

The L1: I-5 Light Rail Alternative primarily would run along I-5, a major interstate freeway that has the highest level of existing bus services in the study area. In this sense, it is highly compatible with the existing freeway land use; however, most of development adjacent to I-5 is single-family residential. Land uses around the I-5 station areas are predominantly single family with some institutional uses (public and private schools) at both the NE 145th and NE 185th Street station locations, and a golf course near NE 145th Street.

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives run along SR 99, an expanded major regional arterial street which has the second highest level of existing bus service in the study area. Land uses in the SR 99 station areas are generally automobile-oriented, low density strip commercial development with pockets of higher density residential and commercial uses and single family residential in areas away from SR 99.

To the north, the primary L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives connect back to Lynnwood via SR 104, a major east-west arterial and state highway that passes through a mix of commercial uses at each end, but is predominantly mixed-density residential through most of this segment. The SR 99 North Variation continues along SR 99 into Snohomish County, with an additional station at 220th Street SW, and then continues east along 208th Street SW. Land uses in this segment are predominantly automobile-oriented commercial and retail, similar to the stretch of SR 99 to the south. The section along 208th Street SW runs along a residential arterial with a mix of multi-family and single-family residences.

To the south, the primary L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives connect back to Northgate along North 110th Street. Land uses along North 110th Street include a mix of commercial and residential uses as well as a cemetery. The Roosevelt Way Variation connects back to Northgate along Roosevelt Way, a narrow, minor residential collector street that passes through a predominantly single-family neighborhood. No stations would be located along these segments, and the Roosevelt Way Variation would bypass the North 130th Street Station contained in the primary SR 99 light rail alternatives.

The B2: Multi-Corridor BRT Alternative would operate along arterial and limited access roadways that have varying levels of existing bus services and serve bus stops and stations within existing road rights-of-way. One of the three BRT routes would use the I-5 HOV lanes and make no stops between Mountlake Terrace and Northgate. The second BRT route, SR 99, includes more intense activity nodes near the commercial and multi-family land uses at the Shoreline Town Center, between North 175th and North 185th Streets, and near North 160th and North 130th Streets. North of North 185th Street, land uses consist of typical commercial development of one or two stories, with ample surface parking. 15th Avenue NE is the third major route served, along which stop areas are surrounded by single family residential uses, with occasional hubs of commercial and multi-family areas around arterial intersections such as at Ballinger Way, NE 175th, NE 145th, and 125th Streets.

Land uses along the B2: Multi-Corridor BRT Alternative are similar to those described for the TSM/Baseline Alternative, with the addition of commercial and multi-family land uses near North 160th and 130th Streets on SR 99 and NE 145th and 125th Streets on 15th Avenue NE.

5.2.3 Transit-Supportive Land Use

Transit-supportive land use is characterized by a mixture of housing and employment within convenient walking distance of transit, and urban design features that support and encourage walking. This type of land use around transit stations is known to increase ridership and to help create and sustain vitality and livability in the surrounding areas.

FTA's Section 5309 New Starts criteria provide the most recent guidance for evaluating land use and economic development potential and are consistent with the discussion that follows.

POPULATION, EMPLOYMENT, AND HOUSING

Population, employment, and housing statistics are commonly used to evaluate land uses that support transit. The alternatives include station areas with the potential to serve both existing and future population and employment. Table 5-15 summarizes the existing and forecasted population, employment, and number of housing units within the defined station areas by alternative.

Table 5-15. Existing and Forecasted Station Area Population, Employment, and Housing

Alternative	No. of Station Areas	Population		Employment		Housing Units	
		Existing	2030	Existing	2030	Existing	2030
TSM/Baseline	9	34,000	38,500	18,600	23,400	14,500	16,400
L1: I-5 Light Rail	4	13,400	15,600	4,900	6,800	5,100	5,900
L2: SR 99 Mixed Profile Light Rail*	5	20,700	23,800	11,700	15,000	9,500	10,800
L3: SR 99 Elevated Light Rail	5	20,700	23,800	11,700	15,000	9,500	10,800
B2: Multi-Corridor BRT	10	43,900	50,900	23,200	29,700	20,000	23,200

*The SR 99 North Variation includes a station at 220th Street in Edmonds in place of the Mountlake Terrace Station. Population numbers are lower for this option and employment and housing numbers are higher. The Roosevelt Way Variation eliminates the North 130th Street Station. Population, employment, and housing units each drop by over 25 percent.

Population, employment, and housing figures need to be considered together with user benefit—measured in this study in terms of hours of travel time savings. If people will not derive benefits (i.e., travel time savings) from using the transit system, they will not be attracted to it, and the ridership potential will not be realized. Details regarding transit user benefits by alternative are presented in Section 5.1 in terms of ridership, capacity, reliability, travel times, and overall travel time savings. Based on this information, the rail alternatives, particularly the

L1: I-5 Light Rail and L3: SR 99 Elevated Light Rail Alternatives, perform far better than the bus alternatives.

The B2: Multi-Corridor BRT Alternative would have 10 bus stations, which is twice as many as the light rail alternatives. This alternative also would have the highest total population, employment, and number of housing units. The I-5 and SR 99 light rail alternatives, serving four and five stations respectively, have lower numbers but would provide significantly increased user benefits in the form of greater travel time savings to a higher number of riders.

BALANCED MIX OF USES

A balanced mix of land uses near stations is supportive of transit use. A measure of the composition of land use patterns as a percentage of each designation under current zoning was used to assess this balance within a 0.50-mile radius of each station. Roadway and freeway right-of-way are included, while water features, primarily minor lakes, are excluded. Station areas with over 50 percent of one use were rated lower than those with a more balanced mix of uses. Positive attributes of a station area that resulted in a higher rating include specific mixed-use designations and commercial uses over 15 percent. Alternatives with a high percentage of rights of way were rated lower. The mix of uses measure is based on existing zoning designations and may not reflect what is built and on the ground today.

Figure 5-19 summarizes the results of this analysis by station and Table 5-16 summarizes the results of this analysis by alternative. The Lynnwood Transit Center Station (a PSRC designated Regional Growth Center included in all alternatives) and the North 130th Street Station have the strongest balance of zoned uses. Current land uses at Lynnwood Transit Center Station, however, do not reflect the balance allowed by zoning. The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives include two or three stations with the strongest balance of uses and no low-performing stations, as illustrated in Table 5-16.

Figure 5-19 illustrates the high percentage of single-family zoning for many of the station areas, as well as the high percentage of rights-of-way for most alternatives. Parks/open space and rights-of-way typically are not redeveloped, decreasing the likelihood for transit supportive uses within those station areas. Almost 50 percent of the Mountlake Terrace Freeway Station area is either parks/open space or rights-of-way; however, the housing and mixed-use zones contribute to a balance of uses.

