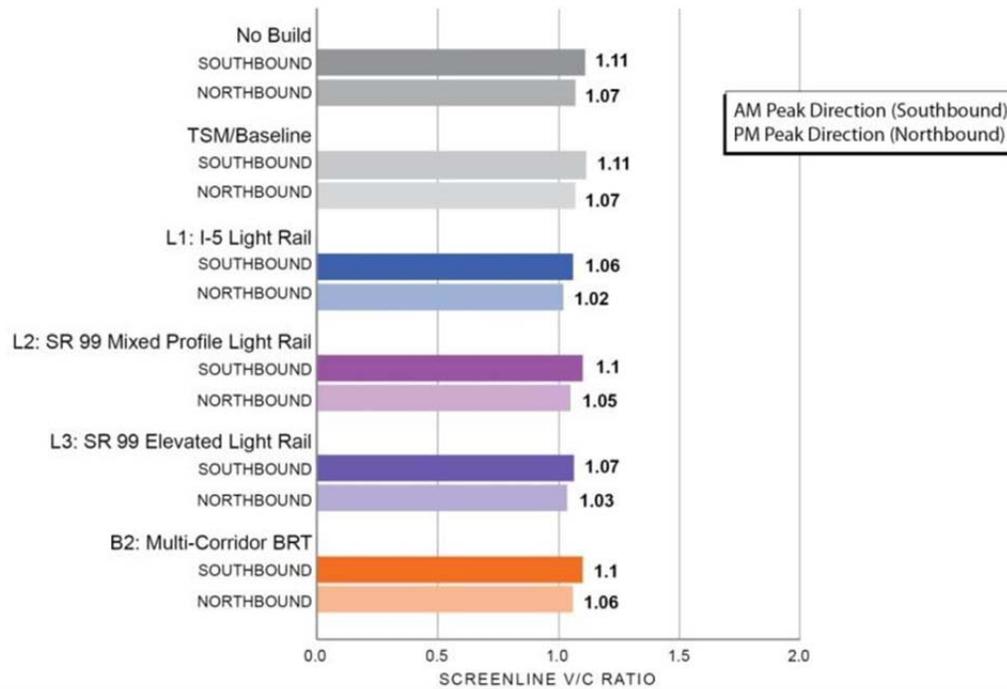
Freeway and arterial traffic operations were evaluated for the Level 2 Alternatives by comparing v/c ratios at screenlines. An east-west screenline just south of the King Snohomish County line captures the I-5 mainline, I-5 HOV lanes, SR 99, and key north south arterials between 20th Avenue NW in Shoreline and Brier Road in Lake Forest Park. V/c ratios at this screenline, presented in Figure 5-23, indicate that all of the build alternatives would reduce traffic volume along key arterial and highway corridors compared to No Build conditions. However, the reduction in v/c ratios is not enough to provide a measurable improvement in peak-period traffic operations for most alternatives and should only be used as a general indicator of each alternative's potential to induce a shift in travel mode. Other operational factors, such as proposed changes in HOV lane operation, and changes in operation at interchange ramps and ramp areas also affect freeway operations for each alternative.

**Table 5-25. Level 2 Evaluation Results—General Purpose Traffic Operations**

Alternative	I-5 Operations	Arterial Operations	Local Circulation and Property Access
TSM/Baseline	Little or no effect on I-5 traffic. Higher volumes of buses in HOV lane.	Higher bus volumes on arterials with more transit signal priority could result in additional delay for general purpose traffic. Potential local effects related to increased traffic at Lynnwood and Shoreline Park-and-Ride lots.	No change.
L1: I-5 Light Rail	Little or no effect on I-5 traffic, with a possible slight decrease in v/c and slight improvement in freeway operation. Slight improvement in HOV lane operation with reduced number of buses in HOV lane.	Potential local effects related to increased traffic at transit stations and park-and-ride lots.	No change.
L2: SR 99 Mixed Profile Light Rail*	No change in I-5 traffic or operation.	All existing signals to remain. Light rail in the median requires widening at signals to replace left-turn lane. Widening for left-turn lane requires reconstruction of SR 99. Dual left-turn lanes needed at North 125th, North 130th, North 145th, and North 160th Streets to maintain LOS. The resulting wider intersections lengthen pedestrian crossing distances, increase crossing time, and increase delay for side-street traffic. Potential local effects related to increased traffic at Lynnwood and Shoreline Park-and-Ride lots.	Light rail in the median limits access and circulation, whether at-grade or elevated. Light rail in the median limits access at minor streets and driveways to right in/right out only. No left-turn lane possible at North 112th Street (cemetery entrance) or North 117th Street (Home Depot entrance).
L3: SR 99 Elevated Light Rail	Little or no effect on I-5 traffic, with a possible slight decrease in v/c and minimal improvement in freeway operation. Slight improvement in HOV lane operation with reduced number of buses in HOV lane.	All existing signals to remain. No change in arterial operation north of North 130th Station. Side-running elevated alignment would have little impact on traffic signals at and north of North 125th Street. Potential local effects related to increased traffic at Lynnwood and Shoreline Park-and-Ride lots.	No change in local street operation or circulation north of North 130th Station. Light rail columns in the median south of North 125th Street would limit access and circulation, further limiting access at minor streets and driveways to right in/right out only. No left-turn lane possible at North 112th Street (cemetery entrance) or North 117th Street (Home Depot entrance). Column location may constrain driveway operations and may require driveway consolidation with possible signal control at SR 99 for driveway access.
B2: Multi-Corridor BRT	Additional buses in HOV lanes. Direct access transit ramps eliminate the weave between the HOV lane to the ramp terminals, benefiting buses and general purpose traffic operations.	Additional buses in SR 99 BAT lane may affect right-turning traffic. Potential local effects related to increased traffic at Lynnwood and Shoreline Park-and-Ride lots. Higher bus volumes on arterials with more transit signal priority could result in additional delay for general purpose traffic.	Increased bus volumes in the SR 99 BAT lanes may affect driveway access/egress.

\* The SR 99 North Variation and Roosevelt Way Variation would result in similar effects on freeway operations. The effect of light rail design and operations along at-grade and elevated segments of the SR 99 alignment would be greater with the SR 99 North Variation and less with the Roosevelt Way Variation, based on the length of the alignment running at-grade in the SR 99 median.

With all alternatives, localized increases in traffic would be generated by park-and-ride facilities and transit stations. At nearby intersections, traffic volumes would likely increase and congestion worsen during peak periods, with the magnitude of change depending on the proximity to the park-and-ride, the lot size, and the volume of traffic already traveling through the intersection. Figure 5-24 shows the study intersections where traffic congestion is anticipated to degrade with the Level 2 Alternatives compared to the No Build Alternative.

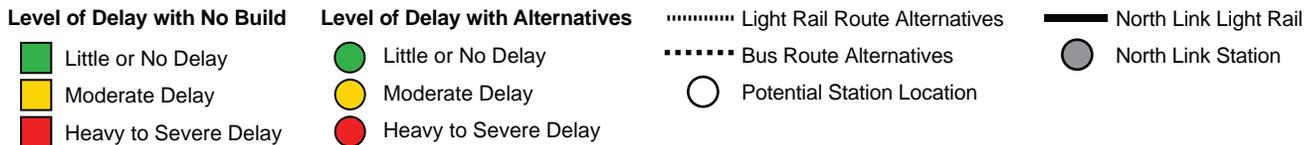
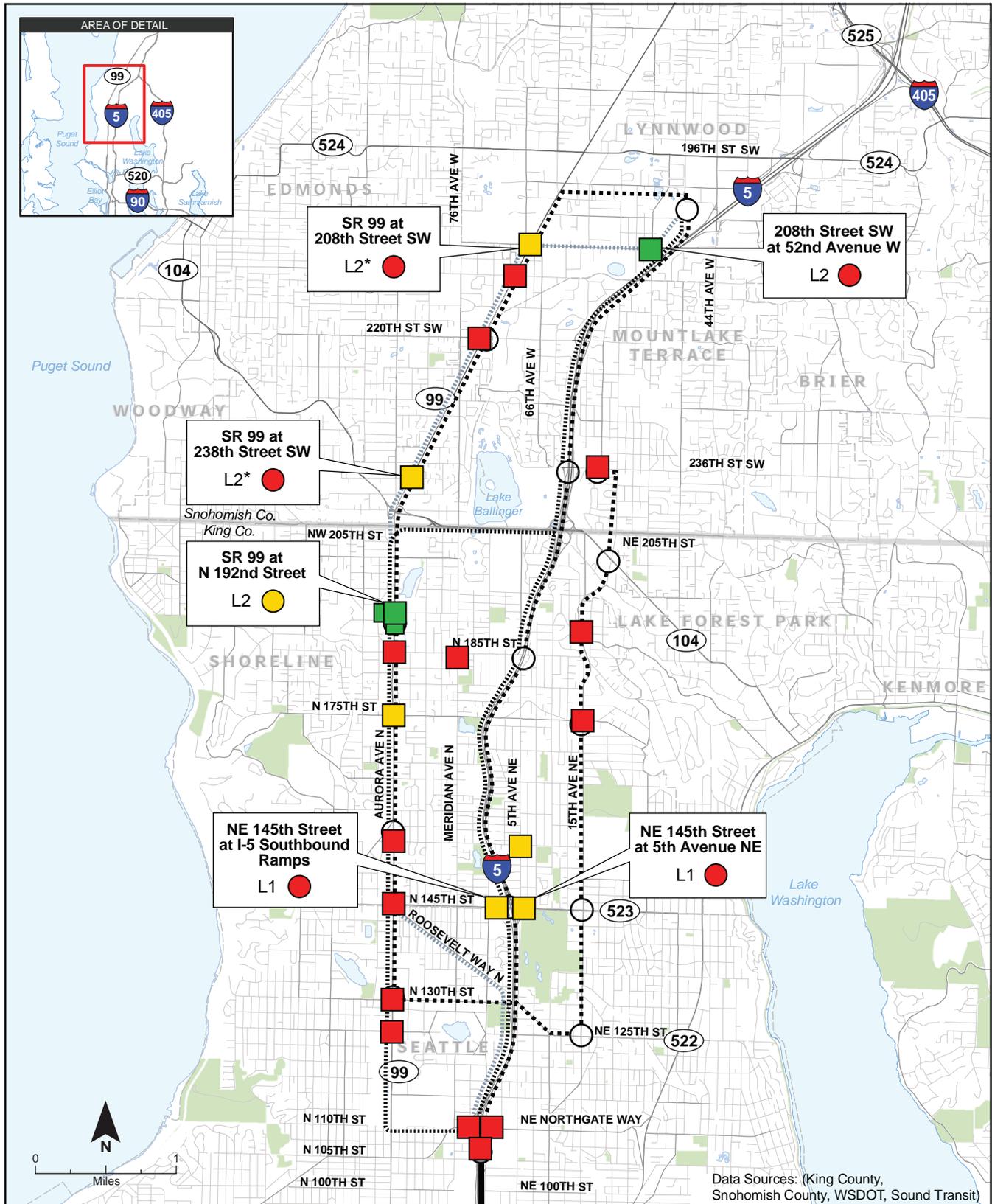


**Figure 5-23.** Screenline V/C Ratios at King/Snohomish County Line

As indicated in Figure 5-24, the most notable changes in congestion are likely to occur near new or expanded park-and-ride lots, and along arterial corridors with at-grade or median elevated light rail.

The TSM/Baseline and B2: Multi-Corridor BRT Alternatives could have minor effects on general purpose traffic operations near expanded park-and-ride facilities and with additional implementation of transit signal priority treatments along key transit arterial corridors.

The L1: I-5 Light Rail Alternative could also have minor effects on general purpose traffic operations in the vicinity of the stations with expanded park-and-ride facilities. This alternative could also result in a small decrease in freeway and arterial traffic volume, because some general-purpose trips would shift to transit, particularly along the I-5 corridor.



Notes: Levels of delay with alternatives are only shown for locations where delay would worsen by one or more levels.

\*The results reported for the L2: SR 99 Mixed Profile Light Rail Alternative at these locations are for the SR 99 North Variation only.

**Figure 5-24. Intersections Worsened by Level 2 Alternatives - PM Peak Hour**

The L2: SR 99 Mixed Profile Light Rail Alternative would have the greatest effect on general purpose traffic operations, with the mix of elevated and at-grade median alignment through the SR 99 corridor. As shown in Figure 5-24, this alternative would result in the highest number of intersections with degraded operations, mostly due to median rail operations along SR 99. Effects on intersection operations could be mitigated with widening at intersections to provide replacement left-turn lanes and left-turn storage to manage traffic. In addition, where light rail is in the median (at-grade or elevated), access at driveways and stop controlled side streets would be converted to right in/right out only. Left-turn movements would be accommodated by U-turns at signals and these movements would experience a noticeable increase in delay. A left-turn lane used for U-turns requires a wide right lane to complete the U-turn. The analysis results shown in Figure 5-24 assume that a number of these measures would be included as part of the L2: SR 99 Mixed Profile Light Rail Alternative to maintain overall intersection operations similar to the No Build Alternative; however, even with these improvements left-turn movements and cross-street movements (for both vehicles and pedestrians), would be severely affected.

The effect of light rail design and operations along at-grade and elevated segments of the SR 99 alignment would be greater with the SR 99 North Variation and less with the Roosevelt Way Variation, based on the length of the alignment running at-grade in the SR 99 median. The SR 99 North Variation would degrade operations at an additional two intersections along SR 99 north of the King County/Snohomish County line compared to the primary alignment, and the Roosevelt Way Variation would not affect any intersections on SR 99 south of North 145th Street.

The L3: Elevated Light Rail Alternative would have minor effects on general purpose traffic in the vicinity of the median alignment along SR 99 where column placement would impact left turn operations. This could impact two to three signalized intersections south of the North 130th Street station. This alternative could also result in a small decrease in freeway and arterial traffic volume because some general-purpose trips would likely shift to transit.

## TRANSIT OPERATIONS

Measures relating to transit operations include benefits and effects associated with each alternative or the conditions in which they operate. Depending on the alternative, transit benefits would include service operating in exclusive rights-of-way, direct access ramps connecting HOV lanes to transit centers, and transit signal priority treatments. Potential benefits and effects include reduced transit travel time, improved transit service reliability, changes in transit operations, potential delay, and route structure changes to local bus routes. The effects on transit operations include the truncating of routes to serve light rail alternatives and then an increase in ridership as bus routes serve new light rail stations. Some form of bus service modifications would occur with all alternatives.

The effects and benefits expected for transit operations are summarized in Table 5-26 by alternative.

**Table 5-26. Level 2 Evaluation Results—Transit Operations**

Alternative	Transit Effects/Conditions	Transit Benefits
TSM/Baseline	Increasing congestion over time in HOV lanes would degrade the travel time and reliability of transit on the I-5 and SR 99 express bus routes.	Additional express bus routes would connect to Northgate Station. Provision of separate transit lane and left-turn lane for buses in Northgate interchange area would improve transit speed and reliability. Bus operations at Aurora Village Transit Center would be relocated to the Shoreline light rail station. BRT and local feeder service would be provided at a single location.
L1: I-5 Light Rail	Commuter bus operations on I-5 would be truncated at Lynnwood Transit Center Station, Mountlake Terrace Station, and 185th Street Station to feed light rail stations. Local bus service would be adjusted to complement light rail. Ridership on existing Community Transit <i>Swift</i> and King County Metro RapidRide BRT services would potentially decrease as a result of competing light rail service in the corridor.	Light rail operating in exclusive right-of-way would provide a high level of speed and reliability for transit. Light rail would replace some buses in I-5 corridor, freeing up service hours for other local service.
L2: SR 99 Mixed Profile Light Rail*	Community Transit I-5 commuter routes connecting south Snohomish County to downtown Seattle and to the University of Washington would continue to operate as they do today, with the exception of routes that currently originate in Edmonds and provide service to downtown Seattle and the University District, which would terminate at the Mountlake Terrace Freeway Station and Shoreline Transit Center Station where passengers would transfer to light rail. Commuter bus operations from north Snohomish County would not be affected. Sound Transit bus operations in south Snohomish County on I-5 would be truncated at Lynnwood Transit Center Station to serve light rail stations. Local bus service would be adjusted to complement light rail. Ridership on existing King County Metro RapidRide BRT service would potentially decrease as a result of competing light rail service in the corridor.	Light rail would provide a high level of speed and reliability for transit, although the SR 99 alignment is slower than on I-5, and may be slower than express bus service between selected trip pairs. Light rail may replace some buses in I-5 corridor, which could shift service hours to local service. Existing Community Transit <i>Swift</i> BRT service would provide feeder service to light rail, potentially increasing ridership on the BRT service. Bus operations at Aurora Village Transit Center would be relocated to the Shoreline light rail station. Rail, BRT, and local feeder service would be provided at a single location.
L3: SR 99 Elevated Light Rail	Commuter bus operations on I-5 would be truncated at Lynnwood, Mountlake Terrace, and Shoreline transit centers to feed light rail stations. Local bus service would be adjusted to complement light rail. Ridership on existing King County Metro RapidRide BRT service would potentially decrease as a result of competing light rail service in the corridor.	Light rail operating in exclusive right-of-way would provide a high level of speed and reliability for transit. Light rail would replace some buses in I-5 corridor, freeing up service hours for other local service. Existing Community Transit <i>Swift</i> BRT service would provide feeder service to light rail, potentially increasing ridership on the BRT service. Bus operations at Aurora Village Transit Center would be relocated to the Shoreline light rail station. Rail, BRT, and local feeder service would be provided at a single location.
B2: Multi-Corridor BRT	Increasing congestion over time in HOV lanes would degrade transit travel time and reliability on the I-5 and SR 99 routes. BRT routes would terminate at Northgate Link Station; transit riders destined to Seattle would transfer to light rail. Lynnwood and Mountlake Terrace express routes would be replaced by BRT. Ridership on existing Community Transit <i>Swift</i> and King County Metro RapidRide BRT services may slightly decrease as a result of competing BRT service in the corridor.	Transit direct access ramps would provide operation improvements between I-5 HOV lanes and the Northgate Station as well as North 130th Street. Transit travel time between Lynnwood and Northgate would improve over the TSM/Baseline Alternative. Stop consolidation on SR 99 and 15th Avenue NE would improve transit travel time. Bus operations at Aurora Village Transit Center would be relocated to the Shoreline light rail station. BRT and local feeder service would be provided at a single location.

\* The SR 99 North Variation and Roosevelt Way Variation would result in similar effects on transit operations. With the SR 99 North Variation, some Community Transit I-5 commuter routes connecting south Snohomish County to downtown Seattle and to the University of Washington may terminate at the 220th Street Station where passengers would transfer to light rail. With the Roosevelt Way Variation, local King County Metro bus routes in north King County would not be able to interface with rail service at the 130th Street Station, and would need to use the Northgate and/or 160th Street stations to access light rail.

The TSM/Baseline Alternative is not expected to noticeably affect the current and proposed SR 99 BRT routes (Community Transit *Swift* service and Metro RapidRide E Line), while those services may slightly decrease with the B2: Multi-Corridor BRT Alternative.

Community Transit *Swift* and King County Metro RapidRide BRT ridership is projected to decrease under the L1: I-5 Light Rail Alternative due to the competing light rail service in the corridor.

Community Transit *Swift* BRT ridership on SR 99 is projected to increase under the L2: SR 99 Mixed Profile Light Rail Alternative as riders use it to connect with light rail at the Shoreline Park-and-Ride Station, while ridership on King County Metro RapidRide BRT service is projected to decrease. At-grade light rail in the L2: SR 99 Mixed Profile Light Rail Alternative would increase general purpose traffic delay, which would also cause delay to bus operations in the corridor on SR 99 and cross streets. These effects would be greater with the SR 99 North Variation and slightly less with the Roosevelt Way Variation, based on the length of the alignment running at-grade in the SR 99 median.

Similar to the L2: SR 99 Mixed Profile Light Rail Alternative, with the L3: SR 99 Elevated Light Rail Alternative, Community Transit *Swift* BRT ridership is projected to increase as riders could connect to rail at the Shoreline Park-and-Ride Station, while ridership on King County Metro RapidRide BRT service is projected to decrease.

Future managed lanes on I-5 could increase peak-period running speeds for buses as compared to the current HOV lane operation; however, based on sensitivity tests, it is expected that nearly all the benefits of this increased speed would be experienced by Community Transit's express routes serving downtown Seattle and the University District rather than the new North Corridor bus routes added under either the TSM/Baseline Alternative or the B2: Multi-Corridor BRT Alternative.

## PEDESTRIAN AND BICYCLE TRAVEL

At this level of alternative development and analysis, the primary consideration for pedestrian and bicycle effects is the degree to which an alternative, when combined with other public improvements and private development, might alter the larger environment surrounding stations and along the alignment. Once the alternatives are developed further and more is known about station locations and configurations, a more detailed and localized analysis can be completed.

The TSM/Baseline Alternative would have little or no effects on pedestrian and bicycle travel. The modest bus stop and transit center improvements would provide some limited but very localized enhancements.

The L1: I-5 Light Rail Alternative would have effects on pedestrian and bicycle travel primarily around the station areas. The alignment itself, located within or along I-5, is not likely to result in other investments that might alter the pedestrian and bicycle environment along the

freeway. The four new stations, however, each have a varying degree of potential to become part of a larger transformation of the areas around them that could result in major improvements for pedestrian and bicycle travel.