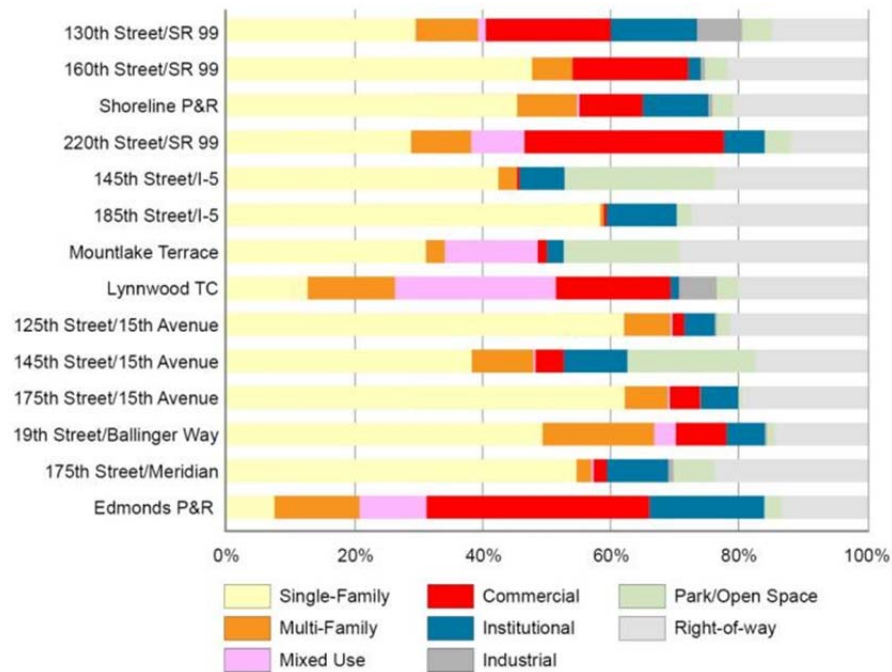


Figure 5-19. Zoned Mix of Uses by Station Area

Table 5-16. Summary of Balanced Mix of Uses by Alternative

Alternative	Station Area Ratings	Highly Rated Stations/ Total Stations
TSM/Baseline	High (2) Medium (2) Low (5)	2/9
L1: I-5 Light Rail	High (1) Medium (1) Low (2)	1/4
L2: SR 99 Mixed Profile Light Rail*	High (2) Medium (3)	2/5
L3: SR 99 Elevated Light Rail	High (2) Medium (3)	2/5
B2: Multi-Corridor BRT	High (3) Medium (4) Low (3)	3/10

* The SR 99 North Variation would replace one medium ranked station with a high ranked station. The Roosevelt Way Variation would result in four stations, one high rating, and three medium ratings, similar to L1.

The L1: I-5 Light Rail Alternative performs moderately well, with one highly-rated station at the Lynnwood Transit Center. Three of the station areas include I-5 where the percentage of rights-of-way is higher than with other alternatives.

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives perform well, with all station areas having either a medium or high balanced mix of uses (as zoned). The SR 99 North Variation includes the 220th Street Station in place of the Mountlake Terrace Freeway Station, with a stronger mix of zoned uses. The Roosevelt Way Variation would not include the highly rated North 130th Street Station.

The B2: Multi-Corridor BRT Alternative performs moderately well overall. Station areas along SR 99 and the Mountlake Terrace Freeway Station have better mixes of zoned uses than do station areas along 15th Avenue NE, where single-family zones predominate.

EXISTING STATION AREA CHARACTER

The following attributes were considered to determine the existing character of a station area: well-proportioned facades; minimal building setbacks; street furniture, trees and other pedestrian amenities; barrier-free station access; and narrow roads that can be crossed easily with low-to-moderate traffic speeds. Results from station area assessments along each alternative are combined and compared across all alternatives.

None of the station areas was rated high for existing character. Although some stations would have an excellent block (street grid) size, they are rated medium or low due to other factors such as sidewalks, barriers, or type of roadway. Table 5-17 provides a summary of average ratings by alternative and Table 5-18 shows the character ratings by station area.

Table 5-17. Summary of Existing Station Area Character for Alternatives		
Alternative	Average Character Rating	Number of Stations in Alternative
TSM/Baseline	Medium - Low	9 stations
L1: I-5 Light Rail	Low	4 stations
L2: SR 99 Mixed Profile Light Rail*	Medium - Low	5 stations
L3: SR 99 Elevated Light Rail	Medium - Low	5 stations
B2: Multi-Corridor BRT	Medium - Low	10 stations

*The SR 99 North Variation and Roosevelt Way Variation would see no significant change in character rating.

In general, stations along the I-5 corridor rate the lowest, stations along the SR 99 corridor have moderate ratings, and stations along 15th Avenue NE perform best. Smaller block sizes and fewer automobile-oriented businesses on 15th Avenue NE create a better character. However, in the residential areas, there is less of the retail and service activity that can enhance the livability of an area. Station areas along SR 99 have the zoning in place to support businesses, but the quality of the existing character is poor, with “big box” retail and expansive parking lots fronting streets.

Table 5-18. Existing Station Area Character Rating

Station Areas	TSM/ Baseline Alternative	L1: I-5 Light Rail	L2: SR 99 Mixed Profile Light Rail*	L3: SR 99 Elevated Light Rail	B2: Multi-Corridor BRT
130th Street			Medium	Medium	Medium
160th Street			Low	Low	Low
Shoreline Park-and-Ride	Medium		Medium	Medium	Medium
220th Street	Low				Low
145th Street	Low	Low			
185th Street		Low			
Mountlake Terrace Freeway Station	Medium	Medium	Medium	Medium	Medium
Lynnwood Transit Center	Low	Low	Low	Low	Low
125th Street					Medium
145th Street/15th Avenue NE					Medium
175th Street	Medium				Medium
Ballinger Way	Low				Low
175th Street/Meridian	Medium				
Edmonds Park-and-Ride	Low				

*The SR 99 North Variation includes the 220th Street (rated low) in place of the Mountlake Terrace Freeway Station (rated medium). Roosevelt Way Variation eliminates the North 130th Street Station (rated high).

CONNECTIVITY TO MAJOR TRIP GENERATORS (ACTIVITY CENTERS)

A qualitative analysis was completed to determine the level of connectivity between each activity center and its nearest station based on distance, availability of sidewalks, adjacent land uses, and general quality of the walk. Activity centers designated using published data on activity centers within the project area were collected, compared with FTA and PSRC guidance, and confirmed in consultation with local jurisdictions. In calculating walk distances, if an activity center is a district or larger shopping area, the distance was measured to the center of the district. Transit service accessibility, evaluated in Section 5.1.7, was reviewed and, where appropriate, included in this assessment. Results from station area assessments along each alternative were combined and compared across all alternatives.

Twenty-five activity centers were identified, 15 of which are located within a 0.50-mile radius of station locations. The walk path between each activity center and the nearest station was

determined, and in some cases it was significantly longer than 0.50 mile due to street grid, topography, and other barriers. Table 5-19 summarizes the rating for connectivity by alternatives. Figure 5-20 illustrates the locations of defined activity centers and Table 5-20 includes rating by activity center.