The L2: SR 99 Mixed Profile Light Rail Alternative has the greatest potential to result in enhancements to the pedestrian and bicycle environment both in the areas around stations and along the guideway alignment. Unlike the I-5 alignment, SR 99 is a multi purpose arterial with some level of existing pedestrian and bicycle activity. In addition, the Interurban Trail, a regional bicycle and pedestrian facility, parallels a portion of the alignment. Given the level of existing pedestrian and bicycle activity and investment, and given that SR 99 would need to be reconstructed from approximately North 120th Street to North 175th Street, the L2: SR 99 Mixed Profile Light Rail Alternative, when combined with other private developments and public investments, could result in major enhancements to pedestrian and bicycle travel along SR 99.

The L3: SR 99 Elevated Light Rail Alternative would result in enhancements at the station areas. However, in contrast to L2: SR 99 Mixed Profile Light Rail Alternative, major portions of SR 99 would not have to be reconstructed under this alternative. Nonetheless, when station improvements are combined with other private developments and public investments, they could still result in major enhancements to pedestrian and bicycle travel along SR 99.

The B2: Multi-Corridor Alternative would have effects similar to the TSM/Baseline Alternative, although bus stop/station and transit center improvements would be more substantial than for the latter.

## TRANSPORTATION SAFETY

The primary considerations for effects on transportation safety are potential changes in conflicts for pedestrians, bicycles, and vehicles (general purpose and transit) along the alignment, crossing the alignment, and accessing the associated facilities, such as the light rail stations, BRT stations, and park-and-ride facilities. Where the alternative is routed through highly congested intersections, the potential for conflicts would increase. Where an alternative is grade separated and or removes transit from mixed traffic operations conflicts would decrease. Table 5-27 summarizes evaluation results related to transportation safety for each of the alternatives in comparison to existing, or No Build, conditions.

For the TSM/Baseline Alternative, the potential for conflicts is expected to remain comparable to the No Build condition or very slightly increased. This alternative would increase bus volumes in mixed traffic but also include improvements that would reduce conflicts at key I-5 access locations.

All light rail alternatives would operate on exclusive guideways and would result in rail transit operations with little to no conflicts with existing traffic. The L1: I-5 Light Rail and the L3: SR 99 Elevated Alternatives, which are both fully grade separated, would result in no rail transit conflicts with other traffic.

**Table 5-27. Level 2 Evaluation Results—Safety**

Alternative	Vehicles	Pedestrians	Bicycles
TSM/Baseline	Little or no change. Transit operates through nine highly congested intersections.	No change	No change
L1: I-5 Light Rail	Eliminates all vehicle conflicts with regional transit services. Slight improvement in safety with reduced v/c ratios at screenlines. Reduced potential for vehicle conflicts in HOV lanes with decrease in bus volume.	No change	No change
L2: SR 99 Mixed Profile Light Rail*	Potential to increase vehicle conflicts with regional transit services where rail passes through at-grade crossings. Nature and type of vehicle accidents would change. Median alignment would also result in access control and reduced vehicle conflicts at driveways and local street intersections. Alignment passes through a number of highly congested intersections, depending on variation.	Consolidated pedestrian crossings at signal controlled locations along SR 99 should improve safety. However, longer pedestrian crossings could increase potential for pedestrian/vehicle conflicts. Access control along SR 99 could also increase jay-walking, due to long spacing between signal/controlled crossings.	Access control along SR 99 could reduce bicycle/vehicle conflicts and would also restrict bicycle mobility. At-grade intersections with light rail tracks may be a crossing hazard for turning bicyclists. Design would provide right-angle crossing to minimize hazard for bicyclists. Major turns in alignment are elevated (north variation).
L3: SR 99 Elevated Light Rail	Eliminates all vehicle conflicts with regional transit services. Median alignment south of North 125th Street would result in access control and reduced vehicle conflicts.	No change	In median alignment south of North 125th Street, access control along SR 99 could reduce bicycle/vehicle conflicts and could also restrict bicycle mobility.
B2: Multi-Corridor BRT	Little or no change. Transit would operate through seven highly congested intersections with an increased potential for vehicle conflicts. Improved safety for transit vehicles on I-5 with direct access ramps.	No change	No change

\* The potential positive and negative safety effects of running an at-grade median alignment would be greater with the SR 99 North Variation and less with the Roosevelt Way Variation, based on the length of the alignment running at-grade in the SR 99 median.

The L2: SR 99 Mixed Profile Light Rail Alternative would have varying numbers of at-grade traffic crossings, depending on the alignment variation, where potential conflicts with roadway traffic could occur. The nature and type of accidents would change with an at-grade median alignment, when compared with the No Build condition. The median alignment would result in increased access control and thus would reduce vehicle conflicts along the arterial (SR 99) and some types of vehicle collisions may be reduced, e.g., those involving mid block left-turning vehicles.

For the L2: SR 99 Mixed Profile Light Rail Alternative, the design would include access control along SR 99, and locations for pedestrian crossing would be consolidated at controlled locations

(i.e., signals). The median alignment (with widening for left-turn storage at signals) would result in longer pedestrian crossing distance, which could increase potential for pedestrian/vehicle conflicts. This could be alleviated somewhat by providing safe refuges for pedestrians in the median. Long spacings between signals/controlled crossings could also potentially increase jay-walking.

The potential safety effects (positive and negative) of running an at-grade median alignment would be greater with the SR 99 North Variation and less with the Roosevelt Way Variation, based on the length of the alignment running at-grade in the SR 99 median.

The L3: SR 99 Elevated Light Rail Alternative would result in no conflicts between light rail trains and other traffic. The elevated median alignment, south of North 125th Street, would result in increased access control and reduced vehicle conflicts along the SR 99 arterial. In this segment, there would be consolidated pedestrian crossings (at signals), which could improve safety by facilitating crossings at controlled locations.

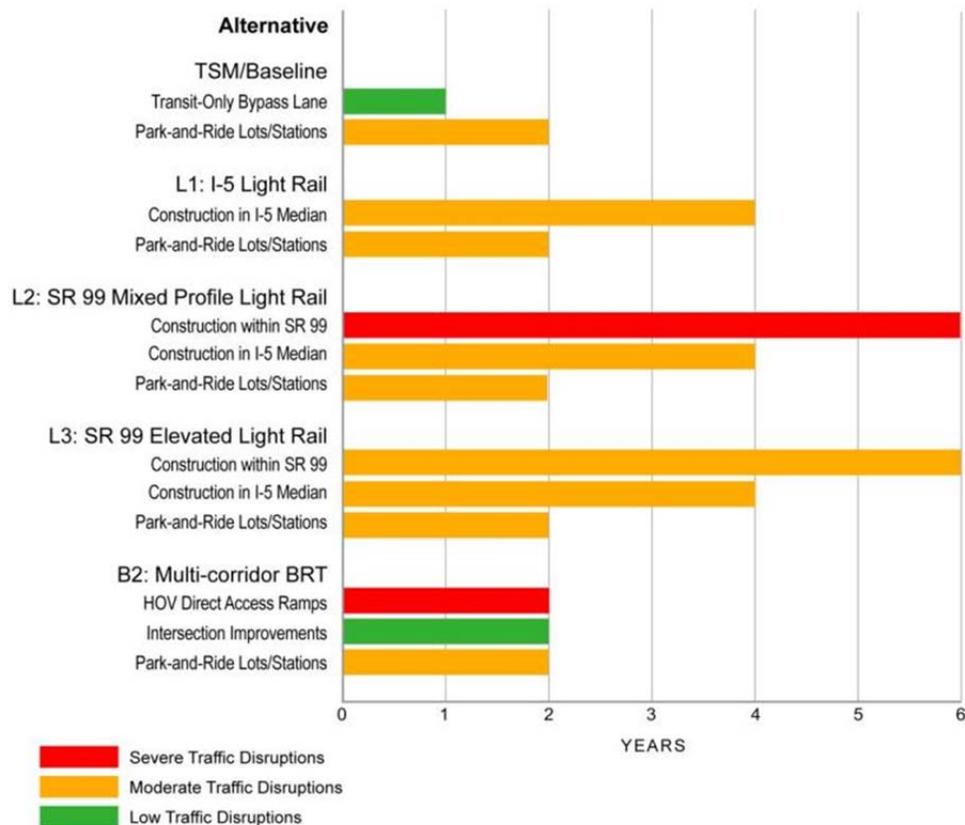
With the B2: Multi-Corridor BRT Alternative, the potential for conflicts is expected to remain comparable to the No Build condition or very slightly increased. This alternative would increase bus volumes in mixed traffic but also include improvements that reduce conflicts at key I-5 access locations.

## **CONSTRUCTION EFFECTS ON THE TRANSPORTATION SYSTEM**

This section identifies potential construction-related disruptions that could affect the traveling public. Construction effects are measured by the severity and duration of construction activities as shown in Figure 5-25. Construction phasing has a direct effect on severity and duration. The light rail alternatives would be constructed by segments, starting at one end and moving to the other end. Construction phasing of previously built Link light rail was considered for application to the I-5 and SR 99 light rail alignments. This includes Link light rail through Tukwila (elevated light rail), which was constructed between 2005 and 2008; and Link light rail on Martin Luther King Jr. Way (at-grade median-running light rail), which was constructed between 2004 and 2008.

The TSM/Baseline Alternative would have limited construction disruptions on the transportation system. A modest level of disruption would occur with construction of the I-5 ramp improvements in the Northgate area. Park-and-ride lot expansion would result in either a portion of the park-and-ride lot closed for construction and/or the relocation of park-and-ride activity to another park-and-ride lot. Local traffic impacts would occur in the vicinity of park-and-ride lots and transit centers during construction.

Construction within the I-5 median for the L1: I-5 Light Rail Alternative would have a relatively long duration (4 years), but a relatively moderate effect on traffic operations. At locations where the guideway crosses I-5, construction may require some short-term lane closures (and possibly night-time full road closures) of I-5. It is anticipated that the L1: I-5 Light Rail Alternative would include one crossing of I-5.



**Figure 5-25. Construction Effects on Transportation System**

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The L2: SR 99 Mixed Profile Light Rail Alternative is expected to have the highest level of traffic disruption over the longest duration (6 years) of all the alternatives. Construction along SR 99 could last approximately 6 years, with severe disruption to traffic operations. This disruption would occur in areas that have been affected by recent reconstruction projects along SR 99, and local travelers and businesses could face an additional several years of construction-related traffic disruption. The alternative would also require two to three crossings of I-5, which would likely involve periodic lane closures and temporary full closures of the freeway, and it would involve the same construction within the I-5 median as in the L1: I-5 Light Rail Alternative. The SR 99 North Variation would extend traffic construction along SR 99 farther to the north. The Roosevelt Way Variation would reduce the amount of traffic disruption on SR 99 south of North 145th Street; however, it would also create major property access and circulation problems along Roosevelt Way during construction.

The L3: SR 99 Elevated Light Rail Alternative would result in less traffic disruption to SR 99 than the L2: SR 99 Mixed Profile Light Rail Alternative because the alignment occurs primarily to one side of SR 99; however, it would be of a similar duration, and would again subject local travelers to an additional several years of construction-related traffic disruption in areas that have had major recent reconstruction. There would be more traffic disruption than for the L1: I-5 Light Rail Alternative where construction would occur primarily within existing WSDOT right-of-way (either along side or in the median of I-5) for much of the alignment. Additionally, the

estimated construction duration would be longer than with the L1: I-5 Light Rail Alternative due to the length of the L3: SR 99 Elevated Light Rail Alternative alignment. Finally, similar to the L1: I-5 Light Rail and L2: SR 99 Mixed Profile Light Rail Alternatives, the L3: SR 99 Elevated Light Rail Alternative could require some partial to full freeway closures for construction of guideway crossings over I-5. The L3: SR 99 Elevated Light Rail Alternative would include three crossings over I-5, with similar potential for traffic disruption as with the L2: SR 99 Mixed Profile Light Rail Alternative.

Construction of the I-5 HOV and/or transit direct access ramps with the B2: Multi-Corridor BRT Alternative is expected to have a high level of disruption to I-5 traffic over a 2-year duration, representing the second-greatest level of construction disruption among the alternatives.

With all alternatives, new or expanded park-and-ride lots and transit centers would result in either a portion of the park-and-ride lot closed for construction and/or the relocation of park-and-ride activity to another park-and-ride lot. Local traffic impacts would occur in the vicinity of park-and-ride lots and transit centers during construction.

## 5.4 COMMUNITY EQUITY

This analysis of community equity examines the potential adverse and beneficial effects on minority and low-income populations and communities, generally categorized as “environmental justice communities.” Figure 5-26 illustrates the environmental justice communities in the project area based on demographic characteristics of small geographic areas defined by the U.S. Census Bureau.

Most of the analysis is based on 2000 census tract block group statistics (U.S. Census Bureau 2000) because long-range forecasts do not project demographic characteristics. Newer statistics, however, were used to assess likely changes in the study area demographics since the 2000 census. The initial alignment information for the conceptual alternatives was used to assess disruptions to communities adjacent to the alternatives. Long-range effects were examined based on minority and low-income populations residing near proposed transit stations.

All of the alternatives would traverse through or be in close proximity to minority and low-income communities. This allows the alternatives to provide transit benefits to these communities, but also increases the potential for impacts.

The study area population, comprising census block groups adjacent to the alternatives, is an estimated 31 percent minority and an estimated 9 percent low-income. Figure 5-26 shows census block groups that have minority populations above 24 percent, or low-income populations exceeding 8 percent of the total population. These thresholds for low-income and minority populations indicate higher concentrations than the average for the combined King and Snohomish County region.

Depending on the alternative, corridor minority populations range from 26 to 33 percent, which is greater than the two-county average of 24 percent. Low-income populations range between 9 and 10 percent, which is slightly greater than two-county average of 8 percent.

Based on the 2010 census, which is currently only available at the city level, the minority composition of the study area population may have increased by as much as 8 percentage points and the low income population may have increased by 2 to 3 percentage points since the 2000 census.

Potential effects on the community were considered during construction and after construction of the project alternatives. Each alternative's potential to affect environmental justice communities is influenced by its effect on community facilities, potential to displace residences and/or businesses, and potential to introduce barriers that could affect community cohesion and interaction.

### 5.4.1 Construction Effects

Because construction would be minimal for both the TSM/Baseline and B2: Multi Corridor BRT Alternatives, neither of these alternatives would be expected to adversely affect community cohesion. The potential acquisitions for the TSM/Baseline and B2: Multi-Corridor BRT Alternatives would be minor compared to the light rail alternatives.

In contrast, construction activities for the light rail alternatives, including the SR 99 North Variation and the Roosevelt Way Variation, would extend along the entire corridor. The degree to which communities would be affected by construction activities corresponds to the length of each alternative alignment—about 8.5 miles for the L1: I-5 Light Rail Alternative, 10.2 miles for the L2: SR 99 Mixed Profile Light Rail Alternative, and 10.2 miles for the L3: SR 99 Elevated Light Rail Alternative.

There is not a notable difference among alternatives in the composition of the populations residing within about 0.5 mile of the light rail alignments. All are more diverse compared to the combined two-county averages, with an estimated 35 percent minority and 8 to 10 percent low-income populations. The land use characteristics along SR 99, however, mean somewhat more residents would be affected by light rail construction associated with the L2: SR 99 Mixed Profile Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative than would be affected by the L1: I-5 Light Rail Alternative. In addition, these areas along SR 99 have already experienced extensive recent construction activity and related effects from disruption of access and business activity associated with the City of Shoreline's Aurora Corridor Improvement Program, which is expanding 60 blocks of Aurora Avenue through the city to add business access and transit (BAT) lanes, re-channelize the roadway, and upgrade the streetscape. While these construction effects could disrupt or dampen economic activity to businesses and other uses along SR 99, it would create particular hardships for low income minority populations and businesses.

## 5.4.2 Effects on Environmental Justice Communities

The L1: I-5 Light Rail Alternative could affect some residences through acquisitions and displacements, mostly in areas along I-5 where the WSDOT right-of-way is constrained. Few businesses would be affected. The potential displacements include areas where low-income or minority communities have been identified, but they are not concentrated in any single neighborhood.

This alternative would not create a new barrier to interaction because the alignment generally follows I-5, which already functions as a boundary for adjacent neighborhoods. The highway right-of-way is wide, sometimes at higher elevations, and has extremely limited numbers of cross streets such that interaction between residents on either side of the highway is essentially precluded. The alignment would not eliminate any existing crossings, so interaction both within and between neighborhoods would not change. Therefore, an I-5 alignment is expected to have few impacts to neighborhood cohesion of North Corridor communities.

The L2: SR 99 Mixed Profile Light Rail Alternative, which has more sections where new rights of-way would be needed, would require right-of-way acquisitions and potential displacements that are estimated to be more than double the number of displacements of the L1: I-5 Light Rail Alternative. These acquisitions also would occur in areas where low-income or minority communities have been identified. The southern connection between NE Northgate Way/SR 99 would remove a portion of an existing neighborhood.

Except for the southern transition between Northgate Way and SR 99, most of the alignment follows major arterial roadways or the freeway, both of which form boundaries for adjacent neighborhoods. The existing width of the major arterial, as well as regional commercial businesses fronting the arterial with low-density residential properties behind the businesses, make interaction between residents from either side of the roadway unlikely despite frequent street crossings. Future redevelopment of transit-oriented land uses around the new transit stations, however, would create opportunities for additional interaction of residents. Light rail could alter some existing features and operations along these roadways. Several major intersections could experience higher levels of congestion, which could further discourage but not eliminate interactions between adjacent residential neighborhoods. Existing streets crossing the alignment would continue to connect neighborhoods. This alternative overall would have low adverse impacts with some benefits for community cohesion. But the east-west sections of the alignment would have a higher potential for affecting communities.

The effects of the Roosevelt Way and SR 99 North Variations would be similar to the primary L2: SR 99 Mixed Profile Light Rail Alternative, but would further increase the effects of displacements. An alignment along residential Roosevelt Way would adversely affect cohesion and interaction because this local street traverses diagonally through the middle of a residential neighborhood. The at-grade light rail operation would change vehicular, bicycle, and pedestrian mobility within the neighborhoods as well as general character with increased noise and safety concerns for children. In contrast, an alignment continuing north along SR 99 through Snohomish County would have similar effects to the other sections along SR 99,

although the east-west transition along 208th Street SW is immediately adjacent to single-family residences and nearby parks, and would have a potential for higher effects similar to the alignment along Roosevelt Way.

The L3: SR 99 Elevated Alternative would have similar impacts to the L2 SR 99 Mixed Profile Alternative, but it would remove at-grade sections and avoid the related impacts to traffic operations. It would have similar rights-of-way acquisition effects (although concentrated on the west side of SR 99 as opposed to both sides).

The cohesion of residential neighborhoods to either side of the alignment would change little considering the major arterial and the highway segments function as barriers that define the exterior boundaries of adjacent neighborhoods. However, the addition of the elevated alignment would increase the adverse barrier effect compared to the L2: SR Mixed Profile Light Rail Alternative due to changes in visual character and shadows. These changes could deter interaction between adjacent residential neighborhoods, but would cause few changes within adjacent neighborhoods. Future redevelopment of higher-density land uses, retail shops, and other transit-oriented development, however, could increase opportunities for residents of adjacent residential neighborhoods to interact near the new transit stations. The reduced traffic congestion at intersections, may somewhat improve interaction between neighborhoods on either side of the alignment corridor. As such, the effects would be similar, but somewhat more adverse, compared to the L2: Mixed Profile Light Rail Alternative.

### 5.4.3 Transportation Benefits

Analysis of long-term benefits to minority and low-income populations included examination of the following measures: long-term transit access benefits (residents within 0.5 mile of transit stations); improvements in travel time; and access to employment opportunities.

#### ACCESS TO TRANSIT STATIONS

All of the proposed transit stations would be located in minority and/or low-income communities, but the access to transit stations varies by alternative. The number of transit stations per alternative range between four and ten. The TSM/Baseline Alternative and the B2: Multi-Corridor BRT Alternative have nine and ten, respectively. The L1: I-5 Light Rail Alternative and the two light rail alternatives along SR 99 have four and five transit stations, respectively. Simply ranking the alternatives with the highest number of people within station areas reveals the following order: B2: Multi-Corridor BRT (43,000); TSM/Baseline Alternative (33,000); L2: SR 99 Mixed Profile Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative (20,000); and L1: I-5 Light Rail Alternative (13,000). While this favors the BRT alternative because it has multiple alignments and stations, it also shows that more people live near SR 99 than near I-5, in part because of the bigger area occupied by I-5.

The composition of the population near stations for the B2: Multi-Corridor BRT Alternative would be about 52 percent minority and 16 percent low-income based on 2000 census data. The composition of the station area populations for the light rail alternatives and the

TSM/Baseline Alternative are more similar, with a composition of 32 to 34 percent minority and 8 to 10 percent low income. These demographic characteristics are still more diverse than the two-county averages, indicating that the transportation and mobility benefits of any of the alternatives would be realized by low-income and minority members of the population, though the TSM/Baseline Alternative and the B2: Multi-Corridor BRT Alternative would have more stations compared to the light rail alternatives.

### IMPROVED TRANSIT SERVICES

As discussed above, minority and low-income populations exist throughout the study area. Therefore, these populations can be assumed to be among the daily riders for the new transit service. The L1: I-5 Light Rail Alternative would provide the highest benefits for projected daily riders, annual new riders, and annualized hours saved. While it has a lower total population near the stations (an estimated 13,000 people), its predicted benefits indicate that it would still be likely to draw 52,000 riders daily, and provide nearly twice the annualized travel time savings of the L2: SR 99 Mixed Profile Light Rail Alternative, the next closest alternative in terms of benefits.