Most of the designated activity centers are located along the SR 99 corridor and range from larger “districts” of multiple blocks to a single site. The B2: Multi Corridor BRT Alternative serves the highest number of activity centers. Because this alternative includes transit service in three different corridors, the high number of centers served provides broad coverage of the large size of the service area.

Connections to the smaller business districts at North City and Mountlake Terrace received the highest rating, in part due to the proximity of the activity center to the station but also due to the existence of sidewalks, minimal large driveways to cross, and general community character.

The connection to the proposed Lynnwood City Center received a low rating. The heart of the proposed city center is approximately 0.5 mile from the Lynnwood Transit Center Station, but the existing walk path is next to parking lots with multiple driveways.

Table 5-19. Summary of Connectivity to Activity Centers within Station Areas for Alternatives

Alternative	Activity Centers	Average Walk Rating	Number of Stations in Alternative
TSM/Baseline	14	Medium	9 stations
L1: I-5 Light Rail	7	Medium - Low	4 stations
L2: SR 99 Mixed Profile Light Rail*	8	Medium	5 stations
L3: SR 99 Elevated Light Rail	8	Medium	5 stations
B2: Multi-Corridor BRT	14	Medium	10 stations

*The SR 99 North Variation has nine activity centers and the average walk rating would be medium. The Roosevelt Way Variation has seven activity centers, four stations, and the average walk rating would not change.

Table 5-20. Walk Rating by Activity Center

Map Number	Activity Center	Station	Walk Rating
5	Bitter Lake Hub Urban Village	130th Street (SR 99)	Medium
6	Commercial area at 15th and 145th	145th Street (15th Avenue NE)	High
6	Commercial area at 15th and 145th	145th Street (I-5)	Low
7	Shoreline Community College	160th Street (SR 99)	Medium
8	Aurora Square Shopping Center	160th Street (SR 99)	Medium
9	Shoreline Town Center	175th Street (Meridian)	Medium
10	Aurora Village Shopping Center	Shoreline Park-and-Ride	Low
11	North City Business District	175th Street (15th Avenue NE)	High
11	North City Business District	185th Street (I-5)	Low
12	Shoreline Conference Center	185th Street (I-5)	Medium
13	Ballinger Terrace	Ballinger Way (19th Avenue NE)	Medium
13	Ballinger Terrace	Mountlake Terrace	Low
16	International District	220th Street (SR 99)	Medium
17	Hospital Community and Family Retail Center	220th Street (SR 99)	Medium
17	Hospital Community and Family Retail Center	Edmonds Park-and-Ride	Low
18	Mountlake Terrace Town Center	Mountlake Terrace	High
19	Melody Hill Premera	220th Street (SR 99)	Medium
19	Melody Hill Premera	Edmonds Park-and-Ride	Low
20	Lynnwood City Center	Lynnwood Transit Center	Low
23	Group Health	Lynnwood Transit Center	Medium

The SR 99 North Variation has three activity centers not listed above, all rated medium. Two activity centers would not be included in this variation, one rated low and one rated medium.

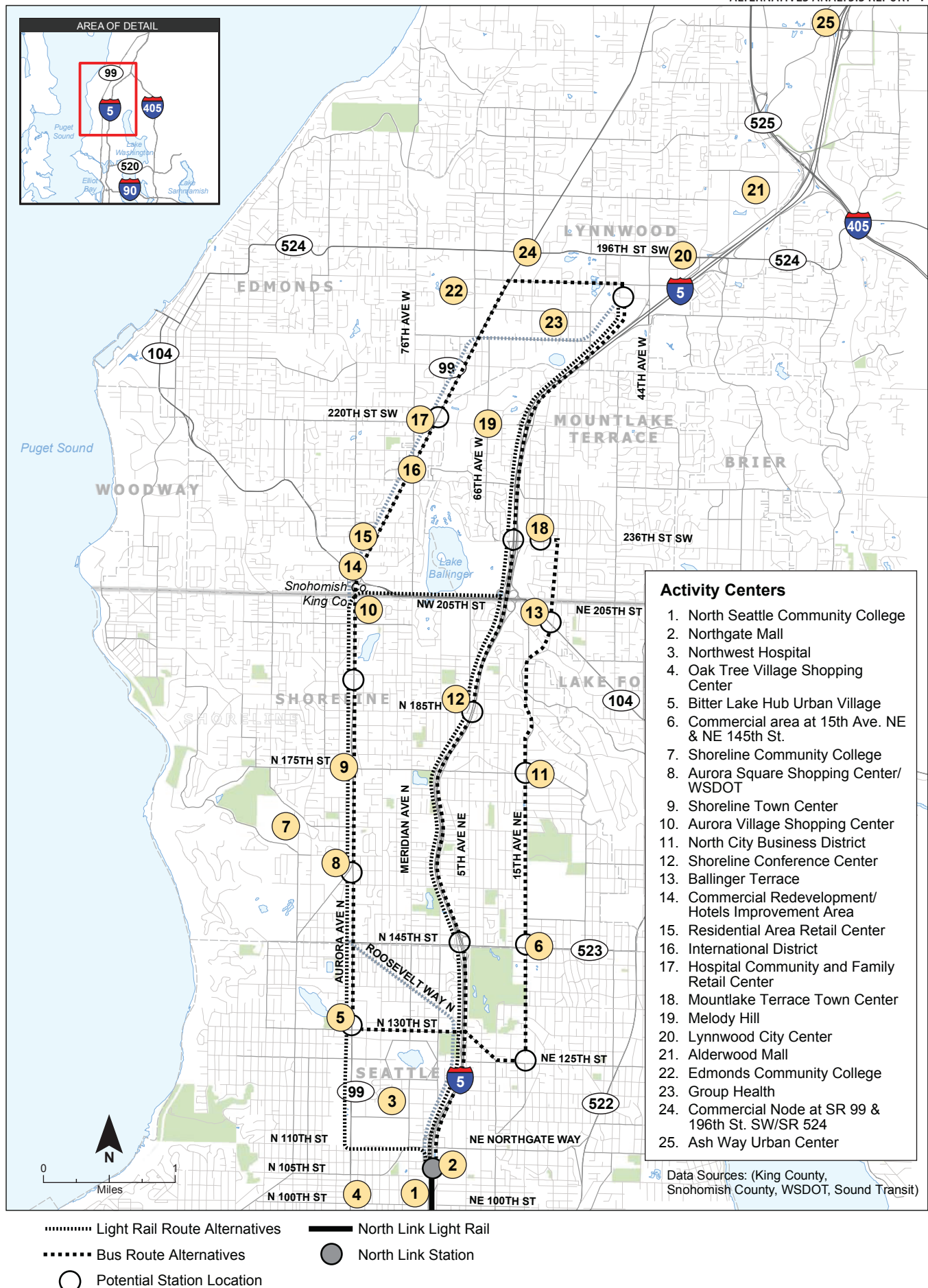


Figure 5-20. Activity Centers

TRANSIT-SUPPORTIVE PLANS AND POLICIES

This measure includes a qualitative discussion of existing development strategies for station areas including transit-supportive plans, policies that support and promote transit-oriented growth in station areas, and existing programs and incentives that facilitate growth around transit stations. Results for each station area are combined by alternative. The TSM/Baseline Alternative was not analyzed for development potential, because it is not considered a build alternative and is used solely as the FTA New Starts baseline.

Adopted plans and policies were reviewed to evaluate how each station and alternative could support transit-oriented development and associated future land-use densities. The reviewed plans and policies included comprehensive plans, land use and zoning documents, sub-area plans, and other transit-related plans and policies. A complete listing of reviewed documents is included in the Station Area Development Potential Technical Memorandum (Sound Transit 2011g).

Information for station areas was combined for each alternative and results were compared across all alternatives. Some station areas would be served by light rail or BRT, depending on the selected alternative, and the analysis was consistent for either mode. Table 5-21 provides a summary by alternative and Table 5-22 illustrates development potential by station.

Table 5-21. Transit-Supportive Plans and Policies by Alternative

Alternative	Ratings (per each station area)	Percent of Medium or Highly Rated Stations
L1: I-5 Light Rail	High (1) Medium (1) Low (2)	50%
L2: SR 99 Mixed Profile Light Rail*	High (2) Medium (3)	100%
L3: SR 99 Elevated Light Rail	High (2) Medium (3)	100%
B2: Multi-Corridor BRT	High (2) Medium (4) Low (4)	60%

*The SR 99 North Variation includes a station at 220th Street (medium rating) that would replace the Mountlake Terrace Freeway Station (medium rating). The Roosevelt Way Variation eliminates one highly rated station.

Table 5-22. Transit-Supportive Plans and Policies by Stations

Station Areas	L1: I-5 Light Rail	L2: SR 99 Mixed Profile Light Rail	L3: SR 99 Elevated Light Rail	B2: Multi-Corridor BRT
130th Street		High	High	High
160th Street		Medium	Medium	Medium
Shoreline Park-and-Ride		Medium	Medium	Medium
220th Street				Medium
145th Street	Low			
185th Street	Low			
Mountlake Terrace Freeway Station	Medium	Medium	Medium	Medium
Lynnwood Transit Center	High	High	High	High
125th Street				Low
145th Street/ 15th Avenue NE				Low
175th Street				Low
Ballinger Way				Low
175th Street/ Meridian				
Edmonds Park-and-Ride				

The L1: I-5 Light Rail Alternative has an overall medium level of support for transit-oriented development around stations, as summarized below by jurisdiction.

- Lynnwood:** The City of Lynnwood developed and adopted a City Center sub-area Plan focused on a mixed-use, pedestrian-friendly and transit supportive center near the Lynnwood Transit Center. The sub-area Plan outlines policies to accommodate city center growth including mixed-use development in buildings ranging in height from 140 to 350 feet. Lynnwood has also developed City Center Design Guidelines, a Street Master Plan with a smaller street grid in the City Center, and a Parks Master Plan.

Other activities include a Market Analysis and Absorption Study; an 8- to 12-year multi family property tax exemption to exempt apartment and condominium developments within the City Center; planned creation of a Business Improvement District; phased consolidation of City facilities; and development of property acquisition strategies.

- Mountlake Terrace:** The City's Comprehensive Plan provides for the development of a revitalized town center within a 5-minute walk of the Mountlake Terrace Freeway

Station. The City designated a Community Business Downtown zone with transit- and pedestrian oriented policies. A Transit Oriented Development Study focuses on the town center area, with recommendations incorporated into the Comprehensive Plan and related town center planning efforts.

A Transit Service Strategy focuses on the town center and the North Melody Hill area, and supports transit-oriented development at the Mountlake Terrace Freeway Station area to provide better transit access to the North Melody Hill area.

An updated Freeway/Tourist zoning designation would allow 20-story buildings just south of the Mountlake Terrace Freeway Station.

- **Shoreline and Seattle:** There are no existing transit-supportive plans and policies for station areas along I-5 at 185th Street or 145th in the cities of Shoreline and Seattle.

The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives have an overall high level of support for transit-oriented development around stations, as summarized below by jurisdiction.

- **Lynnwood:** Similar to the L1: I-5 Light Rail Alternative.
- **Mountlake Terrace:** Similar to the L1: I-5 Light Rail Alternative. The SR 99 North Variation does not include a Mountlake Terrace Freeway Station, but includes a station along SR 99 at 220th Street, which would serve Stevens Hospital, part of an envisioned Hospital Community and Family Retail Center. This station would be located 0.50 mile from a major employer, Premera, in the North Melody Hill area of Mountlake Terrace. The Mountlake Terrace Transit Strategy includes North Melody Hill as a critical service area without addressing efforts to affect land use change.
- **Shoreline:** Shoreline would have two stations under this alternative. The City of Shoreline does not have specific adopted transit-oriented plans or policies around either station area, but King County has identified the Shoreline Park-and-Ride site as an excellent candidate for transit-oriented development and plans to develop the site in the future. Supporting this, the City of Shoreline's economic development plans include this site as a priority for redevelopment.

Shoreline's Comprehensive Plan includes a vision for SR 99 as "Shoreline's Grand Boulevard." Most of the improvements along this corridor have been completed, including BAT lanes that have transformed SR 99 into a street more conducive to transit activities. The plan also envisions high-density mixed-use housing along transit lines.

- **Seattle:** One station along this alternative would be located in Seattle at North 130th Street in the heart of a designated hub urban village. Bitter Lake Hub Urban Village's vision includes development of a residential-serving business zone in addition to continued commercial development along SR 99. The existing zoning supports transit-oriented development and mixed uses. The Bicycle Master Plan recommends bike

lanes on 130th Street and SR 99 north of 130th Street, encouraging non-motorized access to the area.

The Roosevelt Way Variation would eliminate the 130th Street Station, resulting in no stations in Seattle.

The B2: Multi-Corridor BRT Alternative has an overall moderate level of support for transit-oriented development around stations, as summarized below by jurisdiction.

- **Lynnwood:** Similar to the L1: I-5 Light Rail Alternative.
- **Mountlake Terrace:** Similar to the L1: I-5 Light Rail Alternative and the SR 99 North Variation.
- **Edmonds:** Similar to the SR 99 North Variation.
- **Shoreline:** Similar to the L1: I-5 Light Rail Alternative and L2: SR 99 Mixed Profile Light Rail Alternative with the addition of three stations in the 15th Avenue NE corridor from Ballinger Way to the southern city boundary. There is a tax exemption for multi-family developments in the North City business district area with the goal of adding more people to support the existing business district.
- **Seattle:** Similar to the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives with the following addition: the City of Seattle does not have transit-supportive plans and policies for the station area at 15th Avenue NE and 125th NE Street.