The L2: SR 99 Mixed Profile Light Rail Alternative would have more population near its stations (about 20,000 people), but would provide less transit benefits. Its forecasted daily ridership is 41,000, but it would have only about half the number of new annual riders and the annualized travel time savings of the L1: I-5 Light Rail Alternative.

Compared to the L2: SR 99 Mixed Profile Light Rail Alternative, the L3: SR 99 Elevated Light Rail Alternative would have similar population near its stations (about 20,000 people), and it would offer somewhat similar travel times, but with twice the frequency. Its forecast daily ridership is 48,000, which is comparable with the L1: I-5 Light Rail Alternative. This would result in transportation benefits that are in the mid-range between the L1: I-5 Light Rail and L2: SR 99 Mixed Profile Light Rail Alternatives. Considering transportation benefits as well as the proximity to low-income and minority populations, its overall benefits would be considered to be similar to the L1: I-5 Light Rail Alternative.

The B2: Multi-Corridor BRT Alternative and the TSM/Baseline Alternative have more stations and therefore would have more populations within a 0.5-mile radius, but they would offer lower transportation benefits to those populations. The TSM/Baseline Alternative is the lowest performing in this regard. The B2: Multi-Corridor BRT Alternative performs somewhat better, but still would have less than one-quarter of the daily ridership seen with the L1: I-5 Light Rail Alternative, and less than one-quarter of the annualized travel time savings.

### ACCESS TO JOBS

For minority and low-income persons interested in using the proposed transit services, the average weighted travel time to the Seattle CBD is an indicator of access to employment opportunities (considering downtown Seattle is the largest employment center served by the region's transit system). Those who can most easily take advantage of these benefits are minority and low-income persons living within 0.5 mile of stations because they can most easily

walk to transit stations and would not need to transfer between travel modes or routes. The average travel time calculated for these minority and low-income populations from all stations combined to the Seattle CBD were generally the same compared to the general population, but differed by alternative. Average travel time under the TSM/Baseline Alternative was longest of all of the alternatives—about 40 minutes for all three population groups. Similarly, the average travel time under the B2: Multi-Corridor BRT Alternative was about 37 minutes for the general and minority populations, but about 1 minute shorter for the low-income population.

The average travel times to the Seattle CBD under the light rail alternatives were almost twice as fast. The average travel time for both the L2: SR 99 Mixed Profile Light Rail Alternative and the L3: SR 99 Elevated Light Rail Alternative was estimated to be 26 minutes for the general and minority populations, and about 1 minute shorter for low-income populations. With reduced headways to 4 minutes, however, overall transit services and therefore access to the Seattle CBD would be improved under the L3: SR 99 Elevated Light Rail Alternative. Average weighted travel time for all users was fastest at about 23 minutes under the L1: I-5 Light Rail Alternative, though it was about 1 minute longer for both minority and low-income populations. Therefore, when considering absolute travel times, the light rail alignment along I-5 would provide shorter travel times for both minority and low-income populations in comparison to the SR 99 alignments. However, when compared to the average weighted travel time to the Seattle CBD for the general population, minority and low-income populations would receive somewhat shorter travel times under both SR 99 light rail alternatives as compared with the L1: I-5 Light Rail Alternative.

## 5.5 FINANCIAL ANALYSIS

This section reports on the capital and operating cost estimates, financial feasibility, operating efficiencies, and potential risks and uncertainties associated with each alternative.

### 5.5.1 Key Findings

Key findings related to the financial analysis include:

#### CAPITAL COSTS

The TSM/Baseline Alternative is the least expensive of the alternatives.

Of the light rail alternatives, the L3: SR 99 Elevated Light Rail Alternative is the most expensive, primarily due to its longer guideway and additional station in comparison with the L1: I-5 Light Rail Alternative; and its higher vehicle fleet needs (due to shorter headways) as well as its fully elevated alignment along SR 99 in comparison with the L2: SR 99 Mixed Profile Light Rail Alternative.

## OPERATING COSTS

Because of its large coverage area combined with its high frequencies of service, the B2: Multi-corridor BRT Alternative is the most expensive of all the build alternatives to operate and maintain.

Of the light rail alternatives, the L3: SR 99 Elevated Alternative has the highest operating costs due to its longer distance and running time in comparison to the L1: I-5 Light Rail Alternative; and its higher frequencies in comparison to the L2: SR 99 Mixed Profile Alternative. The operating costs of the L3: SR 99 Elevated Light Rail Alternative would be more than 30 percent higher than those for the L1: I-5 Light Rail Alternative and 40 percent higher than those for the L2: SR 99 Mixed Profile Light Rail Alternative.

The L1: I-5 Light Rail and L2: SR 99 Mixed Profile Light Rail Alternatives have similar operating costs even though the L1: I-5 Light Rail Alternative has more frequent peak period service (4 minute headways versus 8-minute headways for the L2: SR 99 Mixed Profile Light Rail Alternative) due to the longer distance and running time of the L2: SR 99 Mixed Profile Alternative.

## FINANCIAL FEASIBILITY

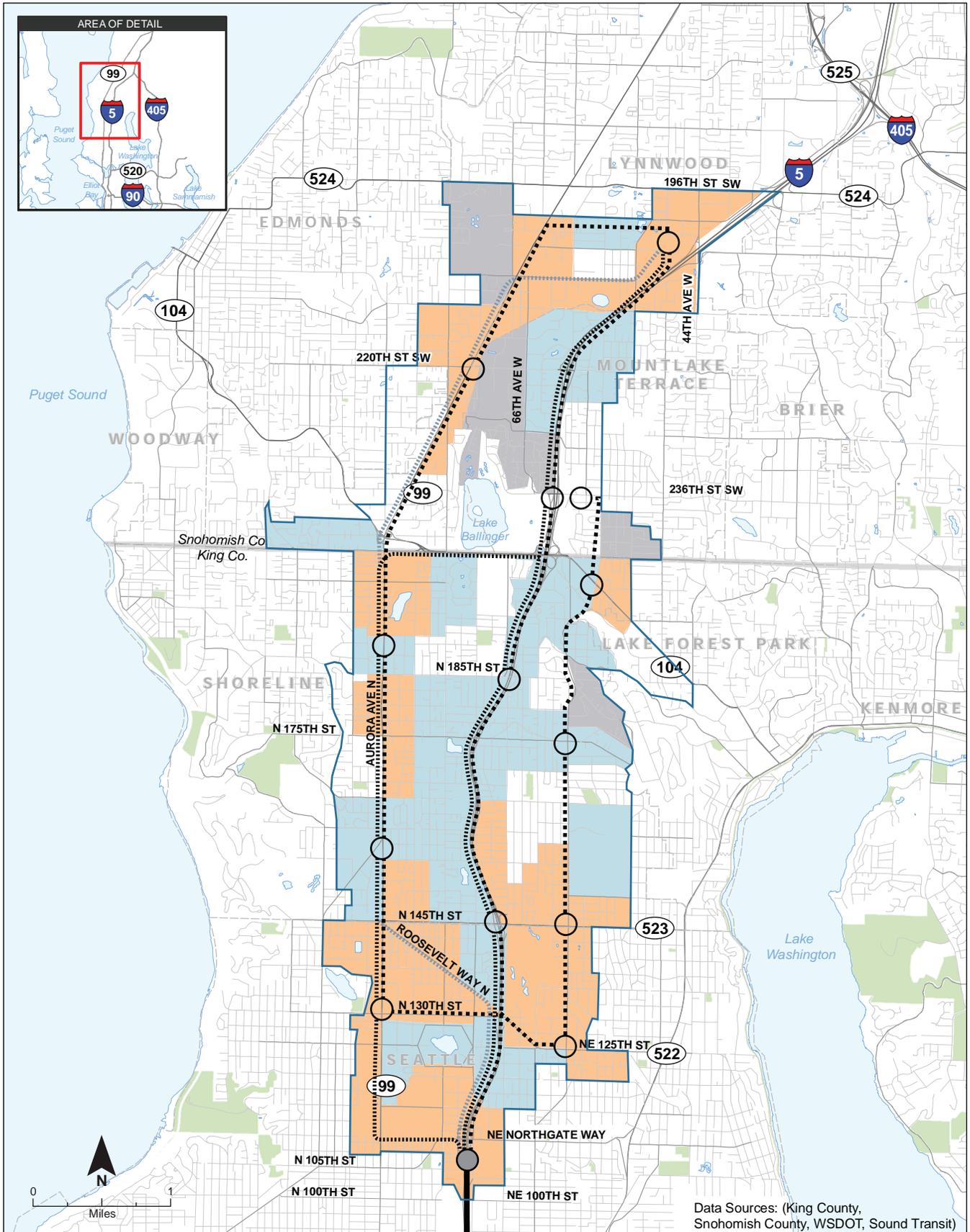
The capital costs of the TSM/Baseline and B2: Multi-Corridor BRT Alternatives are well within Sound Transit's current financial capacity to fund. The L1: I-5 Light Rail Alternative is affordable within that capacity at the low end of its cost range, but not affordable at the high end of the range. The costs of the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives are well outside Sound Transit's financial capacity to fund.

## OPERATING EFFICIENCIES

Because of its high expected ridership, and its lower operating and capital costs, the L1: I-5 Light Rail Alternative is the most efficient of the build alternatives in terms of operating cost per passenger mile, cost per hour of user benefit, and incremental cost per new passenger.

## RISKS AND UNCERTAINTIES

The three light rail alternatives have higher levels of risk and uncertainty than the bus alternatives for a variety of reasons. The rail alternatives include more infrastructure leading to higher cost amounts that could be affected by changing economic conditions; more infrastructure built across more jurisdictions resulting in higher risk associated with inter-agency coordination; and more right-of-way acquisition needs resulting in higher risk of delays.



- Low-Income Block Group Community (Above 24% Low Income)
- Minority Block Group Community (Above 8% Minority)
- Low-Income and Minority Block Group Community
- Light Rail Route Alternatives
- Bus Route Alternatives
- Potential Station Location
- Study Area Boundary
- North Link Light Rail
- North Link Station

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

**Figure 5-26. Environmental Justice Communities**

## 5.5.2 Capital Costs

Capital costs are based on the capital cost estimating methodology documented in the Sound Transit 2 Planning Capital Cost Estimating Methodology Report (Sound Transit 2007b), which was reviewed by and endorsed by an independent Expert Review Panel, and by methods and data from the North Corridor Transit Project Level 1 Alternatives Capital and Operations Cost Estimating Methodology and Results report (Sound Transit 2011d) and the North Corridor Transit Project Unit Cost Library and Composite Section Costs report (Sound Transit 2011e).

The general approach for the Level 2 Evaluation capital cost estimating methodology consisted of four steps:

1. Define the scope of the alternatives.
2. Identify unit costs according to the methodology described herein.
3. Estimate quantities from the alternatives descriptions included in the North Corridor Transit Project: Detailed Definition of Level 2 Alternatives Technical Memorandum (Sound Transit 2011h).
4. Calculate the costs.

Costs are stated as ranges, which is appropriate for this conceptual level of design.

Significant capital cost data (Sound Transit 2008) were collected during the ST2 planning process and have been included in the Unit Cost Library for the North Corridor Transit Project. In addition to the ST2 data, available data from Sound Transit, other transit agencies, project databases, WSDOT, and other industry sources were gathered and summarized.

Cost data from other sources were considered and compared to local experience to develop the unit pricing data. Costs taken from projects in other locations were used to validate existing data and fill in the gaps for cost elements where data from Sound Transit were not available. Local historical data were not available for all project elements. In these cases, unit costs were built up based on conceptual design and cost components from other sources. Completion of the vast majority of transit improvements under Sound Move provided a wealth of cost experience for Sound Transit. In addition, Sound Transit has begun implementation of the ST2 Plan. This information relates to a variety of project stages, such as:

1. Projects that are complete or currently under construction
2. Projects that are well into final design phases and have advanced engineer's estimates
3. Projects for which preliminary engineering has been completed and anticipated costs have been reviewed and verified by independent reviews (e.g., FTA's Project Management Oversight Consultant)
4. Projects for which planning and/or environmental assessment has been completed and costs have been reviewed and verified

The cost data were reviewed and condensed to provide all-inclusive conceptual capital cost data in per route foot units, each, or using another unit basis as appropriate.

In cases where Sound Transit cost information was not available for specific project types, data were gathered from other publicly available sources, including Parsons Brinckerhoff and WSDOT (direct access ramps), as well as Community Transit and King County Metro (for *Swift* and *RapidRide*, respectively). Data from these other sources were refined and/or reformatted as needed to be comparable with Sound Transit's local cost data.

For cost elements where local historical cost data were not available, cost estimates were based on a conceptual scope developed as appropriate for the specific element identified (e.g., freeway BRT off-line station). These costs were developed by combining the costs of the specific material components (concrete, excavation, utility relocation, etc.) applicable to a conceptual design typical cross-section and stated in one unit cost. The typical cross-sections developed for the project were assembled on an as-needed basis if no other historical data for the system element were available.

### **CAPITAL COST CATEGORIES**

Construction costs were calculated for the following FTA cost categories:

- 10. Guideway and Track Elements
- 20. Stations, Stops, Terminals, Intermodals
- 30. Yards, Shop, Administration/Support Facilities
- 40. Sitework and Special Conditions
- 50. Systems

Total construction costs are stated as the sum of categories 10 through 50.

To complete the project-wide capital cost estimate, the following FTA cost categories were also included:

- 60. Right-of-Way, Land, Existing Improvements
- 70. Vehicle
- 80. Soft Costs
- 90. Unallocated Contingency
- 100. Finance Charges (Note: This cost category is not included in the Level 1 evaluation capital cost estimates)

## CAPITAL COST RESULTS

Table 5-28 shows cost ranges for the alternatives.

As shown in Table 5-28, the TSM/Baseline Alternative is the least expensive of the alternatives. Of the light rail alternatives the L3: SR 99 Elevated Light Rail Alternative is the most expensive. It is more expensive than the L1: I-5 Light Rail Alternative primarily due to its longer guideway and additional station. In comparison with the L2: SR 99 Mixed Profile Light Rail Alternative, the higher cost of the elevated guideway offsets the costs of reconstructing much of SR 99. However, because of its shorter headways, the L3: SR 99 Elevated Light Rail Alternative has higher vehicle fleet and maintenance facility requirements, resulting in notably higher costs than the L2: SR 99 Mixed Profile Light Rail Alternative in these categories.

<b>Table 5-28. Capital Cost Ranges for Level 2 Alternatives</b>		
<b>Alternative</b>	<b>Low (mid-2010 \$million)</b>	<b>High (mid-2010 \$million)</b>
TSM/Baseline	\$200	\$230
L1: I-5 Light Rail	\$1,420	\$1,640
L2: SR 99 Mixed Profile Light Rail	\$1,830	\$2,100
SR 99 North Variation: change from primary alignment	+\$140	+\$160
Roosevelt Way Variation: change from primary alignment	+\$30	+\$35
L3: SR 99 Elevated Light Rail	\$2,010	\$2,310
B2: Multi-Corridor BRT	\$640	\$730

### 5.5.3 Operating Costs

#### LIGHT RAIL OPERATION AND MAINTENANCE COSTS

Sound Transit recently began using a new light rail O&M cost model. The new model, which is being used to test alternative North Corridor light rail scenarios, is described in Light Rail Operating and Maintenance Cost Methodology: 2011 Model for 2030 North Corridor Alternatives (Sound Transit 2011i). The report describes the background and underlying assumptions of the model, along with its structure and modules. Light rail O&M cost estimates for the light rail alternatives were provided by Sound Transit staff.

#### BUS OPERATIONS AND MAINTENANCE COSTS

The conceptual routing and estimated headways for the TSM/Baseline and the B2: Multi Corridor BRT Alternatives provided an estimate of bus platform hours needed for each of these alternatives. Similarly, revised routing and headway assumptions for bus service for the light rail alternatives were used to estimate the savings in bus platform hours for each of these alternatives.

The unit cost (per platform hour) for Sound Transit bus O&M varies depending on which transit partner provides the service. The current (2010) contracted hourly rate is \$96 or \$125 for service operated by Community Transit and King County Metro, respectively. These figures were obtained from Sound Transit for the 60-foot articulated Sound Transit coaches operated and maintained under contract by Community Transit and King County Metro.

For Sound Transit BRT service under the alternatives, 20 percent was added to the typical Sound Transit bus rates described above to cover miscellaneous additional costs such as security monitoring at BRT stations. Therefore, the estimated O&M cost would be \$115 or \$150 per platform hour for Sound Transit BRT service operated by Community Transit and King County Metro, respectively. The Level 2 cost estimation analysis conservatively assumes the higher rate for future service because the operator of the service is yet to be determined.

### OPERATION AND MAINTENANCE COST ESTIMATES

Estimated additional (i.e., above and beyond No Build) net annual O&M costs for the Level 2 Alternatives are provided in Table 5-29. These estimates reflect savings from the truncation of parallel Sound Transit express regional bus service as well. (Note: These estimates are for the year 2030 and are expressed in 2010 dollars.)

Alternative	Annual Platform Hours Added	Annual O&M Cost (mid-2010 \$million)
TSM/Baseline	141,000	\$17.6
L1: I-5 Light Rail	27,000 train-hours	\$11.0*
L2: SR 99 Mixed Profile Light Rail	30,000 train-hours	\$10.4*
L3: SR 99 Elevated Light Rail	35,000 train-hours	\$14.6*
B2: Multi-Corridor BRT	224,000	\$33.6

\* Light rail alternative O&M costs include savings due to ST Express regional bus service reductions.

Because of its large coverage area combined with its high frequencies of service, the B2: Multi Corridor BRT Alternative is the most expensive of all the build alternatives to operate and maintain.

The L1 and L2 light rail alternatives have similar operating costs even though the L1: I-5 Light Rail Alternative would have more frequent peak period service (4-minute headways versus 8 minute headways for the L2: SR 99 Mixed Profile Light Rail Alternative). During off peak periods when headways on both alternatives would be similar, the shorter and faster route for the L1: I-5 Light Rail Alternative would have substantially lower O&M costs compared to the L2: I-5 Mixed Profile Light Rail Alternative. The L3: SR 99 Elevated Light Rail Alternative, with its route length longer than the L1: I-5 Light Rail Alternative and more frequent headways than the L2: SR 99 Mixed Profile Light Rail Alternative (4 minutes compared with 8 minutes for the L2: SR 99 Mixed Profile Light Rail Alternative), would have higher operating costs – 30 percent higher than those

for the L1: I-5 Light Rail Alternative and 40 percent higher than the L2: SR 99 Mixed Profile Light Rail Alternative. The TSM/Baseline Alternative would have higher operating costs than any of the light rail alternatives, but is still considerably lower than the B2: Multi-Corridor BRT Alternative.

### 5.5.4 Financial Feasibility

This section compares the estimated capital costs of the alternatives to the lifetime capital cost funded in Sound Transit’s current long-term financial plan. This comparison provides an assessment of the agency’s ability to afford each alternative. Sound Transit’s current financial plan funds \$1,540 million in North Corridor Transit Project capital costs (Sound Transit 2011j) . Table 5-30 summarizes the capital cost of each alternative and the difference from the funded amount in financial plan.

**Table 5-30. Level 2 Alternative Capital Cost Affordability**

Alternative	Low Cost (mid-2010 \$million)		High Cost (mid-2010 \$million)	
	Estimate	Difference from Financial Plan	Estimate	Difference from Financial Plan
TSM/Baseline	\$200	(\$1,340)	\$230	(\$1,310)
L1: I-5 Light Rail	\$1,420	(\$120)	\$1,640	\$100
L2: SR 99 Mixed Profile Light Rail	\$1,830	\$290	\$2,100	\$560
L3: SR 99 Elevated Light Rail	\$2,010	\$470	\$2,310	\$770
B2: Multi-Corridor BRT	\$640	(\$900)	\$730	(\$810)

The capital costs of the TSM/Baseline and B2: Multi-Corridor BRT Alternatives are well within Sound Transit’s current financial capacity to fund. The L1: I-5 Light Rail Alternative is affordable within that capacity at the low end of its cost range, but not affordable at the high end of the range. The costs of the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives are well outside Sound Transit’s financial capacity to fund.

### 5.5.5 Operating Efficiencies

This section provides a summary of the results for the following sub-measures:

- Operating cost per passenger mile
- Cost per hour of user benefits
- Incremental cost per new passenger

Table 5-31 presents the operating cost per passenger mile for each alternative. This is calculated by dividing the annual project operating costs (less savings from bus service reductions assumed for Sound Transit, King County Metro, and Community Transit) by the estimated annual number of passenger miles traveled by users of the North Corridor Transit Project. Because of its high expected ridership, and its lower operating costs, the L1: I-5 Light Rail Alternative is the most efficient of the build alternatives in terms of operating cost per

passenger mile. The two bus-based alternatives, due to overall lower ridership and high operating costs, have considerably higher O&M costs per passenger mile than any of the light rail alternatives.

**Table 5-31. 2030 Annual O&M Cost per Annual Passenger Mile**

Alternative	2030 Annual O&M Cost per Annual Passenger Mile
TSM/Baseline	\$0.40
L1: I-5 Light Rail	\$0.06
L2: SR 99 Mixed Profile Light Rail	\$0.09
L3: SR 99 Elevated Light Rail	\$0.08
B2: Multi-Corridor BRT	\$0.66

Note: Costs are in mid-2010 dollars and reflect savings due to Sound Transit express, King County Metro, and Community Transit bus service reductions.