5.3 ENVIRONMENTAL PERFORMANCE

5.3.1 Key Findings

Key findings related to environmental performance for the alternatives are described in the following section.

ECOSYSTEMS

All of the light rail alternatives have the potential for a high level of impacts on the natural environment because they cross sensitive wetland-stream complexes, including a wetland and stream area (Scriber Creek Wetland Complex) just south of the Lynnwood Station. If any of the light rail alternatives are selected, the project would explore design or alignment alternatives to avoid or minimize impacts to this wetland complex, which could affect the Lynnwood Station layout and orientation. The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives have longer routes but would encounter fewer natural areas than the L1: I-5 Light Rail Alternative and could affect sensitive areas to a lesser degree. The B2: Multi-Corridor BRT Alternative would have limited effects on the natural environment, as would the TSM/Baseline Alternative.

WATER RESOURCES

The L1: I-5 Light Rail Alternative would have a larger increase in impervious surfaces because its alignment is generally in vegetated areas along I-5. The L2 and L3 SR 99 light rail alternatives would have more sections in areas that are already developed. The B2: Multi Corridor BRT Alternative would have a lower level of effects, and only minor effects are expected with the TSM/Baseline Alternative.

SECTION 4(F) AND SECTION 6(F) RESOURCES

While all of the light rail alternatives have the potential for low to moderate impacts on Section 4(f) and Section 6(f) resources, the L1: I-5 Light Rail Alternative has the most potential for direct effects on historic resources or parks and recreation facilities that may qualify to be Section 4(f) resources, followed closely by the L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives. The TSM/Baseline and B2: Multi-Corridor BRT Alternatives have little to no potential for direct effects on Section 4(f) properties. No parks or recreation facilities that may qualify as Section 6(f) resources would likely be directly affected by any of the build alternatives.

HISTORIC RESOURCES

No properties listed in the National Register of Historic Places (NRHP) or designated as landmarks by affected jurisdictions have been identified in the area within one block of the project alternatives. However, all alternatives are in areas where historic era properties (50 years or older) are located. The L2: SR 99 Mixed Profile Light Rail and L3: SR 99 Elevated Light Rail Alternatives could affect one property in the city of Shoreline that may be eligible for listing in the NRHP. These alternatives are also located along the SR 99 corridor, which has a large number of historic-era properties, although many have been altered and may not be NRHP eligible. Determination of the potential impacts for all alternatives would depend on more detailed design information, including right-of-way needs. Any of the project alternatives could affect potentially eligible properties. Further study during an EIS would be needed to identify other properties along the corridor that may be eligible for listing in the NRHP.

ARCHAEOLOGICAL RESOURCES

No known archaeological sites would be affected by the project alternatives, but further evaluation and consultation with the Washington State Department of Archaeology and Historic Preservation (DAHP), tribes, and others would be conducted in the EIS.

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Most of the project alternatives have the potential to reduce air pollutant and greenhouse gas emissions, based on how well they help reduce automobile use compared to No Build conditions. The L1: I-5 Light Rail Alternative and the L3: SR 99 Elevated Light Rail Alternative would result in the greatest reduction in air pollutants and greenhouse gas emissions.

AESTHETICS

The L1: I-5 Light Rail, L2: SR 99 Mixed Profile Light Rail, and L3: SR 99 Elevated Light Rail Alternatives include more elements that would result in changes to visual character in the corridor. This includes the removal of existing visual features and the construction of elevated guideways and multi-story park-and-rides. Much of this construction would be along established transportation corridors. The TSM/Baseline and B2: Multi-Corridor BRT Alternatives generally would limit changes to station development areas or direct access ramps.

NOISE

All of the light rail alternatives have alignments near noise-sensitive land uses, including single-family residences, hotels, motels, and apartment buildings. The B2: Multi-Corridor BRT and TSM/Baseline Alternatives would result in lower noise effects than the light rail alternatives, as they would require fewer changes to the existing noise environment.

PROPERTY ACQUISITIONS AND DISPLACEMENTS

All of the alternatives would require new right-of-way, which would affect properties owned by others. The L2: SR 99 Mixed Profile Light Rail Alternative and its two route variations would require the most right-of-way, requiring about 44 acres of new right-of-way and impacting 320 to 370 parcels. This would be nearly double the effects compared to the L1: I-5 Light Rail Alternative, which would need about 22 acres for new transportation right-of-way, affecting 140 to 270 parcels. The L3: SR 99 Elevated Light Rail Alternative would require a similar but slightly lower amount of new right-of-way than the L2: SR 99 Mixed Profile Light Rail Alternative. The B2: Multi-Corridor BRT and TSM/Baseline Alternatives would have few right-of-way impacts.

TRANSPORTATION

General Purpose Traffic Operations

The highest level of impact on general purpose traffic operations (arterial and local traffic) would occur with the L2: SR 99 Mixed Profile Light Rail Alternative. Effects on intersection operation could be mitigated with widening at intersections to provide replacement left-turn lanes. Median alignment of light rail, whether at-grade or elevated, would require reconstruction of the arterial with additional widening for left-turn storage to maintain intersection LOS, with longer delays to left-turn movements from SR 99 and to side street traffic. Median alignment would also result in access control for driveways and side streets between signals. Left turns previously made mid-block, as well as left-turn movements from the side streets, would be consolidated at signalized intersections and accommodated by U turns.

Transit Operations

The primary effect on transit operations would occur when bus routes are truncated to serve light rail alternatives, particularly the L1: I-5 Light Rail Alternative and the L3: SR 99 Elevated Light Rail Alternative, which each would experience a greater amount of bus route truncation than the L2: SR 99 Mixed Profile Light Rail Alternative. These alternatives are also projected to result in an increase in bus ridership for routes serving light rail, which would be accommodated

by changes in service. 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.

Transportation Safety

The L2: SR 99 Mixed Profile Light Rail Alternative would increase the potential for vehicle conflicts with regional transit; however, because the median alignment would provide more controlled traffic access—particularly at mid-block locations—some types of vehicle collisions may be reduced, e.g., those involving mid-block left-turning vehicles.

Construction

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 because major reconstruction of SR 99 would need to occur in order to place light rail transit in the median. However, the L3: SR 99 Elevated Light Rail Alternative would also require major construction along SR 99, which has already been subject to major reconstruction in several of the sections that would be affected. All the light rail alternatives would also require structures over I-5, which would require freeway closures, but the SR 99 alternatives would involve more crossings with closures than the L1: I-5 Light Rail Alternative.

5.3.2 Ecosystems

For the purpose of this study, the ecosystems measures assess resources such as wetlands and jurisdictional ditches, fish, wildlife, and sensitive species. Wetlands and streams are subject to regulations by local jurisdictions, which include establishing buffers for wetlands and streams. Wetlands, streams, and sensitive species are also subject to federal and state regulations. At the federal level, wetlands and streams are regulated by the Clean Water Act (CWA) Section 404, which regulates placement of fill in waters of the United States. Activities that affect wetlands and streams may also require a water quality certification (Section 401 of the CWA).

"Jurisdictional ditches" are waters that are not subject to federal regulation but are frequently considered as part of a wetlands impact assessment.

Fish and wildlife species are regulated at both state and federal levels. The U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) regulate listed species under the Endangered Species Act (ESA); Washington Department of Fish and Wildlife (WDFW) regulates state-listed species.

Because the No Build Alternative and TSM/Baseline Alternative involve few new facilities, they would be unlikely to affect or would have minimal effects on ecosystems in the project area.

The L1: I-5 Light Rail Alternative has the potential for affecting the natural environment, primarily due to the presence of moderate- to high-quality wetland-stream complexes along the corridor. However, potential effects on listed species are minimal. The L1: I-5 Light Rail Alternative would affect Thornton Creek and its associated wetlands, McAleer Creek and its associated wetlands, and Scriber Creek and its associated wetlands (see Figure 5-21). Just south of the Lynnwood Station area, the alternative has two approaches for crossing Scriber Creek and its wetlands. The option that stays along I-5 before crossing to a north/south oriented station in Lynnwood avoids more of the creek and wetland area, compared to an alignment that curves through a larger area of the creek and wetland to reach an east-west oriented station.

The L2: SR 99 Mixed Profile Light Rail Alternative also has the potential for natural environmental effects, but potential effects on listed species are minimal. It shares the same alignment as the L1: I-5 Light Rail Alternative in the areas near moderate- to high-quality wetland-stream complexes along the corridor, although it avoids Thornton Creek. It also crosses near McAleer Creek and its associated wetlands, near the Mountlake Terrace Station, but it has a different alignment than the L1: I-5 Light Rail Alternative in that area. From Mountlake Terrace Station to the north, it would have the same effects as the L1: I-5 Light Rail Alternative, including the potential for effects on Scriber Creek near the Lynnwood Station. Although the L2: SR 99 Mixed Profile Light Rail Alternative has more construction because it has a longer route, the additional area of construction would be mostly within previously developed areas with fewer natural areas.

The SR 99 North Variation could avoid effects on McAleer Creek and its associated wetlands, but it would have the same effects on the Scriber Creek wetland complex as the L2: SR 99 Mixed Profile Light Rail Alternative. The Roosevelt Way Variation would have the same impacts as the L2: SR 99 Mixed Profile Light Rail Alternative.

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

The B2: Multi-Corridor BRT Alternative may affect wetlands around I-5 near the Northgate Transit Center for the construction of direct access ramps to I-5.

The most sensitive areas along the alignment appear to be McAleer Creek and Scriber Creek and their moderate- or high-quality wetlands. The L1: I-5 Light Rail, the L2: SR 99 Mixed Profile Light Rail, and the L3: SR 99 Elevated Light Rail Alternatives cross the Scriber Creek wetland complex. If the L1: I-5 Light Rail, the L2: SR 99 Mixed Profile Light Rail, or L3: SR 99 Elevated Light Rail Alternatives are selected, the project would explore design or alignment alternatives to avoid or minimize impacts to this wetland complex, which could affect the Lynnwood Station layout and orientation. If impacts cannot be avoided, the project would provide mitigation measures, which would include the creation or restoration of wetlands to replace the lost function of the affected wetlands.

5.3.3 Water Resources

The project area lies entirely within Water Resource Inventory Area (WRIA) 8, and surface water runoff drains to Thornton Creek, Hall Creek/Ballinger Lake/McAleer Creek, and Scriber Creek (see

Figure 5-21). The project area receiving waters are highly urbanized, although fish bearing, and most have 100-year Federal Emergency Management Agency (FEMA) floodplains in the project vicinity. Lake Ballinger is the only project area waterbody included on the Washington State Department of Ecology (Ecology) 303(d) list of impaired waterbodies. Most major roads with stream crossings in the project area present fish-passage barriers. No major stormwater management facilities such as regional detention facilities are near the potential alignments. Surface water in the project area is generally conveyed in piped systems, with some roadside ditches. For areas that may discharge to combined sewer systems, capacity issues may exist. Most of the project area is developed and has a moderate-to-high amount of impervious surface.

There would likely be minimal to no effects for the No Build Alternative and TSM/Baseline Alternative because they would change very little of the existing land cover.

The L1: I-5 Light Rail Alternative would convert some vegetated areas with light rail and station area developments, potentially affecting nearby floodplains with receiving waters in the project area. This alternative would also result in the largest increase in impervious surface of all the proposed alternatives, and detention would potentially be required to reduce the risk of flooding from overloading the capacity of the local conveyance system. The L1: I-5 Light Rail Alternative would cross Thornton Creek and McAleer Creek, both of which currently have fish barrier culvert crossings at I-5. In areas where the alternative could alter WSDOT facilities or increase paved areas, improvements to WSDOT or local stormwater systems may also be needed.

The L2: SR 99 Mixed Profile Light Rail Alternative would have a lower risk of directly affecting receiving waters because there are fewer receiving waters within the proposed project area. This alternative would potentially affect a City of Seattle flood area in the south part of the alignment, Lake Ballinger in the north, and various stormwater ponds in between. North of Mountlake Terrace, the alternative would be similar to the L1: Light Rail Alternative, where much of the area to be developed would be within WSDOT right of way. The southern portion of area for the L2: SR 99 Mixed Profile Light Rail Alternative is already the most highly developed; therefore, this alternative would result in relatively minor increases to impervious surface. Construction to today's stormwater standards has the potential to reduce pollution-generating impervious surface. However, this alternative would likely require the most replacement and retrofit of existing storm drainage facilities.

The SR 99 North Variation would have similar effects to those of the L2: SR 99 Mixed Profile Light Rail Alternative; however, it would avoid effects to Lake Ballinger and some stormwater ponds, while posing a risk to others. Also, this variation would place retained fill in the vicinity of Hall Creek and its associated floodplain. The Roosevelt Way Variation would also have similar effects to those of the L2: SR 99 Mixed Profile Light Rail Alternative, although it would avoid effects to the City of Seattle flood area. The Roosevelt Way Variation would have a greater potential to increase impervious surface compared to the other alignment in the L2: SR 99 Mixed Profile Light Rail Alternative.