Table 5-32 presents the cost per hour of user benefits for each alternative. This was calculated by dividing the sum of the annualized capital costs and annual project operating costs (less the savings from bus service reductions assumed for Sound Transit, King County Metro, and Community Transit) by the estimated annual hours of travel time saved (user benefits). Annualized capital costs were calculated using the FTA Standard Cost Categories Annualized Cost Workbook. The L1: I-5 Light Rail Alternative has the lowest cost per hour user benefits at \$25 to \$28 per hour, followed by the L3: SR 99 Elevated Light Rail Alternative at \$42 to \$48 per hour (a 72 to 75 percent increase). The L2: SR 99 Mixed Profile Alternative is slightly higher than the TSM/Baseline Alternative, though still less than the B2: Multi-Corridor BRT Alternative, which is the most expensive of all alternatives in terms of cost per user benefits.

**Table 5-32. 2030 Cost per Hour of User Benefits**

Alternative	2030 Cost per Hour of User Benefits	
	Low	High
TSM/Baseline	\$60	\$64
L1: I-5 Light Rail	\$25	\$28
L2: SR 99 Mixed Profile Light Rail	\$61	\$69
L3: SR 99 Elevated Light Rail	\$42	\$48
B2: Multi-Corridor BRT	\$91	\$99

Note: Costs are in mid-2010 dollars.

Table 5-33 presents the incremental cost per new passenger for each alternative. This measure was calculated by dividing annual operating costs and annualized capital costs by the projected annual new passengers. Similar to the cost per hour of user benefits, the L1: I-5 Light Rail Alternative has the lowest incremental cost per new passenger, followed by the L3: SR 99 Elevated Light Rail Alternative.

**Table 5-33. 2030 Incremental Cost per New Passenger**

Alternative	2030 Incremental Cost per New Passenger	
	Low	High
TSM/Baseline	\$55	\$59
L1: I-5 Light Rail	\$25	\$29
L2: SR 99 Mixed Profile Light Rail	\$58	\$67
L3: SR 99 Elevated Light Rail	\$41	\$46
B2: Multi-Corridor BRT	\$83	\$90

Note: Costs are in mid-2010 dollars.

### 5.5.6 Risks and Uncertainties

Previous sections of this study address the capital costs, O&M costs, and the financial resources available to fund the various alternatives. However, risks and uncertainties that could affect the successful completion of each alternative exist. During the life of the project, Sound Transit will need to identify and monitor these risks and uncertainties and take the necessary steps to control and mitigate them.

Major items of risk and uncertainty associated with the alternatives can be categorized as follows:

- Economic and financial
- Cooperation with jurisdictions, agencies, and other involved third parties
- Right-of-way acquisition and changes to current land use
- Construction

The three light rail alternatives have higher levels of risk and uncertainty than the bus alternatives for a variety of reasons. The rail alternatives include more infrastructure, leading to higher cost that could be impacted by amounts changing with economic conditions; more infrastructure would be built across more jurisdictions resulting in higher risk associated with inter-agency coordination; and more right-of-way would need to be acquired resulting in higher risk of delays.

#### ECONOMIC AND FINANCIAL

Economic and financial risks include such factors as the vitality of the general economy, inflation, the level of FTA funding, and maintaining control of the scopes of the projects. The vitality of the general economy can affect the program in that the primary source of local revenues, the voter-approved sales tax surcharge, can fluctuate with the health of the economy. A stronger local economy results in higher sales tax revenue. A weaker economy can result in lower than anticipated sales tax revenues available for all alternatives. However, a weaker

economy may also result in a slowing of the growth of construction costs, which could result in lower than anticipated capital costs.

Inflation, which is also an indicator of the vitality of the economy, can also affect the project. An increase in inflation beyond the current expectations would result in increased costs for all alternatives. Increased inflation would affect construction costs, O&M costs, and the cost of financing. The alternatives with the highest capital and O&M costs, namely the three light rail alternatives, would have the highest risk of all alternatives. On the other hand, sales tax revenues could also increase with higher inflation, although it is not likely to increase adequately to offset the rise in costs.

The level of FTA funding is subject to annual appropriations and future program reauthorizations. If future reauthorization legislation varies significantly from trends in the recent past as assumed in the financial analysis, projects would need to rely more heavily on local funding. Because this project will compete for New Starts funds with many other projects, the level of New Starts funds pledged to this project will not be finalized until just prior to entering into a Full Funding Grant Agreement some years from now.

All of the alternatives studied in this AA would have portions of the program constructed within the jurisdictional limits of numerous cities and two counties, and within major portions of existing WSDOT right-of-way. Each of these jurisdictions and agencies will have concerns regarding the implementation of a major transportation infrastructure within their boundaries. Any of these may request that the scope of the project elements include items that may not have been originally planned in the initial program. Sound Transit will have to monitor these issues carefully during the life of the program to maintain the scope of the various project elements.

### **COOPERATION WITH JURISDICTIONS, AGENCIES, AND OTHER INVOLVED THIRD PARTIES**

The success of this project will depend heavily on cooperation among all parties, as previously noted. The cities, counties, and WSDOT will be responsible for issuing permits and permission to construct and operate in their rights of way. Changing requirements during the course of the project's life can result in unforeseen delays or additional costs.

### **RIGHT-OF-WAY ACQUISITION AND CHANGES TO CURRENT LAND USE**

Right-of-way will be required for all alternatives but will be particularly critical to all three light rail alternatives at passenger station locations. Risk resulting from delays in acquiring right-of-way could result in higher costs due to schedule delays.

### **CONSTRUCTION**

The majority of construction for all alternatives will occur in existing major transportation corridors. This will create construction challenges, particularly for the light rail alternatives and bus-based alternatives that could lead to cost and schedule increases. These challenges, along with the economic risks that may affect commodity prices previously described, can add risk

and uncertainty to the project. To minimize the risk at this stage in the planning, the capital cost estimates developed for the alternatives include contingencies that vary depending on the complexity and uncertainty of the type of construction. The capital cost estimates include specific line item contingencies ranging from 15 percent to 35 percent, depending on their complexity and susceptibility to fluctuation. The capital cost estimates also include contingencies of 10 percent to account for construction change orders, which, when applied, result in overall construction contingencies of approximately 25 to 45 percent. Unallocated contingencies of 10 percent are then also included to account for unforeseen events.

## 5.6 CONSISTENCY WITH SOUND TRANSIT'S LONG-RANGE VISION

This measure addresses the extent to which the alternatives support the long-range vision, goals, and objectives for transit service established by Sound Transit's Long-Range Plan. This criterion was measured in three ways, as follows:

- A determination as to whether the alternative meets the definition of HCT in state law; specifically if the alternative, combined with the current HCT system, results in a system that provides a substantially higher level of passenger capacity, speed, and service frequency
- The number of miles that the alternative operates in general purpose traffic lanes
- Consistency with Sound Transit's Long-Range Plan, as measured by travel time and reliability and the capacity of an alternative to accommodate future ridership growth that may occur as a result of extending the system to Everett as envisioned in the plan

By Washington State law Sound Transit is mandated to provide a "High Capacity Transportation System" as defined by RCW 81.104.015 (2). The definition is as follows:

*"High capacity transportation system" means a system of public transportation services within an urbanized region operating principally on exclusive rights-of-way, and the supporting services and facilities necessary to implement such a system, including interim express services and high occupancy vehicle lanes, which taken as a whole, provides a substantially higher level of passenger capacity, speed, and service frequency than traditional public transportation systems operating principally in general purpose roadways.*

The second measure was based on the "number of miles that transit operates in general purpose lanes," because it is assumed that transit traveling in general purpose lanes does not meet the definition of a HCT system. A low value—that is number of miles in general purpose lanes—means that the alternative includes a high level of consistency with the development of a HCT system, and conversely, a high value means a low level of consistency.

The third measure was based on the consistency with Sound Transit's 2005 Long-Range Plan. Both BRT and light rail are identified as transit modes in the North Corridor. The transportation system goal, as stated in Sound Transit's Regional Transit Long-Range Plan (adopted July 7, 2005) is as follows:

*“Provide a public transportation system that helps ensure long-term mobility, connectivity, and convenience for the citizens of the Puget Sound region for generations to come.”*

Measures that relate to the ability of an alternative to meet Sound Transit’s public transportation system goal overlap with other evaluation criteria as follows:

- Long-term mobility = Reliability, capacity, and travel time criteria (including the ability of the alternative to meet the long-term objective of extending regional transit to Everett)
- Connectivity and convenience = Connections to regional multi-modal system criterion (number of transfers to reach regional transit system at Northgate)

The measure for consistency with Sound Transit’s Long-Range Plan is evaluated with a “yes” or “no” response. Summary findings based on evaluating the consistency of the alternatives with Sound Transit’s Long-Range Plan are as follows:

- All of the light rail alternatives are consistent with the definition of a HCT system because they operate on exclusive right-of-way.
- The L1: I-5 Light Rail Alternative with 4-minute headways is consistent with light rail transit operations between Northgate and downtown Seattle and consistent with Sound Transit’s Long-Range Plan.
- L2: SR 99 Mixed Profile Light Rail Alternative and both of its variations are not consistent with Sound Transit’s Long Range Plan. With light rail operating at grade through a number of highly congested intersections, the headways are limited to 8 minutes. Operations with 8-minute headways do not provide the long term capacity to accommodate the demand expected from a future extension of regional transit to Everett.
- The L3: SR 99 Elevated Light Rail Alternative with 4-minute headways is consistent with light rail transit operations between Northgate and downtown Seattle and consistent with Sound Transit’s Long-Range Plan.
- The TSM/Baseline and B2: Multi-Corridor BRT Alternatives are inconsistent with both the Long-Range Plan and the development of a HCT system due to bus travel in general purpose lanes, on freeways, and arterials.

Table 5-34 presents the results of the three evaluation measures. The TSM/Baseline Alternative and B2: Multi-Corridor Alternative include use of the existing I-5 HOV lanes with regional transit in both HOV lanes and general purpose lanes of I-5 as well as the SR 99 BAT lanes. The SR 99 BAT lanes include general purpose right-turning traffic at driveways and intersections. Both bus alternatives also include long segments of mixed traffic operation along substantial sections of congested arterial streets in the study corridor.

**Table 5-34. Evaluation Results—Consistency with Long-Range Plan**

<b>Alternative</b>	<b>Definition of High- Capacity Transportation System</b>	<b>Miles of Operation in General Purpose Lanes<sup>1</sup></b>	<b>Consistent with Sound Transit’s Regional Transit Long-Range Plan</b>
TSM/Baseline	No	4.9	No
L1: I-5 Light Rail	Yes	0	Yes
L2: SR 99 Mixed Profile Light Rail	Yes	0	No
SR 99 North Variation	Yes	0	No
Roosevelt Way Variation	Yes	0	No
L3: SR 99 Elevated Light Rail	Yes	0	Yes
B2: Multi-Corridor BRT	No	7.7	No

# 6 PUBLIC AND AGENCY INVOLVEMENT AND COORDINATION

The North Corridor Transit Project AA included extensive involvement with stakeholders, interest groups, the general public and public agencies at the local, regional, state, and federal levels. To guide this work, the project team developed involvement and coordination plans to identify constituents and partners and outline strategies for informing and involving the public. These plans were designed to be updated as the project moves forward through the project development process.

## 6.1 OVERVIEW OF PLANS

Two related agency and public involvement plans were developed to guide public involvement and agency coordination during the AA phase. The major difference between the two plans is the public involvement plan includes public involvement strategies, goals and activities for the full planning project schedule (until the final Record of Decision [ROD] is issued), while the agency coordination plan is intended to guide AA activities until the NEPA environmental process begins.

A Coordination Plan that meets federal requirements under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has also been prepared to guide outreach and involvement activities during the environmental review phase of the project. See Chapter 8 for more discussion of this plan.

### 6.1.1 Public Involvement Plan

The North Corridor Transit Project Public Involvement Plan is a working, living document to be updated throughout the life of the project as it transitions through different phases. It provides a detailed blueprint for how the project is conducting its public involvement program through the following phases:

- Alternatives Analysis, Environmental Scoping, and Conceptual Engineering



- Draft Environmental Impact Statement and Early Preliminary Engineering
- Preliminary Engineering and Final Environmental Impact Statement, through Record of Decision.

After the AA/EIS/PE portion of the project, a separate plan will be developed for outreach specific to final design and construction. This project's public involvement plan is designed around the following goals for engagement in the North Corridor:

**Overarching goals:**

- Inform the public of the project's purpose and need, and identify and communicate the process and schedule for public participation.
- Actively seek public input throughout all project stages of planning, project development, and engineering.
- Research and respond to public inquiries, suggestions, and ideas in the decision-making process.
- Provide opportunities for the public to affect major decisions before they are finalized.
- Publicize all programs and activities through a variety of diverse communication vehicles and make the proceedings and records available for public review.
- Provide the public with different and innovative opportunities and methods for accessing project information throughout each project phase.
- Ensure diverse populations, including minority and low income populations are engaged in the planning and development process by making materials available in multiple formats, holding meetings in accessible facilities, and providing meeting and project information to underserved populations.

**Project-specific goals:**

- Clearly communicate the need and process for obtaining FTA New Starts grant funding.
- Communicate key project milestones and accomplishments to show progress toward project completion and the start of service. Ensure transparency of the process by communicating the needs, potential solutions, schedules, and budget information.
- Use information obtained through North Corridor stakeholder interviews and the initial public outreach effort to enhance the project team's knowledge of the area, key stakeholders, and community leaders.
- Work closely with Sound Transit government and community relations staff, and the project team to ensure public outreach efforts and government/elected official/Tribal involvement efforts are coordinated.
- Create a project record of public input, responses, and outreach activities.

- Acknowledge outreach challenges and risks, and implement outreach activities tools that help avoid them.

### 6.1.2 Agency Coordination Plan

An agency coordination plan was developed to guide the involvement of agencies defining the purpose and need, the problems to be solved, environmental concerns, and the range of alternatives for the North Corridor Transit Project during the alternatives analysis phase. The plan addresses coordination with the governmental entities within the project area that have statutory, regulatory, permitting, and/or funding roles: FTA, the Congressional delegation, Washington State legislators, WSDOT, PSRC, counties, cities, and transit agencies.

The purpose of the agency coordination plan is to effectively support agency participation in the scoping for the AA phase, leading to the Draft EIS.

Goals of the agency coordination plan are to:

- Ensure all agencies have similar levels of understanding surrounding proposed alternatives and associated issues.
- Clearly define and agree on Sound Transit and agency roles and responsibilities.
- Provide opportunities for agencies to provide effective feedback and review at key decision points during the AA phase.
- Encourage agencies with legally defined coordination and/or approval roles to meet all statutory and regulatory requirements to allow the project to go forward.

## 6.2 EARLY SCOPING

The project began with an early scoping period, which is an optional procedure under NEPA and SEPA. This was an initial step in the project's commitment to ensure open agency and public involvement in project development as expected under these Acts. The early scoping process for the North Corridor Transit Project began September 24, 2010 with a series of public notices, advertisements, and mailings, and continued through October 27, 2010.<sup>1</sup> Three public meetings and an agency meeting were held, and comments were accepted in a wide variety of formats. The agency meeting invited state and federal jurisdictions, as well as resource agencies.

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<sup>1</sup> Most of the initial public notices, advertisements and mailings, including a legal notice and a SEPA Register notice, appeared on or before September 24, 2010 and requested comments by October 25, 2010. However, the official federal notice was not published in the Federal Register until September 27, 2010. To allow at least 30 days for comments, Sound Transit extended the comment period to October 27, 2010, and included the extended date on subsequent notices and on the Sound Transit Web site.

### 6.2.1 Public Notices in the Federal Register and the SEPA Register

Early scoping notices were published in the the SEPA Register on September 24, 2010 and in the Federal Register on September 27, 2010. With the early scoping announcements, Sound Transit and FTA invited the public and agencies to learn about the project and provide comments. The announcements provided the dates and times of public meetings, described how people could get more information about the project, and provided project contacts. They also stated the purpose of the early scoping process and described the overall planning, public involvement, and state and federal environmental processes expected for the North Corridor Transit Project. The notices invited public comments on the scope of the AA for the North Corridor Transit Project, including the purpose of the project; the range of alternatives; and the environmental, transportation, and community impacts and benefits to be considered.

To provide additional background on the project and encourage comments, Sound Transit prepared an *Early Scoping Information Report* (Sound Transit 2010f). The report provided more detail about the project corridor, the potential alternatives, and details on the public meetings and how to comment, along with a Preliminary Purpose and Need Statement and the project's current schedule. This report was available on the Sound Transit Web site effective September 24, 2010 and copies were available at the public meetings and the agency scoping meeting.

#### ADVERTISEMENTS AND LEGAL NOTICES

Display advertisements were placed in the following publications:

- *The Seattle Times* (legal notice, daily, 9/24/10, 10/1/10, and 10/8/10)
- *The Everett Herald* (daily, 9/29/10 and 10/5/10)
- *North Seattle Herald Outlook* (weekly, 9/29/10 and 10/6/10)
- *The Enterprise* (weekly, 9/29/10 and 10/6/10)
- *The Edmonds Beacon* (weekly, 9/30/10 and 10/7/10)
- Snohomish County Business Journal (monthly, October 2010)

Advertisements were placed in online newspapers and blogs, either continuously or based on the number of views (“impressions”). The advertisements linked directly to the project Web site.

- The Seattle Times (9/30/10 – 10/14/10)
- The Seattle PI (9/30/10 – 10/14/10)
- The Everett Herald/HeraldNet (9/30/10 – 10/14/10)
- Mountlake Terrace News (9/27/10 – 10/14/10)
- The Enterprise (9/27/10 – 10/14/10)
- The Edmonds Beacon (9/27/10 – 10/14/10)
- Snohomish County Business Journal (9/27/10 – 10/14/10)
- My Edmonds News (9/27/10 – 10/14/10)
- Lynnwood Today (9/27/10 – 10/14/10)
- Publicola (9/30/10 – 10/14/10)
- Seattle Transit Blog (9/27/10 – 10/14/10)
- Aurora Seattle (9/27/10 – 10/14/10)

### FLYERS, MAILINGS, AND OTHER MEDIA NOTICES

Before the beginning of the early scoping period, postcard notices were mailed to approximately 130,000 single-family homes, apartments, and businesses in and around the North Corridor and were received beginning September 22, 2010. Bundles of postcards were distributed at nearly 35 locations in the project area. The sites included facilities serving the general public such as service or resource centers, churches, libraries, recreation centers, senior centers, and retail establishments, as well as gathering places for the Asian and Hispanic communities.

Translated information about interpretation services was provided in Spanish and traditional Chinese. These two languages were selected based on Sound Transit’s translation staff recommendations and information from the most common previous translation inquiries to Sound Transit from existing vendor TeleLanguage call data. The postcards also indicated how people could receive the information in other formats or languages.

The mailing area was determined by the project team as the area in which potential alignments could be built, plus substantial additional adjacent areas that may be potential travel shed areas. This area was bounded to west by Puget Sound, the east by Lake Washington and Highway 527, the south by 103rd, and the north by North 164th Street (approximately).

Sound Transit also provided notices to local area governments, community calendars, and blogs, and they were posted on the following online sites:

- City of Shoreline
- City of Lynnwood
- City of Mountlake Terrace
- City of Lake Forest Park
- City of Edmonds
- Publicola’s Publicalendar
- Shoreline Area News
- Feet First

Email notices were sent to community groups, elected officials, and city governments. A project-specific email list was developed during this phase for subsequent engagement. Notice of the project was also part of the Sound Transit “CEO Report” and highlighted on Sound Transit’s home page and agency public calendar. Notification of public meetings and comment opportunities were also distributed through social media channels, using Sound Transit’s Facebook page and Twitter feed.

## 6.2.2 Public Early Scoping

### EARLY SCOPING PUBLIC MEETINGS

More than 200 people attended the public meetings, which were held at the following locations from 6:00 to 8:30 pm:

- North Seattle: October 7, 2010—Ingraham High School, 1819 North 135th Street, Seattle 98133 (40 attendees)
- Lynnwood: October 12, 2010—Lynnwood Convention Center, 3711 196th Street SW, Lynnwood 98036 (90 attendees)
- Shoreline: October 14, 2010—Shoreline Conference Center, 18560 First Avenue NE, Shoreline 98155 (80 attendees)

### HOW THE PUBLIC MEETINGS WERE HELD

Each public meeting consisted of an open house, a presentation and question-and-answer period, and small group sessions that used a workshop format. All meetings were in locations accessible to persons with disabilities, and in one meeting, participants with hearing disabilities requested and were provided with sign language interpreters. The public notices and advertisements for the meetings described the format and timing of each meeting.

During the open house portion of the meetings, participants were invited to review project information, display boards, and an aerial map. Project staff was available to answer questions. A formal presentation explained Sound Transit’s overall mission and services, the ST2 program, and background on the project. The presentation included a question-and-answer session, which was followed by the workshop portion of the meeting.

During the workshop, participants formed small groups, which varied from 6 to 12 people, depending on the attendance at the particular meeting. Within each group, two project staff members guided discussions, using a large aerial map of the general project corridor, encompassing areas with potential alignments identified to date, including I-5, SR 99, and 15th Avenue NE. The groups also were supplied with tools such as a scale to show a 0.5 mile and 1 mile radius around potential stations or access points, a flip chart, pens for documentation, and stick-on dots to show areas of interests.

The groups were asked the following questions to guide their conversations:

- Looking at the aerial map, where do you think there should be access to HCT service?
- Why do you think those are the right access points?
- What would make you choose differently about those access points for transit?
- How might we connect those access points?

The workshop groups had nearly 50 minutes to discuss their thoughts. They used stick-on dots to show their ideas about potential station locations and routes. Flip charts recorded major themes, including the potential features or attributes of the project. The group also provided their opinions on why some alignments or modes of transportation had more advantages or disadvantages than others. The workshop groups then shared their major points with the entire group. A summary of the workshop results is included in Section 6.3.

### 6.2.3 Agency Early Scoping Meeting

In addition to the Federal Register, the SEPA Register, and other legal notices, Sound Transit sent invitations for the agency scoping meeting to local, state, and federal agencies, as well as tribal governments. The agency scoping meeting was held on October 13, 2010, in the Sound Transit Board Room. Fifteen people attended the meeting, representing the following cities and agencies:

- City of Shoreline
- City of Edmonds
- City of Mountlake Terrace
- City of Everett
- City of Lynnwood
- Seattle City Light
- Snohomish County Public Works
- King County Metro
- Community Transit

### 6.2.4 Opportunities to Comment

Sound Transit accepted written scoping comments by U.S. mail or email through October 27, 2010 and at the public meetings.

Comments were sent to:

Roger Iwata, North Corridor Transit Project, Sound Transit, 401 South Jackson Street, Seattle, WA 98104-2826; or [roger.iwata@soundtransit.org](mailto:roger.iwata@soundtransit.org).

The project also used an online questionnaire tool to help in targeting the online community and people who might not be able to attend a public meeting. The tool was available on the project Web site (<http://www.soundtransit.org/NorthHCT>) throughout the early scoping period. More information about the questionnaire tool and general results is included in Section 6.4.1.

## 6.3 SUMMARY OF WRITTEN COMMENTS RECEIVED

In addition to formally submitting written comments, the public also had the opportunity to express their opinions about the project by participating in the public meetings or by using the project's online questionnaire tool. Following the summary of written comments, this report summarizes the public workshop and questionnaire results. More detailed information was included in the *Early Scoping Summary Report* (Sound Transit 2010g).

The formally submitted written comments from the general public were fairly limited in number (nearly 80) as well as length, which is not uncommon for an early scoping period, when specific project alternatives are not yet defined. Nine agency comment letters were received and were typically more detailed. Agencies that submitted comments were: the cities of Edmonds, Lynnwood, Mountlake Terrace, and Shoreline, Seattle Department of Transportation, King County Department of Transportation, Snohomish County, Community Transit and the Muckleshoot Indian Tribe fisheries division. Sound Transit received comments from state and local agencies. Most of these agencies requested coordination with Sound Transit or highlighted specific concerns related to light rail construction and operation. These comments are summarized in the *Early Scoping Summary Report* (Sound Transit 2010g).

Written comments fell into five general categories, summarized below.

### 6.3.1 Comments Related to the Preliminary Purpose and Need Statement

Respondents who addressed what the project should achieve were in consensus with the purpose and needs stated in the Preliminary Purpose and Need Statement. Specific comments about the draft statement included:

- Connect centers with rapid and reliable high-capacity regional transit service.
- Strive for consistency with the regional transit system Long-Range Plan and its goals to eventually connect Tacoma, Seattle, and Everett.
- Consider the needs of the urban growth areas within the North Corridor and the importance of regional transit to serve the people who will live or work there.

### 6.3.2 Comments Specific to a Mode

Of public comments received through email, mail, phone, or at the public meetings, 33 commented on mode. Of these, 31 specified support of light rail. One respondent preferred buses and another monorail, but both of these respondents also showed support for light rail. Seven of nine agencies indicated a mode preference, and all supported light rail.

### 6.3.3 Comments Specific to a Potential Project Alignment or Features

Some commenters identified specific routes or stations, as follows:

- The cities of Edmonds, Lynnwood, Mountlake Terrace, Seattle, and Shoreline provided more detailed comments about specific routes or stations identified. A summary of these comments is included in the *Early Scoping Summary Report* (Sound Transit 2010g). Seattle and Shoreline recommended evaluation of only the I-5 and SR 99 corridors.
- Among individual respondents, there was the most support for light rail along I-5 followed by light rail along SR 99. There was one comment in support of light rail on 15th Avenue NE and one comment in opposition. Several respondents advocated for stops at Alderwood Mall and Lynnwood City Center, outside of the North Corridor Transit Project area. One respondent did not believe that a connection between Northgate and Lynnwood was necessary.
- Individual respondents appeared to be primarily concerned with parking, connectivity to/integration with other existing and future modes of transportation, impacts on residents in areas where stations will be constructed, and access to stations.

#### COMMENTS SPECIFIC TO A LOCATION OR NEIGHBORHOOD

- The City of Lynnwood asked that the analysis document the expected increase in traffic on local streets, predict the resulting increase in congestion, and recommend measures to mitigate that congestion. Lynnwood also asked that the analyses address the impact of this congestion on the planned redevelopment of the Lynnwood City Center.

#### COMMENTS ON ENVIRONMENTAL ISSUES OR PROCESS

- The Cities of Edmonds, Shoreline, and Lynnwood provided comments on environmental issues ranging from air pollutants and greenhouse gases to BRT emissions. King County provided comments on a range of issues. A summary of these comments is included in the *Early Scoping Summary Report* (Sound Transit 2010g).
- The Muckleshoot Indian Tribe provided information regarding the issues that should be addressed in the EIS, particularly regarding impacts on fisheries and related natural resources, including water quality and habitat.

## 6.4 ONLINE QUESTIONNAIRE AND ADDITIONAL PUBLIC OUTREACH

### 6.4.1 Online Questionnaire

Nearly 275 people completed the online questionnaire available on the project Web site (<http://www.soundtransit.org/NorthHCT>) throughout the early scoping period. Although the results cannot be considered a statistical representation of the public's preferences, they do provide feedback on general trends and opinions, particularly when considered in conjunction with the formal written comments and the results of the public meeting workshops. Almost half of respondents submitted additional informal written comments, narrative in nature, at the end of their entry.

Several key themes emerged from the online questionnaire tool:

- Light rail was the mode suggested by most participants. Many of these participants cited this preference because of its benefits and/or because light rail is what the public approved for the corridor in the 2008 ST2 ballot measure.
- Most people said ease of access was important. This includes strong east-west corridor connections with coordinated and direct feeder buses, substantial/appropriate parking, and easy bicycle and pedestrian access.
- Most people identified either I-5 or SR 99 as appropriate routes for the system. Several thought 15th Avenue should be considered.
- Responses about potential station areas and numbers of stations were mixed. Many people understood why the planned location of system termination is at the Lynnwood Transit Center, but many asked if it could be extended farther north to Alderwood Mall. Many people thought the new Mountlake Terrace Transit Center could provide good access to the system, whereas comments about potential southern station areas on I-5 and potential station areas on SR 99 varied.
- Overall, participants wanted to know more about the potential tradeoffs and impacts of the project. Some expressed concerns about how the project would be affected by Sound Transit's current financial situation and tradeoffs being explored by the Sound Transit Board.

Some questions were directly related to assisting the project team in planning techniques for future public engagement. Most respondents commented that their preferred method of communication and receiving information about the project was email, the Sound Transit Web site, independent Web sites, or social networking sites. Most respondents selected the following from a list of activities or places where they would be most likely to attend and receive information about the project: at a public meeting, during their commute or at a transit center, during their lunch hour, at a local place where they shop, or at a library.

## 6.4.2 Stakeholder Interviews

During the early stages of the AA process, Sound Transit and the consultant team conducted a series of more than 30 stakeholder interviews to learn more about the communities in the North Corridor Transit Project area, gain a better understanding of potential project challenges, and identify any audiences not previously identified.

The goals of the stakeholder interviews include:

- Develop strong relationships early on; build trust in and ultimately consensus around the decision-making process.
- Enhance the project team's knowledge of the area, key stakeholders, and community leaders.
- Develop awareness of the project and communicate the purpose and need of the project.
- Reach out to traditionally under-represented or hard-to-reach communities.

Key themes emerged from the stakeholder interviews about knowledge base, existing transit use, the project, the communities, and communications and outreach, including:

- Many recalled the Sound Transit 2 ballot measure and upon explanation understood the need to explore multiple modes of transit during the AA process.
- Most organizations expressed excitement for expanding transit north; some understood but were surprised at the length of time needed for planning and construction.
- Nearly everyone noted that better connections with existing transit service in the area are needed, particularly east/west connections.
- At most interviews, similar views to what was heard during early scoping were given, including identifying I-5 and SR 99 as potential alignments.
- Many stakeholders located in the SR 99 corridor thought that business owners were already experiencing "construction fatigue" due to Aurora revitalization projects. Many questioned the benefits of SR 99 use, given the assumed large property impacts.
- Many organizations see the value of this project and broad engagement in it; they are willing and interested in helping disseminate information through their existing channels of communication.
- This is a diverse area in terms of economic status, employment opportunities, language, culture, transit use, and accessibility. Outreach should be flexible and tailored to reach the diverse populations. Talking in person at existing gathering places is an effective way to spread information. Many people provided anecdotal language information.

- Organizations representing environmental justice populations were helpful in providing specific publications and locations where under-represented populations can be reached.

### 6.4.3 Public Outreach to Minority and Low-Income Populations ("Environmental Justice")

The project's public outreach efforts are being conducted to help identify and involve minority and low-income populations that could be benefited or impacted by the project. Executive Order 12898, signed by President Clinton in 1994, directs federal agencies to make achieving "Environmental Justice" part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

The project's initial analysis of the larger corridor area, using U.S. Census data and other sources, indicated that areas of the corridor contain members of a number of minority groups, including people identifying themselves as Asian or Hispanic. Based on Sound Transit's translation staff recommendations and information from the most common previous translation inquiries to Sound Transit from existing vendor TeleLanguage call data, the public notices were translated into Spanish and Chinese to help reach these groups.

Interpretation services were also offered via translated Language Line information on the postcard. When new 2010 census data are available, translation staff and consultant staff will review languages in which to translate notification information for scoping and future outreach.

In addition to the blanket mailing of 130,000 postcards with translation notices that were sent to all residential addresses in areas in and surrounding the project corridor, the project distributed bundles of postcards at nearly 35 locations in the project area. The sites included facilities serving the general public as well as specifically the Asian or Hispanic communities, such as service or resource centers, churches, libraries, recreation centers, senior centers, and retail establishments. The multiple newspaper notices in a variety of project area papers also were intended to reach low-income and minority populations in addition to others in the various communities. Information was posted in English; however, publications were selected based upon their wide range of audiences.

Sound Transit will continue to develop its strategy and outreach to environmental justice populations as the project moves forward into the environmental documentation phase and beyond. Sound Transit has made it a priority to engage and solicit input from these populations early in the planning and development process.

### 6.4.4 Agency Involvement

In addition to the Agency Early Scoping Meeting detailed above, Sound Transit has been working closely with agencies as outlined in the agency coordination plan. As the project

moves forward, coordination with agencies is expected to intensify and the agency coordination plan will be updated to reflect a strategy for future phases.

### 6.4.5 Policy Advisory Committee

Prior to Sound Transit's formal kick-off of the North Corridor Transit Project, a group of senior staff and department heads from cities, counties and transit agencies formed on their own to provide a forum for discussing policy issues related to the project among themselves as well as with Sound Transit. This group is known as the North Corridor Policy Advisory Committee (PAC). The PAC has been meeting since early 2010.

North Corridor Light Rail Policy Advisory Committee members include representatives from the following jurisdictions:

- City of Seattle
- City of Shoreline
- City of Mountlake Terrace
- City of Edmonds
- City of Lynnwood
- Snohomish County
- City of Everett
- Community Transit

### 6.4.6 Interagency Technical Working Group

Sound Transit formed an Interagency Technical Working Group (ITWG) of technical staff to supplement the PAC, comprised of staff that could focus more on technical aspects and have day-to-day involvement in the project. The ITWG provides an avenue for sharing technical information about the project and receiving feedback at progress and decision points. A key objective is to maintain consistency of members and participation throughout the process. The ITWG operates under the premise that this is a regional project and decisions or issues from one jurisdiction can have implications and consequences in other jurisdictions. Some members of the ITWG also represent their jurisdictions in policy-focused discussions at the PAC, and the ITWG and PAC frequently meet with Sound Transit together.

The ITWG was convened in August 2010 and it is assumed this group will continue meeting through the duration of the project.

#### MEMBER SELECTION PROCESS

Members were sought based on their ability to provide informed review and comment on behalf of their agency, and their technical background in transportation and/or land use and economic development. This group is not intended to provide official recommendations on policy-related decisions. Representatives from each jurisdiction/agency, listed below, also have good access to staff involved with planning, engineering, utilities, permitting, and economic development.

- City of Seattle
- City of Shoreline
- City of Edmonds
- City of Mountlake Terrace
- City of Lynnwood
- Community Transit
- WSDOT
- King County Metro
- Snohomish County
- PSRC

### RESPONSIBILITIES OF INTERAGENCY TECHNICAL WORKING GROUP MEMBERS

- Attend ITWG meetings as scheduled. A minimum of 3 weeks advance notice is provided to ITWG members and each member is encouraged to appoint an alternate if the member cannot attend. Meeting topics include:
  - Purpose and need evaluation process and criteria
  - Preliminary alternatives for early scoping
  - Results of general public early scoping meetings
  - Level 1 AA evaluation results
  - Conclusion of AA evaluation
  - Identification of Draft EIS alternatives
- Act as conduit between the Sound Transit team and member agency staff, gathering information and/or disseminating information as requested by the project team.
- Review materials that will be presented to the public, scheduled with adequate review time for the Sound Transit team to produce materials.
- Provide early and informal feedback on project issues.

### FORMAT OF INTERAGENCY TECHNICAL WORKING GROUP

ITWG meetings are scheduled as needed when new project information is available for review or when issues arise that need to be discussed with the group. Relevant materials are presented by the project team in an interactive workshop format. When possible, briefing materials are sent to the ITWG prior to a meeting.

Results of meetings, particularly action items, are recorded and sent to members for confirmation and follow-up. Detailed meeting minutes are not provided. During the AA, meetings were held on the following dates:

- August 19, 2010
- September 23, 2010
- October 28, 2010
- February 15, 2011
- May 10, 2011
- July 28, 2011

## 6.5 SHARING THE RESULTS OF THE ALTERNATIVES ANALYSIS

Sound Transit plans to provide project updates and share results of the AA with local agencies and stakeholders through the summer. Stakeholders include the general public (including minority and low-income populations), business and neighborhood organizations, special interest groups, local agencies and government officials.

Briefings will be conducted with identified key stakeholders. Over 35 potential community, transportation, and environmental organizations and over 40 government individuals, councils and committees were identified as a result of community research conducted last fall. Briefings will include a general project update, results of the AA and notification of opportunities for public comment during fall scoping.

The Sound Transit web site has a project page dedicated to the North Corridor Transit Project. This project page will be updated with the AA results and will include mechanisms for viewers to become involved in the project as it moves forward. Additionally, an electronic project update will be sent to the current Email list of over 1,000 addresses.

Eight summer fairs and festivals have been identified for Sound Transit staff to attend, to provide general agency information and specific project information at participating event booths. The events are located along the project corridor where there is strong project interest and anticipated high attendance with broad representation of the community.

A public open house is scheduled for mid-August with the purpose of sharing results of the AA. General agency and project information will also be available at this event. The location will be central to the project corridor and the planned format is an informal open house with project staff available to answer questions and provide more detailed information as the public prepares for formal scoping.

Additional meetings of the project's PAC and the ITWG will be held over the summer. Members will receive the AA results prior to public scoping.

# 7 COMPARATIVE EVALUATION OF ALTERNATIVES

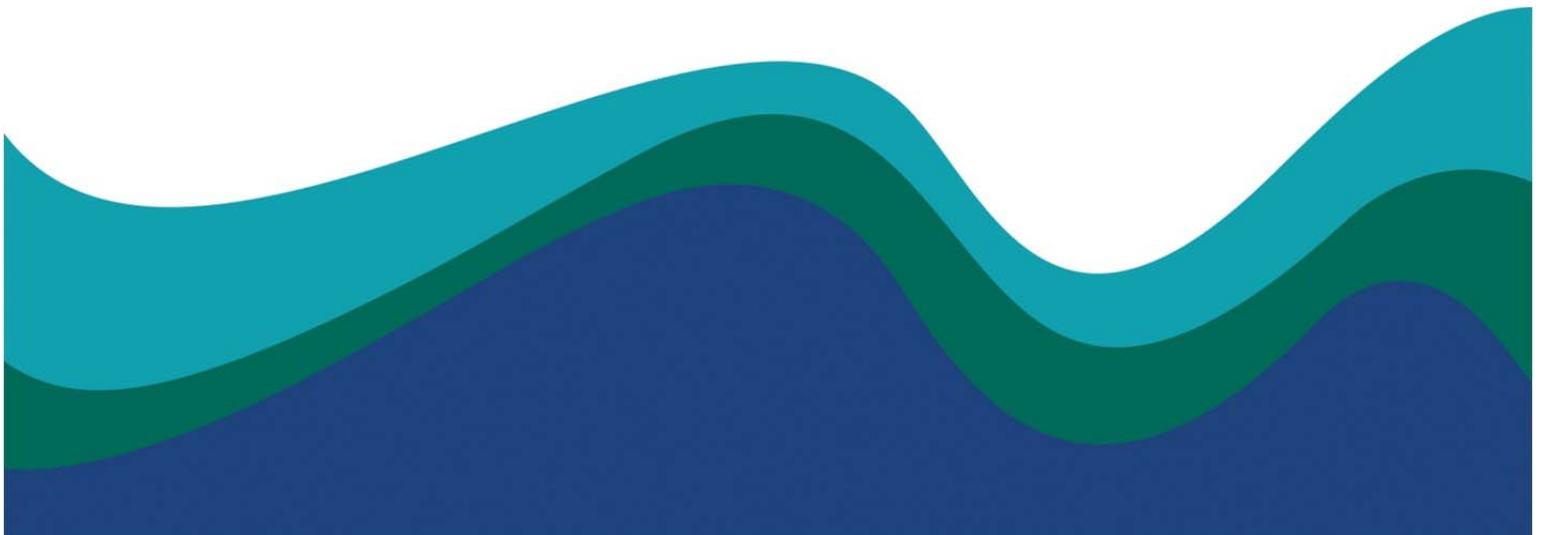
## 7.1 INTRODUCTION

This chapter presents the comparative analysis of the four Level 2 build alternatives along with a discussion of the relative performance of the TSM/Baseline Alternative. The four build alternatives and a number of variations are described in detail in Chapter 4 and include the following:

- L1: I-5 Light Rail
- L2: SR 99 Mixed Profile Light Rail
- L3: SR 99 Elevated Light Rail
- B2: Multi-Corridor BRT

Chapter 4 also presents a detailed description of both the No Build and TSM/Baseline Alternatives. In addition to these alternatives, a number of other alternatives and variations were identified early in the AA process and were screened out through the initial evaluation steps as failing to satisfy the project's Purpose and Need. These alternatives, along with the reasons for dropping them, are discussed in Chapter 3.