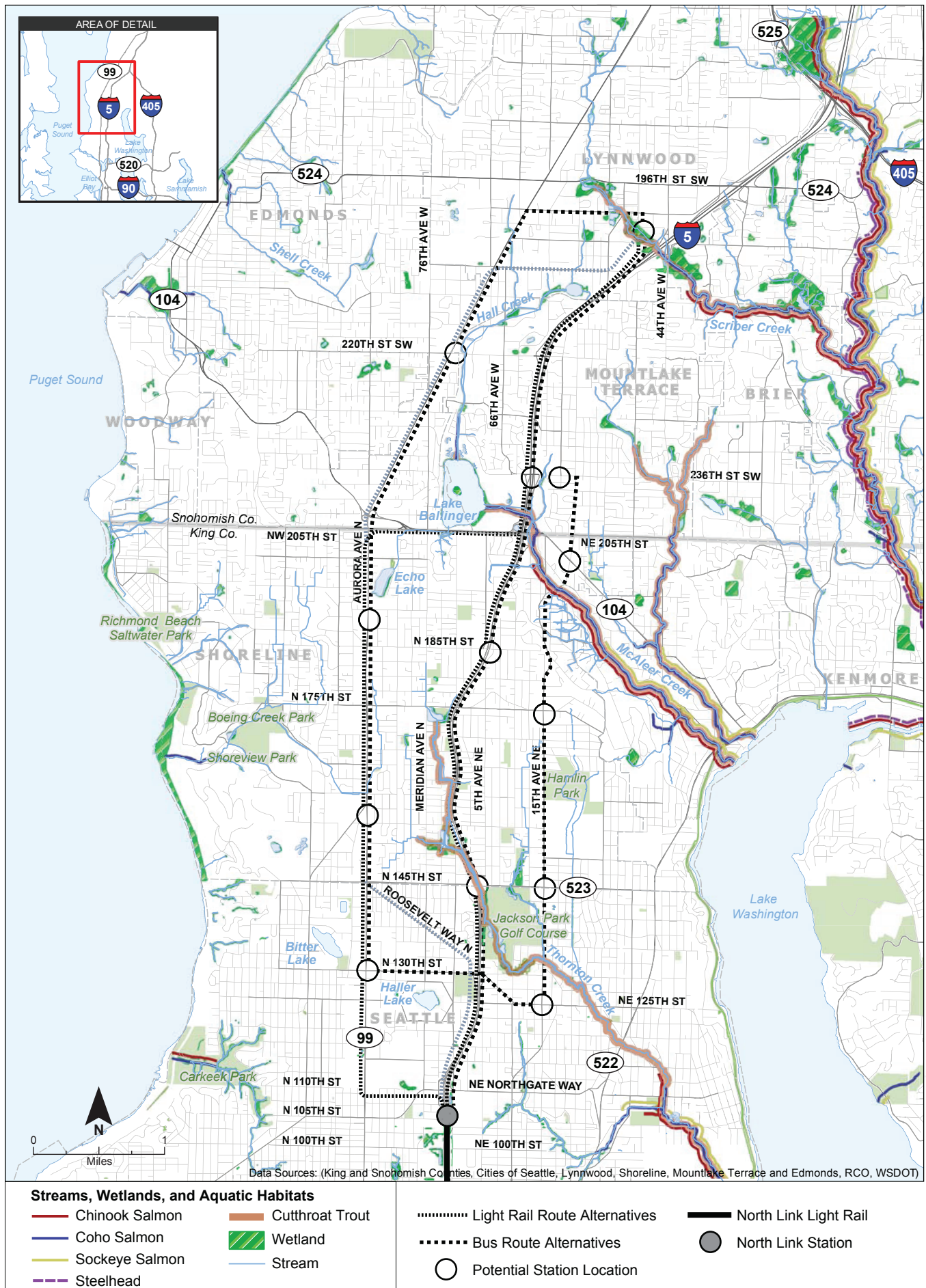


Figure 5-21. Ecosystems

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)

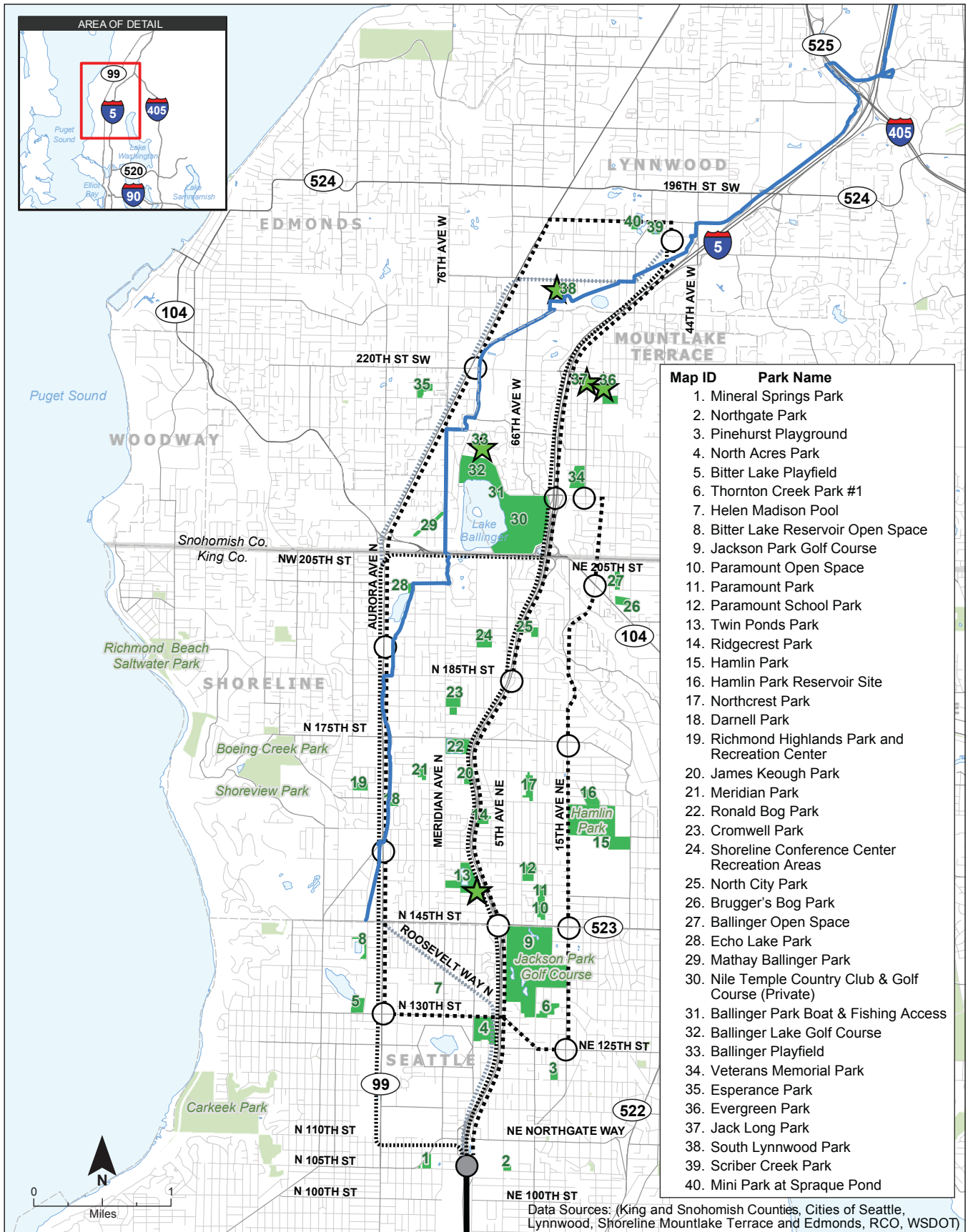


Figure 5-22. Parks and Recreation Facilities in the Project Area

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 (CO₂e) 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.