Table 7-1 provides a summary of the Level 2 evaluation findings organized by category of the North Corridor Transit Project's Purpose and Need. The Purpose and Need, as described in Chapter 2, is summarized into six broad categories of evaluation measures that were applied to the alternatives. The six categories include those of local importance as well as FTA guidance on recommended factors to be considered in an AA. (See: Advance Notice of Proposed Rulemaking: Federal Transit Administration, 49 Code of Federal Regulations [CFR] Part 611 [Docket No. FTA-2010-0009], RIN 2132-AB02, Major Capital Investment Projects, dated June 3, 2010). The categories are:



**Table 7-1. Level 2 Alternatives Evaluation Summary**

**KEY TO RANKING**



	<b>TSM</b> TSM/Baseline	<b>L1</b> I-5 Light Rail	<b>L2</b> SR 99 Mixed Profile Light Rail	<b>L3</b> SR 99 Elevated Light Rail	<b>B2</b> Multi-Corridor BRT
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**Purpose and Need: Transportation Effectiveness in Meeting Mobility, Access and Capacity Needs**

2030 Project Daily Riders	21,000 <i>Daily Riders</i>	52,000 <i>Daily Riders</i>	41,000 <i>Daily Riders</i>	48,000 <i>Daily Riders</i>	24,000 <i>Daily Riders</i>
2030 Annual New Riders	0.64 million <i>New Riders</i>	4.5 million <i>New Riders</i>	2.5 million <i>New Riders</i>	3.9 million <i>New Riders</i>	1.1 million <i>New Riders</i>
2030 Annual Hours of Travel Time Saved	0.59 million <i>Hours Saved</i>	4.6 million <i>Hours Saved</i>	2.4 million <i>Hours Saved</i>	3.8 million <i>Hours Saved</i>	1 million <i>Hours Saved</i>
2030 New Weekday Transit Trips to Regional Centers	1,500 <i>More Trips</i>	10,400 <i>More Trips</i>	5,300 <i>More Trips</i>	8,400 <i>More Trips</i>	2,500 <i>More Trips</i>
Capacity in passengers per hour per direction (pphpd)	1,680 <i>pphpd</i>	8,880 <i>pphpd</i>	4,440 <i>pphpd</i>	8,880 <i>pphpd</i>	3,600 <i>pphpd</i>
2030 Peak Hour Passenger Demand/Capacity	At capacity	72%	95%	62%	86%
2030 Peak Transit Travel Time: Lynnwood to Northgate	30 minutes	14 minutes	21 minutes	18 minutes	24 minutes
2030 Transit to Auto Travel Time Comparison (Peak Lynnwood to Northgate)	4 minutes <i>FASTER than Auto</i>	20 minutes <i>FASTER than Auto</i>	13 minutes <i>FASTER than Auto</i>	16 minutes <i>FASTER than Auto</i>	10 minutes <i>FASTER than Auto</i>
2030 Transit to Auto Travel Time Comparison (Peak Lynnwood to Downtown)	6 minutes <i>SLOWER than Auto</i>	10 minutes <i>FASTER than Auto</i>	3 minutes <i>FASTER than Auto</i>	6 minutes <i>FASTER than Auto</i>	Similar to Auto
Operations on Non-Exclusive Right-of-Way	23.8 miles	0 miles	0 miles	0 miles	25.8 miles
Signalized Intersections Traversed	30 <i>Intersections</i>	0 <i>Intersections</i>	5 <i>Intersections</i>	0 <i>Intersections</i>	50 <i>Intersections</i>
Number of Transfers to Reach Major Destinations	1 <i>Transfer</i>	0 <i>Transfers</i>	0 <i>Transfers</i>	0 <i>Transfers</i>	1 <i>Transfer</i>
2030 Reduction in Weekday VMT	16,900 <i>Fewer Miles</i>	191,500 <i>Fewer Miles</i>	85,200 <i>Fewer Miles</i>	160,700 <i>Fewer Miles</i>	33,100 <i>Fewer Miles</i>

**Purpose and Need: Equitable Community Impacts and Benefits**

Impacts on Affected Communities	Low	Moderate	High	Moderate to High	Low
Transportation Benefits to Affected Communities	Low	High	Moderate	Moderate to High	Low

**Purpose and Need: Supportive Land Use and Economic Development Effects**

Access to Regional Growth Centers	Low	High	Moderate	Moderate to High	Low
Station Areas with High TOD Potential	Not Applicable	1 <i>of 4 Station Areas</i>	2 <i>of 5 Station Areas</i>	2 <i>of 5 Station Areas</i>	2 <i>of 10 Station Areas</i>

**Table 7-1. Level 2 Alternatives Evaluation Summary (continued)**

**KEY TO RANKING**



	<b>TSM</b> TSM/Baseline	<b>L1</b> I-5 Light Rail	<b>L2</b> SR 99 Mixed Profile Light Rail	<b>L3</b> SR 99 Elevated Light Rail	<b>B2</b> Multi-Corridor BRT
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**Purpose and Need: Preservation of a Healthy Environment**

*At this level of concept development and analysis, measures do not account for possible impact avoidance and mitigation.*

Ecosystem Effects	Low	Possible High Effects on Several Sensitive Areas	Possible High Effects on Several Sensitive Areas	Possible High Effects on Several Sensitive Areas	Possible Moderate Effects on Several Sensitive Areas
Water Resources Effects	Low	Moderate	Low to Moderate	Low to Moderate	Low
Potential Park or Historic Resources Effects, Including Section 4(f) Properties	Low	Low to Moderate	Low to Moderate	Low to Moderate	Low
Daily Reduction in Greenhouse Gas Emissions	Similar to No Build	235 tons	33 tons	223 tons	Similar to No Build
Visual Impacts	Low	Moderate, with Localized High	Moderate, with Localized High	Moderate, with Localized High	Low
Potential for Noise Impacts Requiring Mitigation	Low	Moderate to High	Moderate to High	Moderate to High	Low
New Transportation Right-of-Way Required	5 Acres 0 to 5 Parcels	22 Acres 140 to 170 Parcels	44 Acres 320 to 370 Parcels	40 Acres 240-270 Parcels	8 Acres 20-30 Parcels
Traffic Impacts	Minimal	Minor Corridor-wide Improvements	Minor Degradation at SR 99 Intersections	Minimal	Minimal
Pedestrian and Bicycle Travel	Minimal	Improvements Possible Over Time Near Stations	Improvements Possible Over Time Near Stations	Improvements Possible Over Time Near Stations	Minimal
Construction Effects on Transportation System	Low Impacts	Low to Moderate Impacts over Long Duration	High Impacts over Long Duration	Moderate Impacts over Long Duration	High Localized Impacts

**Purpose and Need: Cost and Constructability**

Capital Costs (Millions of Mid-2010 Dollars)	\$200 to \$230	\$1,420 to \$1,640	\$1,830 to \$2,100	\$2,010 to \$2,310	\$640 to \$730
2030 Net Annual Operations and Maintenance Costs (Millions of Mid-2010 Dollars)	\$17.6	\$11.0	\$10.4	\$14.6	\$33.6
Cost per Hour of 2030 User Benefits (Mid-2010 Dollars)	\$60 to \$64	\$25 to \$28	\$61 to \$69	\$42 to \$48	\$91 to \$99
Incremental Cost per 2030 New Passenger (Mid-2010 Dollars)	\$55 to \$59	\$25 to \$29	\$58 to \$67	\$41 to \$46	\$83 to \$90

**Purpose and Need: Consistency with Sound Transit’s Long-Range Vision**

Meets State Definition of HCT	No	Yes	Yes	Yes	No
Consistent with ST Long-Range System Plan	No	Yes	No	Yes	No

- Transportation effectiveness in meeting mobility, access, and capacity needs
- Equitable community impacts and benefits
- Supportive land use and economic development effects
- Preservation of a healthy environment
- Cost and constructability
- Consistency with Sound Transit's Long-Range Plan vision

The results of the detailed Level 2 alternatives evaluation are presented in Chapter 5. Chapter 7 includes a summary discussion of the comparative performance, by category, of the four build alternatives, followed by the resulting conclusions for each alternative. Finally, Chapter 8 contains a discussion of the next steps in the New Starts project development process leading to the preparation of a Draft EIS.

The findings summary in Table 7-1 for the build alternatives shows the performance of the alternatives compared to the No Build Alternative for each performance measure. The color shadings run from dark green to light green in tones that indicate the performance of the alternatives going from best-performing to worst-performing. Red shading indicates where an alternative fails to meet the project's Purpose and Need related to that specific measure.

The TSM/Baseline Alternative is shown in grey because this alternative is developed solely for the purposes of the FTA New Starts criteria comparisons. The sections that follow provide a comparative discussion of the most significant conclusions organized by the findings in each category of the project's Purpose and Need.

### 7.1.1 Transportation Effectiveness in Meeting Mobility, Access, and Capacity Needs

Thirteen criteria were used to assess the transportation performance of the alternatives using 2030 as the design year. The L1: I-5 Light Rail Alternative was the best performing on 8 of the 13 criteria and equal in performance to the next best-performing L3: SR 99 Elevated Light Rail Alternative on the other 5 measures. The L2: SR 99 Mixed Profile Light Rail Alternative was substantially lower on 11 of the 13 criteria compared to the other light rail alternatives. In addition, the L2: SR 99 Mixed Profile Light Rail Alternative is forecasted to be at 95 percent of capacity in 2030, while the fully grade separated light rail alternatives have substantial capacity to carry additional riders. The B2: Multi-Corridor BRT Alternative was generally the poorest performing of the build alternatives, generally ranking last on most measures. Findings by selected key category include:

- **Annual New Riders:** This measure counts travelers who previously did not ride transit but are attracted by the project's new facilities and services. Annual new riders would be highest for the L1: I-5 Light Rail Alternative, followed closely by the L3: SR 99 Elevated Light Rail Alternative. The L2: SR 99 Mixed Profile Light Rail Alternative would

have only half the new riders of the best-performing L1: I-5 Light Rail Alternative. The B2: Multi-Corridor BRT Alternative is last with under one-quarter of the new riders of the best-performing L1: I-5 Light Rail Alternative.

- **Annual Hours of Travel Time Saved:** Travel time savings over the entire transit system as a result of the project is the key measure of user benefit assessed in the analysis. The pattern of performance of the alternatives is very similar to the performance on the new riders measure. The L1: I-5 Light Rail Alternative would save the most travel time at 4.6 million hours annually, followed closely by the L3: SR 99 Elevated Alternative at 3.8 million hours annually. Savings for the L2: SR 99 Mixed Profile Light Rail Alternative would be substantially less at 2.4 million and the B2: Multi-Corridor BRT Alternative would save the fewest hours at 1 million annually.
- **New Transit Trips to Regional Centers:** This measure looks at changes in travel to selected PSRC-designated Regional Growth Centers such as Lynnwood and downtown Seattle. The pattern of the results is very similar to the measure of new riders. The L1: I-5 Light Rail Alternative performs the best, followed by the L3: SR 99 Elevated Light Rail Alternative, the L2: SR 99 Mixed Profile Light Rail Alternative, and finally the B2: Multi-Corridor BRT Alternative.
- **Passenger Capacity:** This category was evaluated in two ways. First, the total seated and standing riders that the project could carry in a single hour in one direction was evaluated. Next, the share of total capacity that would be filled in the 2030 design year was determined. The latter measure provides information about how much growth—beyond target year ridership—the system could accommodate, and also whether the system would have room for additional riders if it were extended north to Everett, as envisioned in Sound Transit’s Long-Range Plan. Both the L1: I-5 Light Rail Alternative and the L3: SR 99 Elevated Light Rail Alternative would have a capacity of 8,880 passengers per hour per direction. By 2030 it is estimated that 72 percent of L1: I-5 Light Rail Alternative’s and 62 percent of the L3: SR 99 Elevated Light Rail Alternative’s capacity would be required to meet peak hour demand, with the excess capacity available for continued growth in ridership in the project area, and to extend the system north to Everett. The L2: SR 99 Mixed Profile Light Rail Alternative would have half the capacity of L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative, because it would operate on 8-minute rather than 4-minute headways (the time between successive train movements in a given direction). The factors constraining L2: SR 99 Mixed Profile Light Rail Alternative headways are the five signalized intersections that would be traversed in this alternative. As a result, the L2: SR 99 Mixed Profile Light Rail Alternative would operate at 95 percent capacity in 2030 with virtually no capacity for ridership growth in the corridor or for extending the system to Everett. The B2: Multi-Corridor BRT would have substantially less capacity than the rail alternatives and be at 86 percent of capacity in 2030. The TSM/Baseline Alternative would provide even less capacity, and would be at capacity in 2030, with no

potential to handle future ridership growth or accommodate additional riders associated with extending the routes to Everett.

- **Travel Time:** The speed advantage of the L1: I-5 Light Rail Alternative is reflected in travel time differences for specific individual trips. Light rail in I-5 would cut peak-period transit travel time between Lynnwood and Northgate<sup>1</sup> in half, compared to the bus in the TSM/Baseline Alternative, and would be 20 minutes faster than driving. The L3: SR 99 Elevated Light Rail Alternative is the next best performer, but would be 4 minutes slower than the L1: I-5 Light Rail Alternative. This is followed by the L2: SR 99 Mixed Profile Light Rail Alternative, which would be 7 minutes slower than light rail in I-5. Finally, the bus in the B2: Multi-Corridor BRT Alternative would be 10 minutes slower than light rail in I-5. The L1: I-5 Light Rail Alternative also would be the fastest in comparison to driving from Lynnwood to downtown Seattle; it would be 10 minutes faster than the average AM peak hour automobile trip. The L3: SR 99 Elevated Light Rail Alternative is next best at 6 minutes faster than driving, while the L2: SR 99 Mixed Profile Alternative would be only 3 minutes faster, and the B2: Multi-Corridor BRT Alternative would take the same amount of time as driving.
- **Measures of Reliability:** Miles of operation on non-exclusive right-of-way and the number of at-grade signalized intersections traversed are indicators of potential sources of variable travel delays and resulting unreliable travel times. In many respects the reliability of trip times is as important to riders as actual travel times. On these measures, both the L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative would result in the most reliable travel times because both operate on fully exclusive, grade-separated guideways. The L2: SR 99 Mixed Profile Light Rail Alternative would be somewhat less reliable because it includes at-grade crossings of five signalized intersections, and the B2: Multi-Corridor BRT would be the least reliable because of the mixed traffic and HOV lane operations.
- **Impacts to Existing Transit Service:** Both the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail alternatives would replace the existing I-5 Community Transit express bus routes that connect Snohomish County to destinations in Seattle. Because of the slower rail travel times and lower capacity these bus routes would continue to operate on I-5 with the L2: SR 99 Mixed Profile Light Rail Alternative. While light rail on either the I-5 or SR 99 corridor would affect ridership on King County Metro's RapidRide BRT and Community Transit's SWIFT BRT lines operating along SR 99, the SR 99 light rail alternatives would more directly connect to and compete with those services. Metro's RapidRide E line could experience lower ridership as some riders choose instead to use light rail along SR 99, while Community Transit's SWIFT line could see increased ridership prompted by a direct connection to light rail in Shoreline not provided by light rail running along I-5. The B2: Multi-Corridor BRT Alternative would have impacts

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<sup>1</sup> Reflects travel time to reach the regional light rail system at Northgate, which includes an added 5 minutes for non-rail modes to transfer to light rail at the Northgate Station.

on the existing bus transit services similar to the L2: SR 99 Mixed Profile Light Rail Alternative.

### 7.1.2 Equitable Community Impacts and Benefits

Community equity looks at potential adverse and beneficial effects on minority and low-income populations and communities, generally categorized as “environmental justice communities.” Impacts include construction effects, effects on community cohesion and interaction, effects on community facilities, and displacement of residences and businesses. Benefits include long-term mobility improvements, reflecting access to stations, improvements in travel time, and access to employment.

All of the alternatives are located in an area where there are higher percentages of low-income and minority populations compared to the rest of King County or Snohomish County. Many of these communities are located in the band between SR 99 and I-5 and extend from Northgate to Lynnwood.

Impacts on affected communities for the B2: Multi-Corridor BRT Alternative are low because new facilities would be limited. Benefits are also low because the BRT alternative would attract fewer riders and provide less travel time savings than the light rail alternatives. Community impacts are moderate for the L1: I-5 Light Rail Alternative, high for the L2: SR 99 Mixed Profile Light Rail Alternative, and moderate to high for the L3: SR 99 Elevated Light Rail Alternative. The L1: I-5 Light Rail Alternative would be constructed along the freeway with fewer potential impacts on identified environmental justice communities than either of the SR 99 alternatives, which would be built in new right-of-way along a fully developed arterial highway. Community benefits would be higher for the L1: I-5 Light Rail Alternative because it would attract more riders and provides faster service, moderate to high for the L3: SR 99 Elevated Light Rail Alternative, and moderate for the L2: SR 99 Mixed Profile Light Rail Alternative.

### 7.1.3 Supportive Land Use and Economic Development Effects

Two key categories were used to assess land use and economic development performance: access to regional growth centers and station areas with high transit-oriented development (TOD) potential. The first measure addresses the fundamental question of how well each alternative would serve the region’s adopted growth management and economic development strategies, while the second addresses TOD potential near individual stations within the project area. Key findings by these two categories include:

- **Access to Regional Growth Centers:** The North Corridor Transit Project connects two of the PSRC-designated Regional Growth Centers (Lynnwood and Northgate) to each other to help balance the regional transit system. The alternatives line up from higher to lower performing in the same order that they line up on ridership and travel time measures: the L1: I-5 Light Rail Alternative and the L3: SR 99 Elevated Light Rail Alternative perform much better than the others, followed by the L2: SR 99 Mixed Profile Light Rail Alternative and finally the B2: Multi-Corridor BRT Alternative. This

ranking and relative performance is the result of the quality, as measured by ridership and travel time, and quantity, as measured by service capacity, of transportation that would be provided.

- **Transit-Oriented Development Potential:** On TOD potential, however, the alternatives are distinguished from each other in a different order. The L2: SR 99 Mixed Profile Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative perform best on this measure because the three stations along SR 99 would provide more opportunities for TOD—where there is already a mix of supportive land uses and density—than would the two stations along I-5 in King County, which are in predominantly single-family neighborhoods. The B2: Multi-Corridor BRT Alternative also would serve the station areas along SR 99 with high TOD opportunities, but it does not rank as high as the SR 99 Light Rail Alternatives because the travel times, capacity, and reliability of the BRT service is significantly lower than for light rail. All of the alternatives would share common stations at Northgate, Mountlake Terrace, and Lynnwood.

#### 7.1.4 Preservation of a Healthy Environment

Environmental measures focus on the range of impacts on the natural environment including water, air, endangered and protected species, and sensitive lands, as well as on the human environment including aesthetics; noise; historic and archaeological resources; property; and existing traffic, transit, pedestrian, and bicycle travel. While there are areas where environmental impacts are anticipated, none of the alternatives are expected to have impacts that would prevent an alternative from being implemented, especially considering potential avoidance and mitigation measures. At this conceptual level of development and analysis of alignments, the environmental measures do not yet reflect the potential for impact avoidance and mitigation measures that the project could incorporate through further design and environmental efforts. Despite these qualifications, there are some differences in the level of potential effects among the alternatives, including:

- **General Effects:** The light rail alternatives would construct the largest amounts of new transportation infrastructure and would require more right-of-way dedicated to transportation in the corridor. This would result in more effects on both the natural and human environments. The L2: SR 99 Mixed Profile Alternative would have the greatest effects, followed by the L3: SR 99 Elevated Light Rail Alternative, the L1: I-5 Light Rail Alternative, and then the B2: Multi-Corridor BRT Alternative.
- **Reduction in Air Pollutants and Greenhouse Gas Emissions:** Reductions in these emissions are a function of the reductions in vehicle miles traveled (VMT) and roadway congestion. While the forecasts are made at a regional level, several of the alternatives still would result in notable reductions in vehicle emissions among the alternatives, providing environmental benefits. The L1: I-5 Light Rail Alternative is forecasted to result in the largest emission reductions, followed closely by the L3: SR 99 Elevated

Light Rail Alternative. Emission reductions for the L2: SR 99 Mixed Profile Light Rail Alternative would be roughly half of those resulting from the L1: I-5 Light Rail Alternative, while the B2: Multi-Corridor BRT Alternative would be similar to the No Build Alternative.

- **Noise:** The light rail alternatives would all be near a large number of noise-sensitive properties and have the potential for noise impacts requiring mitigation. Mitigation for the L2: SR 99 Mixed Profile Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternative could be more complex, particularly for the at-grade sections of SR 99. Noise walls would be less effective given the nature of the uses fronting the arterial and the need for frequent driveway and street access. The elevated sections also have the potential to create noise impacts at greater distances. Mitigation would likely involve noise barriers along the elevated sections, which would increase the visual prominence of the guideway. For the L1: I-5 Light Rail Alternative, there are also a large number of noise-sensitive properties nearby including many single-family homes, but there are more opportunities to avoid impacts through guideway placement (for example, below the existing I-5 cut slopes) or mitigate them with noise walls. As with SR 99, the elevated guideway sections on I-5 would have the potential to cause noise impacts. Potentially affected sensitive receptors would be substantially fewer for the B2: Multi-Corridor BRT Alternative.
- **Acquisitions and Displacements:** The light rail alternatives would require continuous construction of new transportation facilities for the length of the alignment, and therefore have the greatest potential impacts. Acquisitions are greatest for the L2: SR 99 Mixed Profile Light Rail Alternative because the existing SR 99 right-of-way is nearly fully developed and adding light rail would require predominantly all new transportation right-of-way. This is followed by the L3: SR 99 Elevated Light Rail Alternative, which requires slightly less new transportation right-of-way than the L2: SR 99 Mixed Profile Light Rail Alternative because of the smaller ground footprint of the additional elevated sections. The L1: I-5 Light Rail Alternative, which would use portions of the WSDOT I-5 right-of-way, would require roughly half the new transportation right-of-way required by the L2: SR 99 Mixed Profile Light Rail Alternative. The B2: Multi-Corridor BRT Alternative would require substantially less new right-of-way in more localized areas than the light rail alternatives.
- **Transportation Effects:** In general, all of the alternatives would have beneficial effects on the existing roadway, bus transit, pedestrian, and bicycle systems. Many of these benefits are a direct result of the effectiveness of the alternatives in meeting transportation needs as discussed in Section 7.2.1. Benefits would be greatest for the L1: I-5 Light Rail Alternative, followed by the L3: SR 99 Elevated Light Rail Alternative, and then the L2: SR 99 Mixed Profile Light Rail Alternative. Benefits would be substantially fewer for the B2: Multi-Corridor BRT. On the impact side, the L2: SR 99 Mixed Profile Light Rail Alternative would degrade the performance of a number of

intersections along SR 99, while all the other alternatives would have few, if any, localized negative effects.

### 7.1.5 Cost and Constructability

Project affordability was evaluated based on costs, including total capital and annual O&M costs, and on cost-effectiveness measures, including the cost per unit of user benefit and cost per new rider. Key findings on these measures include:

- **Capital Costs (mid-2010 dollars):** These vary significantly among the alternatives. With a range of \$2,010 to \$2,310 million, the L3: SR 99 Elevated Light Rail Alternative would be the most costly to build. The L2: SR 99 Mixed Profile Light Rail Alternative is nearly as costly with an estimated range of \$1,830 to \$2,100. While not shown in Table 7-1, the SR 99 alignment variations are estimated to increase the capital cost of the L2: SR 99 Mixed Profile Light Rail Alternative by \$30 to \$35 million for the Roosevelt Way Variation and \$140 to \$160 million for the SR 99 North Variation in Snohomish County. Both of these variations together would raise the capital cost for the L2: SR 99 Mixed Profile Light Rail Alternative to \$1,990 to \$2,280 million. This is followed by the L1: I-5 Light Rail Alternative at a total capital cost of \$1,420 to \$1,640, which is roughly \$400 to \$500 million less than the range for the L2: SR 99 Mixed Profile Light Rail Alternative and \$600 to \$700 million less than the L3: SR 99 Elevated Light Rail Alternative. At \$640 to \$730 million in total, the B2: Multi-Corridor Alternative would be substantially less costly than the rail alternatives, and at \$200 to \$230 million the TSM/Baseline Alternative would be the least costly to build. Sound Transit's current financial plan funds \$1,540 million in North Corridor Transit Project capital costs. In comparison to this, the capital costs of the TSM/Baseline and B2: Multi-Corridor BRT Alternatives are well within Sound Transit's current financial capacity to fund. The L1: I-5 Light Rail Alternative is affordable within that capacity at the low end of its cost range, but not affordable at the high end of the range. The costs of the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives are well outside Sound Transit's financial capacity to fund.
- **2030 Net Annual O&M Costs (mid-2010 dollars):** These costs include savings in Sound Transit express regional bus services that would no longer be needed. Both King County Metro and Community Transit also are likely to see operating cost savings as a result of bus services that will no longer be needed with implementation of some of the light rail alternatives. These potential savings, however, are not included in the estimates, as they would accrue to those agencies, not Sound Transit. Overall, the rail alternatives would be less costly to operate and maintain than the bus alternatives. The L2: SR 99 Mixed Profile Light Rail Alternative would be the least costly at \$10.4 million per year, followed closely by the L1: I-5 Light Rail Alternative at \$11.0 million annually, and the L3: SR 99 Elevated Light Rail Alternative at \$14.6 million. The TSM/Baseline Alternative would be next at \$17.6 million and the B2: Multi-Corridor BRT Alternative would be the most expensive at \$33.6 million annually.

- **Cost/Hour of 2030 User Benefits (mid-2010 dollars):** This is a measure of the annualized capital and year 2030 O&M costs divided by the estimated year 2030 annual hours of travel time savings. While an abstract number, the results are useful for making comparisons among alternatives to determine the relative costs of user benefits—a measure of cost effectiveness. The L1: I-5 Light Rail Alternative is by far the best performing on this measure, at roughly 60 percent of the cost per hour of user benefit of the next best-performing L3: SR 99 Elevated Light Rail Alternative. This cost measure for both the L2: SR 99 Mixed Profile Light Rail and TSM/Baseline Alternatives are over twice that for the L1: I-5 Light Rail Alternative. The B2: Multi-Corridor BRT is the least cost effective based on this measure.
- **Incremental Cost/2030 New Passenger (mid-2010 dollars):** This is another measure of cost effectiveness and calculates the annualized capital and year 2030 O&M costs divided by the year 2030 annual new transit riders. The cost per new rider calculation shows a pattern similar to the travel time savings calculations. The L1: I-5 Light Rail Alternative performs substantially better than the other alternatives, followed by the L3: SR 99 Elevated Light Rail Alternative, then the TSM/Baseline Alternative, the L2: SR 99 Mixed Profile Light Rail Alternative, and the B2: Multi-Corridor BRT Alternative in that order.

### 7.1.6 Consistency with Sound Transit's Long-Range Plan Vision

The final Purpose and Need category addresses whether the project is consistent with Sound Transit's Long-Range Plan, which requires it to meet the State of Washington's definition of HCT and be able to eventually extend the service north to Everett. Key findings include:

- **Consistency with State Definition of HCT:** Sound Transit's Washington State enabling legislation defines HCT as being located in exclusive rights-of-way and providing substantially higher levels of service in terms of capacity, speed, and frequency than traditional public transportation systems operating on general purpose roadways. Express buses operating in HOV lanes are recognized as an interim form of HCT service. Under this definition, only the L1: I-5 Light Rail, L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives would meet the definition of permanent HCT. Both the TSM/Baseline and B2: Multi-Corridor BRT Alternatives, while utilizing in part the I-5 HOV lanes and the SR 99 BAT lanes, would operate in large sections in general purpose traffic lanes. Thus, the B2: Multi-Corridor BRT Alternative does not meet the definition of permanent HCT.
- **Consistency with Sound Transit's Long-Range Plan:** Only the L1: I-5 Light Rail Alternative and L3: SR 99 Elevated Light Rail Alternatives are consistent with Sound Transit's Long-Range Plan for regional transit, because they are the only alternatives that provide capacity for future extensions to Everett. In addition, the L1: I-5 Light Rail Alternative would have substantially shorter travel times between Lynnwood and Northgate compared to any of the other alternatives. The L2: SR 99 Mixed Profile Light

Rail Alternative is constrained by the limitations of the at-grade segments and crossings of five major intersections, and would provide half the capacity of the L1: I-5 Light Rail Alternative. As a result, the L2: SR 99 Mixed Profile Light Rail Alternative is forecasted to be near capacity in 2030 with little capability to absorb growth or the riders added by extending the line north of Lynnwood. The B2: Multi-Corridor BRT Alternative would have some excess capacity within the project area itself by 2030, but only limited capacity to accommodate more riders from the project area, or for expansion to the north.

## 7.2 SUMMARY FINDINGS

The sections that follow discuss the overall findings for each build alternative. The section begins with a brief discussion of the findings regarding the TSM/Baseline Alternative, which, while not a build alternative, is the alternative that will be used as the basis for all comparisons in the FTA New Starts process.

### 7.2.1 TSM/Baseline Alternative

The TSM/Baseline Alternative has evolved through the AA process, beginning with an early concept of a single new express bus route to now include a comprehensive program of service changes and improvements, along with a number of low-cost transit facility, roadway, and traffic engineering enhancements. The TSM/Baseline Alternative represents the most that can be done to improve the existing regional transit system to meet the North Corridor Transit Project Purpose and Need short of major new capital investments. The analysis of the TSM/Baseline Alternative is a requirement of the FTA New Starts planning process. It will ultimately serve as the basis for the measures of cost effectiveness that will be used to judge the performance of the build alternatives and ultimately the preferred alternative later in the project development process. The alternative includes three new express bus routes connecting the project area to the light rail system at Northgate. It also includes park-and-ride supply additions and transit center enhancements to improve access to the regional transit system, along with various traffic engineering and signalization enhancements, as well as new freeway ramp and arterial bus-only lanes.

This alternative would not be very effective in meeting the principal transportation needs identified in the corridor. The TSM/Baseline Alternative would be inconsistent with both the definition of HCT and Sound Transit's Long-Range Plan vision of extending the regional transit system north to Everett. It also is the least costly and would have the fewest likely potential impacts on the surrounding environment.

### 7.2.2 L1: I-5 Light Rail Alternative

The L1: I-5 Light Rail Alternative has evolved from the concept originally developed as the representative light rail alignment during the ST2 system planning work. The initial alternative,

based on the ST2 concept, included a fully elevated trackway from Northgate to Lynnwood running primarily along the east side of I-5 and four new elevated stations. As a result of additional discussions with WSDOT and further concept refinements, it was determined that a significant portion of the trackway and at least one of the stations could be placed at-grade adjacent to the freeway. The at-grade sections include multiple locations along the east side of I-5 through Seattle and Shoreline and in the median of I-5 in Snohomish County. These changes have the potential to reduce the cost and impacts of this alternative as well as improve its performance.

In general, the L1: I-5 Light Rail Alternative is the best performing in terms of the transportation criteria and is the least costly of the light rail alternatives. While it has the potential for effects on the surrounding built and natural environment, the alignment along I-5 would help avoid many effects. With further planning and design, it is likely that the level of impacts can be reduced by avoidance and mitigation measures. From a land use and economic development perspective, it would do the best job of providing access to the PSRC-designated regional centers, but fall short of the L3: SR 99 Elevated Light Rail, L2: SR 99 Mixed Profile Light Rail, and B2: Multi-Corridor BRT Alternatives when it comes to serving station areas with high TOD potential. The L1: I-5 Light Rail Alternative is one of two alternatives studied in Level 2 that are capable of supporting Sound Transit's Long-Range Plan vision of extending the regional system north to Everett. From a transportation standpoint, the key findings compared to the No Build Alternative include:

- Year 2030 average weekday riders is projected to be 52,000, over twice the riders carried by the TSM/Baseline Alternative and over 4,000 daily riders more than the next best-performing alternative.
- Year 2030 total annual transit system new riders of 4.5 million and 4.6 million total annual hours of travel time savings, roughly eight times the new riders and travel time savings of the TSM/Baseline Alternative, and 15 percent more new riders and 20 percent more travel time savings than the next best-performing alternative.
- This alternative would have the capacity to carry 8,880 passengers per hour per direction, which is the same as the L3: SR 99 Elevated Light Rail Alternative, over five times the capacity of the TSM/Baseline Alternative.
- Lynnwood-to-Northgate peak-period travel times of 14 minutes would be the shortest of all the alternatives and 20 minutes faster than travel by automobile. Travel on the next best-performing L3: SR 99 Elevated Light Rail Alternative would take 4 minutes longer.
- Based on exclusive operation on a fully grade-separated guideway, the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives would be the most reliable of all of the alternatives studied.
- In terms of impacts on regional vehicle travel statistics, the L1: I-5 Light Rail Alternative is forecasted to result in more than 10 times the reduction in VMT than the

TSM/Baseline Alternative, and slightly less than 20 percent greater VMT reductions forecasted for the next best-performing L3: SR 99 Elevated Light Rail Alternative.

The L1: I-5 Light Rail Alternative is consistent with Sound Transit's Long-Range Plan as a result of full operation on exclusive, grade-separated guideway, and conforms to the definition of HCT. In addition, extending light rail from Northgate to Lynnwood in a configuration that would allow reliable operation of trains at 4-minute peak period headways has been determined to be necessary to support eventual extension of the line north to Everett. At headways longer than 4 minutes in this segment, supplemental express bus service may be required to serve the resulting passenger demand.

Because this alternative uses substantial portions of the WSDOT I-5 right-of-way, it requires the least amount of new transportation right-of-way of the light rail alternatives, roughly half of the new transportation right-of-way needed for either of the SR 99 alternatives.

From a land use and economic development standpoint, the L1: I-5 Light Rail Alternative would do the best job of improving access to and from the two PSRC-designated Regional Growth Centers in the project area (Northgate and Lynnwood) by providing the most people-moving capacity and the shortest travel times. However, it would serve only a single station area north of Northgate (Lynnwood) that has high potential for TOD compared to two station areas (Lynnwood and North 130th Street) with high potential for the L2: SR 99 Mixed Profile Light Rail, L3: SR 99 Elevated Light Rail, and the B2: Multi-Corridor BRT Alternatives.

With a capital cost range of \$1,420 to \$1,640 million (mid-2010 dollars), it is the least costly of the light rail alternatives considered. From a cost-effectiveness standpoint, the L1: I-5 Light Rail Alternative is by far the best performing, with user benefit and new rider costs of 60 percent of the next best-performing L3: SR 99 Elevated Light Rail Alternative, 40 percent of those of the L2: SR 99 Mixed Profile Light Rail and TSM/Baseline Alternatives, and 30 percent of those for the B2: Multi-Corridor BRT Alternative. Based on an available budget of \$1,540 million in Sound Transit's current financial plan, the L1: I-5 Light Rail Alternative is affordable at the low end of its cost range.

### **7.2.3 L2: SR 99 Mixed Profile Light Rail Alternative**

The L2: SR 99 Mixed Profile Light Rail Alternative is a hybrid based on two earlier concepts studied during the Level 1 evaluation. It combines both at-grade and elevated alignments along portions of SR 99 through the cities of Seattle and Shoreline, then elevated on the south side of SR 104 along the county line between Shoreline and Mountlake Terrace, and then along I-5 to Lynnwood. In addition, the Level 2 alternatives evaluation process included variations using an elevated I-5 and Roosevelt Way alignment to reach SR 99 in Seattle, and a combined elevated and at-grade alignment continuing north into Snohomish County along SR 99 to 208th Street SW and then along 208th Street SW to the Lynnwood Transit Center.

As discussed in Section 4.4, early in the Level 2 alternatives development process, a major change was made to this alternative from the concept evaluated during the Level 1 alternatives

evaluation. Based on more detailed analysis of traffic and train operation through the at-grade intersections along SR 99, it was concluded that reliable operation of trains of up to four cars in length at 4-minute headways in both directions was not possible without severe impacts on cross-street and left-turn movements. The resulting traffic congestion and high potential for conflicts would increase the probability of traffic conditions that could produce train delays. Based on Sound Transit's current experience with at-grade operations, at longer headways with shorter trains on Martin Luther King Jr. Way, there is a high probability of operating delays with 4-minute headway operation at-grade on this section of SR 99. Because of the planned structure of the regional light rail network from Tacoma to Everett and across Lake Washington to Redmond, failure to maintain reliable 4-minute headways in this section would result in impacts throughout the regional system. As a result, it was determined that 8-minute headways were the most that could be achieved with partial at-grade operations and the other operating constraints of the regional light rail system.

This change would require that one of the two light rail lines serving the Northgate Station be turned back at Northgate and only one of the lines continue on to Lynnwood. This, in turn, may affect the desired configurations of the tail track and turn-back connections currently being designed at Northgate as part of Sound Transit's North Link project. It would also increase the number of transfers needed to reach some destinations served by the light rail network. In addition, as a result of the lower resulting capacity on the SR 99 link and slower speeds, it is assumed that Community Transit express bus operations from Snohomish County to downtown Seattle and the University District would continue to operate on I-5 and would not be truncated at light rail stations as in the L1: I-5 Light Rail Alternative.

With longer headways, lower capacity, and longer travel times, the L2: SR 99 Mixed Profile Light Rail Alternative does not perform as well as the L1: I-5 Light Rail Alternative or L3: SR 99 Elevated Light Rail Alternative from a transportation standpoint. The L2: SR 99 Mixed Profile Light Rail Alternative has the second highest capital costs of the alternatives studied and does not have the capacity needed for the eventual extension of light rail north to Everett. The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives were judged to have the most proportionate beneficial land use and economic development effects around the proposed stations of all the alternatives studied in the Level 2 evaluation.

From a transportation standpoint, the key findings compared to the No Build Alternative include:

- Year 2030 average weekday riders are projected to be 41,000, the third highest of the alternatives studied and roughly 20 percent fewer than the best-performing L1: I-5 Light Rail Alternative.
- Year 2030 annual new system riders of 2.5 million and 2.4 million total annual hours of travel time savings would be realized, which is the third best-performing of the alternatives but only roughly half that of the best-performing L1: I-5 Light Rail Alternative.

- This alternative would have the capacity to carry 4,440 passengers per hour per direction, nearly three times the capacity of the TSM/Baseline Alternative but only half the capacity of the L1: I-5 Light Rail Alternative and the L3 SR 99 Elevated Light Rail Alternative.
- Lynnwood-to-Northgate morning peak-period travel times of 21 minutes would be 7 minutes longer than the L1: I-5 Light Rail Alternative but faster than travel by bus or automobile.
- Based on fully exclusive guideway operation with limited at-grade crossings, the L2: SR 99 Mixed Profile Light Rail Alternative would be more reliable than bus or automobile travel but less reliable than the L1: I-5 Light Rail Alternative or L3: SR 99 Elevated Light Rail Alternative.
- In terms of impacts on regional vehicle travel statistics, the L2: SR 99 Mixed Profile Light Rail Alternative is forecasted to result in over five times the reduction in daily VMT compared to the TSM/Baseline Alternative. However, VMT reductions are less than those forecasted for the L1: I-5 Light Rail Alternative or L3: SR 99 Elevated Light Rail Alternative.

The L2: SR 99 Mixed Profile Light Rail Alternative is consistent with the definition of HCT in the Long-Range Plan, but the 8-minute headways and resulting capacity and travel times do not support the Sound Transit's Long-Range Plan vision of eventually extending the regional system north to Everett. Based on the Level 2 ridership forecasts and 8-minute peak headways, the line to Lynnwood would operate near its practical capacity in 2030 and could not accommodate much growth or the additional riders it would attract if it were extended north to Everett.

Because this alternative involves the longest rail alignment (roughly 2 miles longer with one additional station compared to the L1: I-5 Light Rail Alternative) and the largest amount of new transportation right-of-way, it has the greatest potential for affecting the natural and constructed environment of all the alternatives.

From a land use and economic development perspective, the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives would serve the most station areas with the highest potential for transit-oriented development of all the alternatives. However, its lower capacity and longer travel times mean that it does not perform as well as the L1: I-5 Light Rail Alternative or the L3: SR 99 Elevated Light Rail Alternative from the perspective of access between the PSRC-designated Regional Growth Centers of Northgate and Lynnwood.

With a range of \$1,830 to \$2,100 million (mid-2010 dollars), the L2: SR 99 Mixed Profile Light Rail Alternative is the second most costly of the alternatives considered, roughly \$400 to \$500 million (mid-2010 dollars) more than the L1: I-5 Light Rail Alternative. From a cost-effectiveness standpoint, the L2: SR 99 Mixed Profile Light Rail Alternative is similar to the TSM/Baseline Alternative and better than the B2: Multi-Corridor BRT Alternative, but still nearly two-and-one-half times the cost per hour of user benefit and cost per new rider compared to the best-performing L1: I-5 Light Rail Alternative. Based on an available budget of \$1,540

million in Sound Transit's current financial plan, the L2: SR 99 Mixed Profile Light Rail Alternative is not within Sound Transit's financial capacity to fund.

Based on the results of the Level 2 evaluation, both the Roosevelt Way Variation and the SR 99 North Variation of the L2: SR 99 Mixed Profile Light Rail Alternative are recommended to be dropped from further consideration. In both cases, these alignment variations perform no better on most measures and on some measures worse than the base alternative when it comes to meeting the project's Purpose and Need. In addition, they are both more costly than the base alternative.

The Roosevelt Way Variation elevated alignment, while decreasing travel time by 2 minutes, would substantially alter the character and setting of what is now a low-volume arterial collector street as it passes through a neighborhood of predominantly single-family homes. In addition, this alignment would not reach SR 99 until North 145th Street, well north of the desired potential station at North 130th Street. As a result, the Roosevelt Way Variation would eliminate much of the land use and economic development advantage that the L2: SR 99 Mixed Profile Light Rail Alternative has over the L1: I-5 Light Rail Alternative. Finally, the Roosevelt Way Variation is estimated to add \$30 to \$35 million (mid-2010 dollars) to the cost of the base L2: SR 99 Mixed Profile Light Rail Alternative.

The SR 99 North Variation that continues the light rail line north along SR 99 into Snohomish County and then east along 208th Street SW also has several problems. It is longer than the base L2: SR 99 Mixed Profile Light Rail Alternative and would add an additional 2 minutes to the travel time between Northgate and Lynnwood. While it would provide an opportunity for a station at SR 99 and 220th Street SW, it bypasses the Mountlake Terrace Transit Center, which represents a large infrastructure investment and major node in Snohomish County's transit system. In addition, the alignment along 208th Street SW would affect the adjacent surroundings in a manner similar to that discussed for the potential impacts along Roosevelt Way. Both streets are currently low-volume residential arterials, and the introduction of light rail on a combination aerial structure and at-grade would substantially change the character and setting of the area. The SR 99 North Variation would also increase the amount of new transportation right-of-way needed. Finally, the SR 99 North Variation is estimated to increase the cost of the L2: SR 99 Mixed Profile Light Rail Alternative by \$140 to \$160 million (mid-2010 dollars).

### **7.2.4 L3: SR 99 Elevated Light Rail Alternative**

The L3: SR 99 Elevated Light Rail Alternative alignment is similar to the L2: SR 99 Mixed Profile Alternative except that the at-grade running sections and two at-grade stations along SR 99 of the latter would be replaced with elevated facilities running along the west side of SR 99. These changes address the capacity and reliability problems found with the L2: Mixed Profile Light Rail Alternative and would allow operation of four car trains at 4-minute headways similar to the L1: I-5 Light Rail Alternative. In addition, this change would reduce the amount of new transportation right-of-way required and the associated potential effects on the natural and

constructed environment. On the negative side, these changes would increase construction costs with the result that the L3: SR 99 Elevated Light Rail Alternative is the most costly alternative studied, costing from \$600 to \$700 million (mid-2010 dollars) more than the least costly light rail alternative (L1: I-5 Light Rail Alternative).

From a transportation standpoint, the key findings compared to the No Build Alternative include:

- Year 2030 average weekday riders are projected to be 48,000, the second highest of the alternatives studied and roughly 10 percent fewer than the best-performing L1: I-5 Light Rail Alternative.
- Year 2030 annual new system riders of 3.9 million and 3.8 million total annual hours of travel time savings make this the second best performing of the alternatives and within 15 to 20 percent of the best-performing L1: I-5 Light Rail Alternative.
- This alternative has the capacity to carry 8,880 passengers per hour per direction, equal to the L1: I-5 Light Rail Alternative and twice the capacity of the L2: SR 99 Mixed Profile Light Rail Alternative.
- Lynnwood-to-Northgate morning peak-period travel times of 18 minutes would be 4 minutes slower than the L1: I-5 Light Rail Alternative but faster than travel by bus or automobile.
- Based on fully exclusive and grade-separated guideway operation, the L3: SR 99 Elevated Light Rail Alternative would be equal in reliability to the best-performing L1: I-5 Light Rail Alternative.
- In terms of impacts on regional vehicle travel statistics, the L3: SR 99 Elevated Light Rail Alternative is forecasted to result in nearly 10 times the reduction in daily VMT compared to the TSM/Baseline Alternative, but would not provide as large a reduction compared to the L1: I-5 Light Rail Alternative.

The L3: SR 99 Elevated Light Rail Alternative is consistent with Sound Transit's Long-Range Plan as a result of full operation on exclusive, grade-separated guideway, and conforms to the definition of HCT. In addition, extending light rail from Northgate to Lynnwood in a configuration that allows reliable operation of four car trains at 4-minute peak period headways would be necessary to support eventual extension of the line north to Everett. At headways longer than 4 minutes in this segment, supplemental express bus service could be required to serve the resulting passenger demand.

Because this alternative involves major infrastructure investment and construction along its entire length, it has the second greatest potential for affecting the natural and constructed environment. Overall, the levels of effects are judged to be larger than those of the L1: I-5 Light Rail Alternative. Only the L2: SR 99 Mixed Profile Light Rail Alternative, which would increase the amount of new transportation right-of-way, would have greater possible effects.

From a land use and economic development perspective, the L3: SR 99 Elevated Light Rail and L2: SR 99 Mixed Profile Light Rail Alternatives would serve the most station areas with the

highest potential for TOD of all the alternatives. However, the longer travel times of the L3: SR 99 Elevated Light Rail Alternative mean it does not perform quite as well as the L1: I-5 Light Rail Alternative from the perspective of access to the PSRC-designated Regional Growth Centers of Northgate and Lynnwood.

With a range of \$2,010 to \$2,310 million (mid-2010 dollars), the L3: SR 99 Elevated Light Rail Alternative is by far the most costly of the alternatives considered, roughly \$200 to \$500 million (mid-2010 dollars) more than the next most costly L2: SR 99 Mixed Profile Light Rail Alternative and \$600 to \$900 more than the L1: I-5 Light Rail Alternative. From a cost-effectiveness standpoint, the L3: SR 99 Elevated Light Rail Alternative is the second best-performing alternative, but would still be over 60 percent more costly than the best-performing L1: I-5 Light Rail Alternative. Based on an available budget of \$1,540 million in Sound Transit's current financial plan, the L3: SR 99 Elevated Light Rail Alternative is well outside Sound Transit's financial capacity to fund.

### 7.2.5 B2: Multi-Corridor BRT Alternative

The B2: Multi-Corridor BRT Alternative consists of three BRT lines serving the project corridor between Lynnwood and the Link light rail terminus at Northgate. This alternative includes an I-5 BRT line that would connect the Lynnwood Transit Center to the Northgate Transit Center with an intermediate stop at the Mountlake Terrace Freeway Station; a line serving north Seattle and Shoreline in the SR 99 corridor that connects to I-5 at NE 130th Street; and a line serving the 15th Avenue NE corridor from Mountlake Terrace through Shoreline and north Seattle to an I-5 connection at NE 130th Street. This alternative takes greatest advantage of the BRT infrastructure that already exists in both the SR 99 and I-5 corridors and adds HOV direct access ramps between the I-5 HOV lane at NE 130th Street to and from the south, and transit-only direct access ramps at Northgate to and from the north only.

In general, this alternative's transportation performance is better than the TSM/Baseline Alternative but falls well short of the performance of the light rail alternatives, while having significantly fewer potential impacts and substantially lower capital costs than the light rail alternatives. The B2: Multi-Corridor BRT Alternative is inconsistent with both the definition of HCT and Sound Transit's Long-Range Plan vision of extending the regional transit system north to Everett.

From a transportation standpoint, the key findings compared to the No Build Alternative include:

- Year 2030 average weekday riders are projected to be 24,000, an increase of 15 percent over the TSM/Baseline Alternative, but less than half the ridership of the best-performing alternative.
- Year 2030 annual new system riders would be 1.1 million, and 1 million total annual hours of travel time savings would be realized, roughly twice the TSM/Baseline Alternative but only one-quarter to one-fifth of the best-performing alternative.

- Capacity to carry 3,600 persons per hour direction (pphd), over twice the TSM/Baseline Alternative but only 40 percent of the capacity of the best-performing alternative.
- Lynnwood-to-Northgate morning peak-period travel times of 24 minutes would be 6 minutes faster than the TSM/Baseline Alternative, 10 minutes faster than travel by auto, but 10 minutes longer than the L1: I-5 Light Rail Alternative.
- Because the B2: Multi-Corridor BRT Alternative includes significant mixed traffic operations and a transfer at Northgate to reach the balance of the region served by the light rail network, it is judged to be considerably less reliable than the light rail alternatives.
- In terms of impacts on regional vehicle travel statistics, the B2: Multi-Corridor BRT Alternative is forecasted to result in twice the reduction in daily VMT compared to the TSM/Baseline Alternative. However, VMT reductions are less than one-sixth of those forecast for the best-performing alternative.

The B2: Multi-Corridor BRT Alternative is not consistent with the definition of HCT as a result of the significant segments of mixed traffic operations of the 15th Avenue NE and SR 99 BRT lines. In addition, the use of the I-5 HOV lanes, while meeting the definition of interim HCT services, does not meet the long-range definition. The B2: Multi-Corridor BRT Alternative is also not consistent with the Long-Range Plan vision for the extension of service north of Lynnwood to Everett because it is estimated to be near capacity in the year 2030.

The B2: Multi-Corridor BRT Alternative would likely have fewer effects on the environment than any of the rail alternatives because it includes substantially less new infrastructure and transportation right-of-way, and its estimated capital costs are much lower at \$640 to \$730 million (mid-2010 dollars). On measures of cost effectiveness, however, the B2: Multi-Corridor BRT Alternative performs the worst of all the alternatives, with costs per hour of user benefits and cost per new rider substantially higher than any of the alternatives.

Over the course of the AA, different versions of the BRT alternative have been substantially refined and modified to address its shortcomings in meeting the project's Purpose and Need. However, even after substantial refinements through the Level 2 evaluation, the BRT alternative continued to perform poorly in three critical areas of the Purpose and Need: transportation effectiveness, cost and constructability (cost-effectiveness), and consistency with Sound Transit's Long-Range Plan vision. From a transportation effectiveness standpoint, the B2: Multi-Corridor BRT Alternative falls well short of the performance of the rail alternatives on every performance measure and is only marginally better than the TSM/Baseline Alternative on many. The weak transportation benefits combined with large capital and O&M costs result in very unfavorable cost-effectiveness performance for the B2: Multi-Corridor Alternative, falling well short of the performance of the TSM/Baseline Alternative on all three performance measures. Finally, the B2: Multi-Corridor BRT Alternative would not have sufficient capacity to support the long-range plan goal of extension north to Everett.

# 8 CONCLUSIONS AND NEXT STEPS

Based on the results of the North Corridor Transit Project AA, Sound Transit plans to move forward with the next steps in the development of a major capital investment in the North Corridor connecting Northgate to Lynnwood. This chapter summarizes the conclusions of the AA and provides an overview of the next steps in the New Starts project development process, including satisfying the requirements for environmental review under NEPA and SEPA.

Following both federal and local review of the findings and conclusions of the AA, Sound Transit plans to identify those alternatives to carry forward for further development and study in the NEPA and SEPA environmental process, including the possible identification of a Locally Preferred Alternative (LPA).

## 8.1 CONCLUSIONS AND TRADE-OFFS AMONG THE ALTERNATIVES

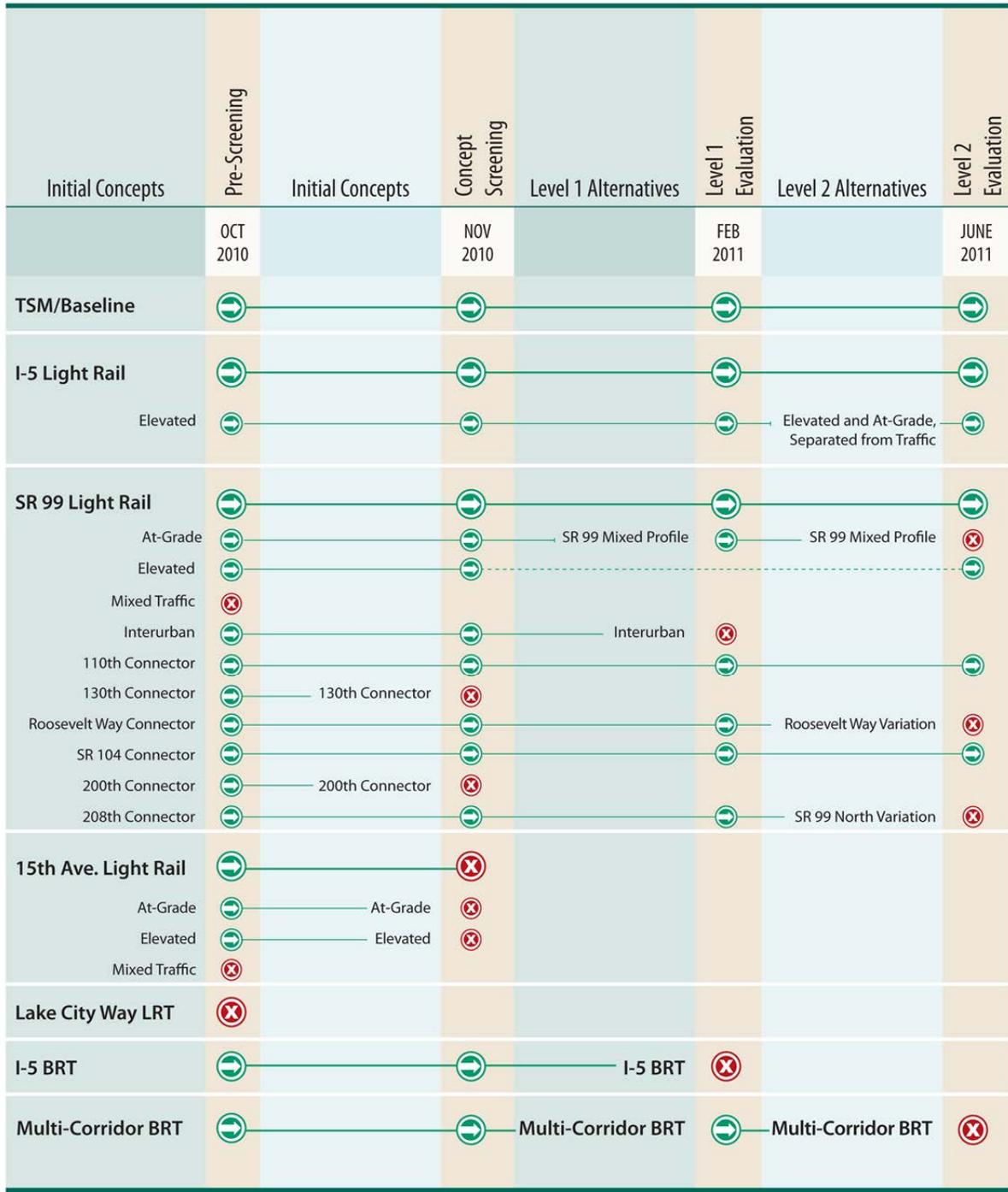
Figure 8-1 summarizes the entire AA alternatives screening and evaluation process. The AA process started with the identification of both bus and light rail concepts and numerous alignment and corridor variations, progressed through both a pre-screening and concept screening step, and then moved through two levels of detailed evaluation. The AA process initially identified three primary light rail alternatives (one along 15th Avenue NE, one focused on I-5, and one along SR 99) and two BRT alternatives. Through the initial screening and Level 1 evaluation process, these alternatives were refined to four (one I-5 light rail concept, two SR 99 light rail concepts, and a multi-corridor BRT concept) that showed the greatest promise for meeting Purpose and Need and were studied in greater detail as part of the Level 2 evaluation. This work resulted in the following primary conclusions regarding the performance and trade-offs among these four alternatives:

- Light rail transit is the only mode that would satisfy the North Corridor Transit Project's Purpose and Need related to transportation effectiveness in meeting the corridor's mobility, access, and capacity needs; as well as Purpose and Need related to consistency with Sound Transit's Long-Range Plan vision.



- Fully grade-separated light rail alternatives markedly outperform alternatives that include at-grade crossings in satisfying Purpose and Need related to transportation effectiveness in meeting the corridor’s mobility, access, and capacity needs. Moreover, fully grade-separated light rail alternatives are the only alternatives that would meet Purpose and Need related to consistency with Sound Transit’s Long-Range Plan vision.
- The fully grade-separated alignments of the L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail alternatives provide the best balance of transportation benefits while accomplishing other elements of the North Corridor Transit Project’s Purpose and Need. These elements include community equity, supportive land use and economic development effects, and consistency with Sound Transit’s Long-Range Plan vision.
- The transportation performance of the L1: I-5 Light Rail Alternative is superior or equal to the L3: SR 99 Elevated Light Rail Alternative on all measures. In addition, the L1: I-5 Light Rail Alternative would be substantially less costly than the L3: SR 99 Elevated Light Rail Alternative. As a result, the L1: I-5 Light Rail Alternative’s cost effectiveness is substantially better than the L3: SR 99 Elevated Light Rail Alternative on measures related to the cost per new rider and cost per unit of user benefit.
- Given the \$1,540 million (mid-2010 dollars) currently budgeted for the North Corridor Transit Project capital costs in Sound Transit’s current financial plan, the SR 99 light rail alternatives (L2 and L3) would both be well outside of Sound Transit’s existing financial capacity to fund. The L1: I-5 Light Rail Alternative, however, is affordable within that capacity at the low end of its capital cost range.
- The L1: I-5 Light Rail Alternative results in the shortest travel times and greatest access improvements to Northgate and Lynnwood, the primary regional centers designated by Vision 2040 to accommodate future growth within the North Corridor. The L3: SR 99 Elevated Light Rail Alternative would have greater economic development and TOD potential in the intermediate station areas in the cities of Seattle and Shoreline than would the L1: I-5 Light Rail Alternative.
- The L1: I-5 Light Rail Alternative takes advantage of substantial portions of the existing WSDOT I-5 right-of-way that are not needed for current or future roadway, while the SR 99 alternatives would require new rights-of-way. The use of the I-5 right-of-way reduces the likely level of potential effects on the environment compared to the L3: SR 99 Elevated Light Rail Alternative, which requires almost twice the amount of new transportation right-of-way.

Based on the conclusions of the Level 2 evaluation, the TSM/Baseline Alternative should move forward in its current form as the basis for the FTA New Starts comparisons, but it would not be a build alternative within the EIS because it would not achieve the project’s purpose and need.



➡ Alternative carried forward.      ⊗ Alternative dropped.

**Figure 8-1.** Summary of Alternatives Development, Screening, and Evaluation Process

## 8.2 ENVIRONMENTAL PROCESS AND SAFETEA-LU REQUIREMENTS

Sound Transit will conduct further scoping and subsequent environmental review for the North Corridor Transit Project in accordance with NEPA and SEPA regulations. Based on the scope of the proposed action and the potential environmental effects information developed through the AA, Sound Transit and FTA will prepare an EIS.

The EIS process will begin with environmental scoping under NEPA and SEPA involving the public, agencies, and tribes. Following scoping and a decision by the Sound Transit Board concerning the alternatives to be studied further in the EIS and the potential identification of a Locally Preferred Alternative (LPA), Sound Transit will move ahead with the preparation of a Draft EIS and conduct conceptual design, environmental analysis, public involvement, and agency coordination. The EIS process will continue through issuance of the Draft EIS for public and agency review and comment, preparation of a Final EIS, and conclude the NEPA process with a Record of Decision (ROD) by FTA. More information about the EIS process is provided in the North Corridor Transit Project *Environmental Scoping Information Report*, which is available on the project Web site.

FTA's regulations implementing NEPA, as well as provisions enacted through the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), emphasize the importance of public involvement in the EIS process. SAFETEA-LU provides additional direction on how agencies and tribes are to be involved. Section 6002 of SAFETEA-LU requires that this agency: "(1) Extend an invitation to other Federal and non-Federal agencies and Indian tribes that may have an interest in the proposed project to become "cooperating" or "participating agencies," (2) provide an opportunity for involvement by agencies and the public in helping to define the purpose and need for a proposed project, as well as the range of alternatives for consideration in the impact statement, and (3) establish a plan for coordinating public and agency participation in and comment on the environmental review process." Sound Transit and the FTA have prepared a Coordination Plan (available on the project website) to guide their efforts for coordinating the participation of the public, agencies, and tribes in the environmental review of the North Corridor Transit Project.

## 8.3 NEXT STEPS

Based on the results of the North Corridor Transit Project AA, Sound Transit plans to move forward in developing a major transit capital investment in the corridor between Northgate and Lynnwood. The next step is to share the findings of the AA with the public and elicit agency and public feedback through formal environmental scoping.

Sound Transit and FTA will initiate scoping for the EIS with a 30-day public comment period that will include several public meetings and one agency meeting. In accordance with SAFETEA-LU Section 6002, Sound Transit and FTA will invite agencies and tribes to be involved as cooperating or participating agencies, including WSDOT; Federal Highway Administration; the

cities of Seattle, Shoreline, Mountlake Terrace, Edmonds, and Lynnwood; Snohomish and King counties (including King County Metro Transit); Community Transit; tribes; and other local, regional, state, and federal agencies.

The EIS scoping process provides an opportunity for public comments on the Purpose and Need for the project, the proposed alternatives to be considered, and environmental issues to be evaluated in the EIS. This AA report was prepared to provide further details about the alternatives that have been considered. The report, which will be an important part of the environmental record for the project, describes how alternatives were developed leading to the EIS. It also describes how their anticipated performance was used to identify the most promising alternatives, and it explains why other alternatives have been removed from consideration.

Following scoping, Sound Transit will prepare and release a scoping summary report. The scoping summary report will document the comments Sound Transit has received about the Purpose and Need, alternatives, and environmental issues. The public and agency comments received during scoping will help Sound Transit, at the direction of the Sound Transit Board, to confirm the Purpose and Need for the project, identify the issues and alternatives to be considered in the Draft EIS, and potentially identify an LPA. The comments will also be considered as Sound Transit, FTA, and other participating and cooperating agencies define the scope of the EIS and its related technical analysis, including any special issues to be addressed.

Work on the Draft EIS will start early in 2012 and take from 12 to 18 months to complete. The No Build Alternative will be carried forward to provide the basis for comparison of the impacts and benefits of the build alternative(s). The TSM/Baseline Alternative, however, will move forward in its current form only as the basis for the FTA New Starts comparisons, but not as a build alternative. If Sound Transit does not identify an LPA prior to the start of the DEIS, then multiple build alternatives will be developed further and studied as part of the DEIS, with identification of the LPA occurring after the DEIS is issued. Following public review of the DEIS, Sound Transit will complete preliminary engineering for the LPA and develop a Final EIS. Based on the Final EIS, the Sound Transit Board will select the project to be built and operated. FTA will issue a Record of Decision (ROD) and the project will then move into the final design, construction, start-up and testing, and ultimately operation. Service is planned to begin in 2023.

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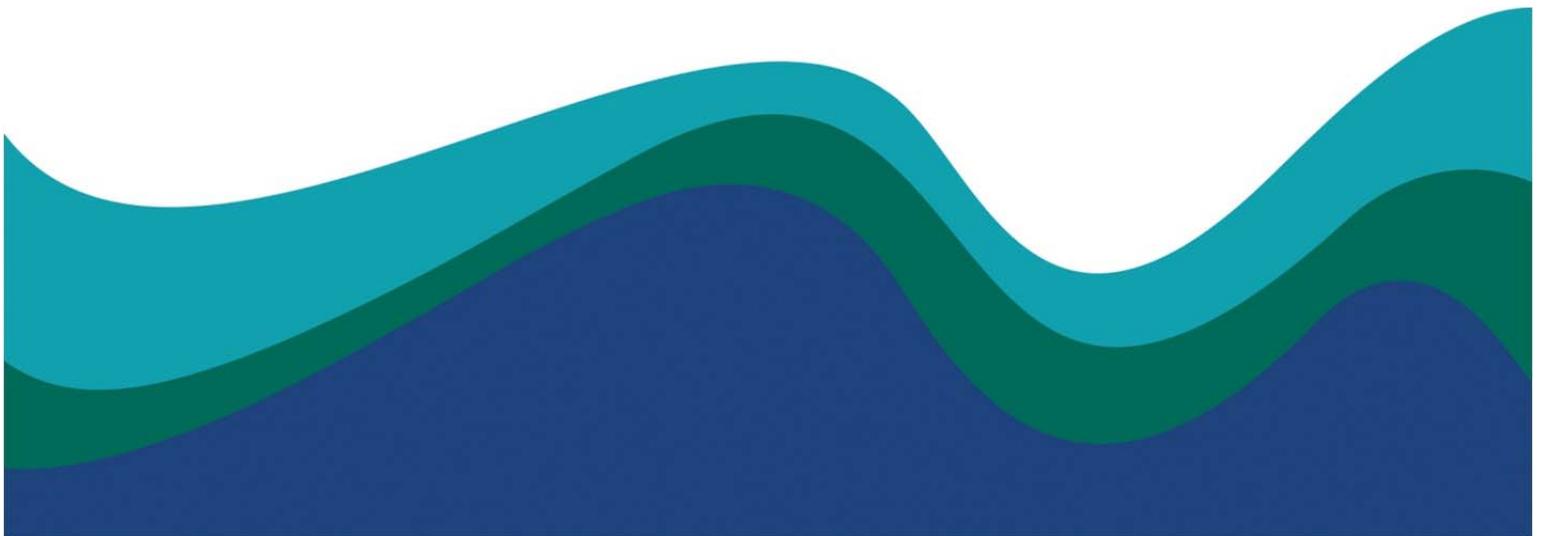
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