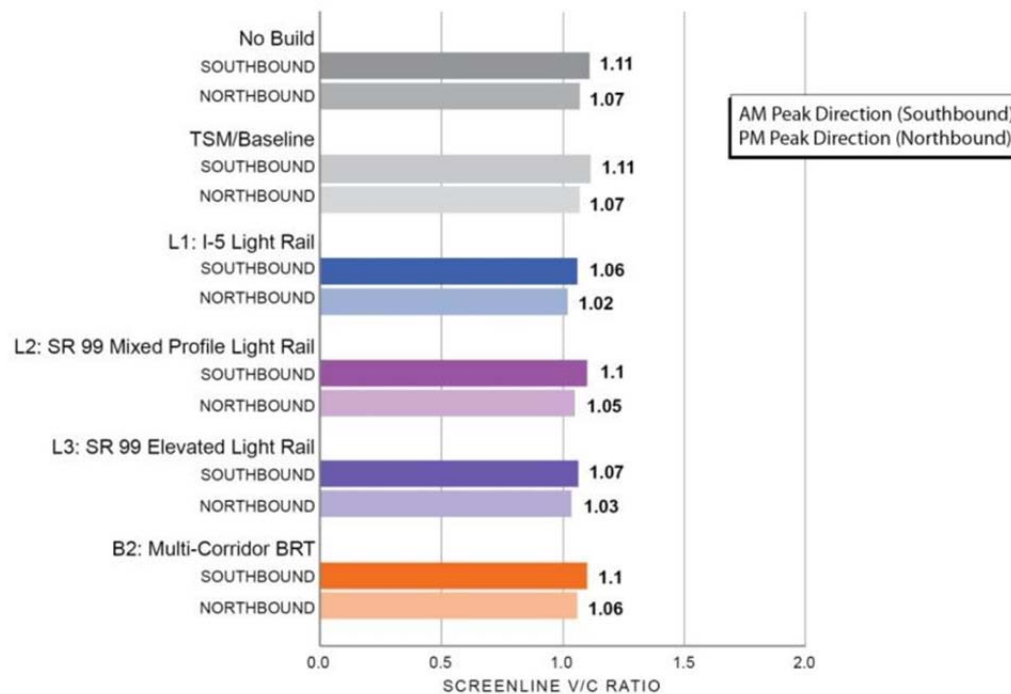


Figure 5-23. Screenline V/C Ratios at King/Snohomish County Line

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.

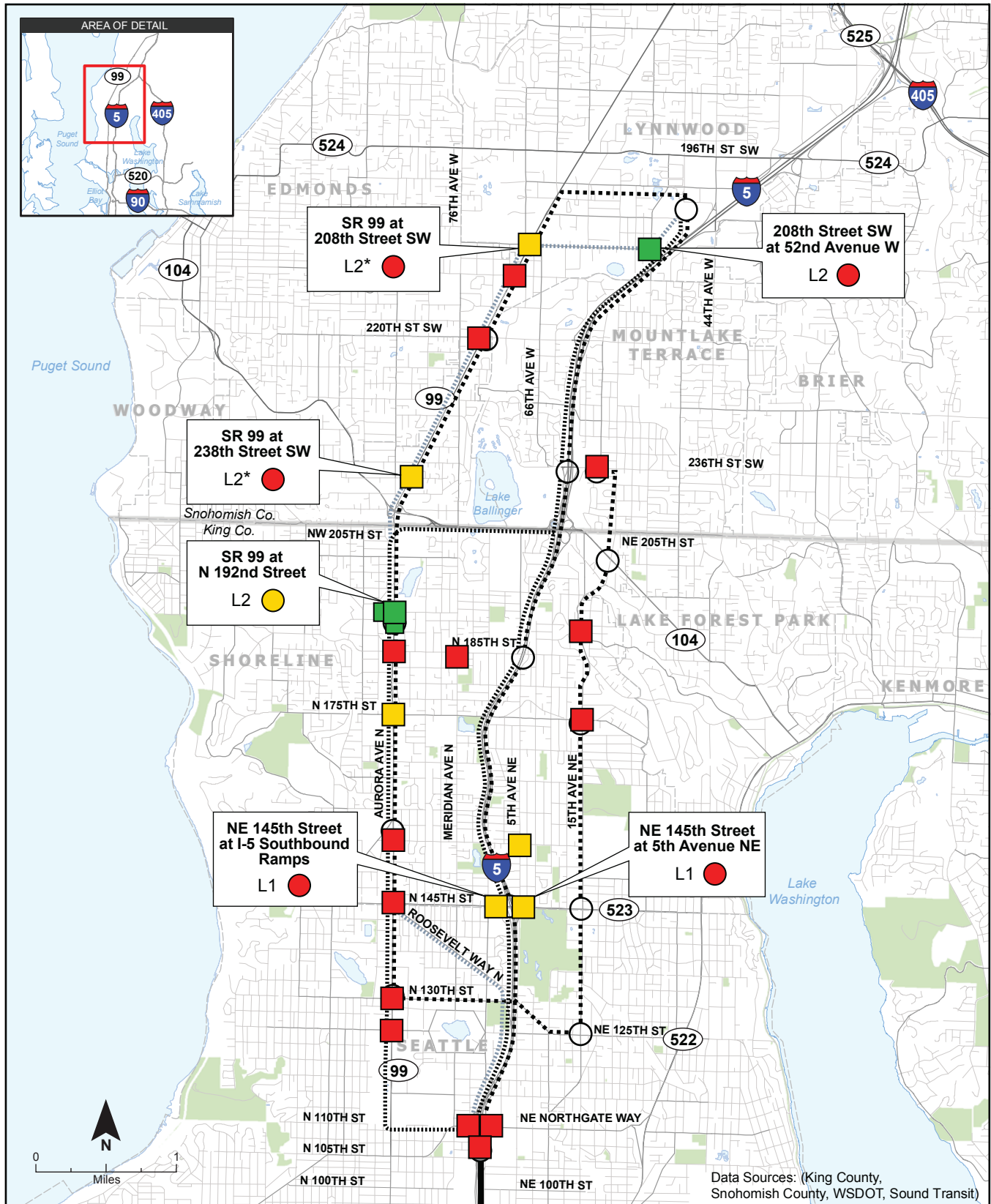


Figure 5-24. Intersections Worsened by Level 2 Alternatives - PM Peak Hour

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.

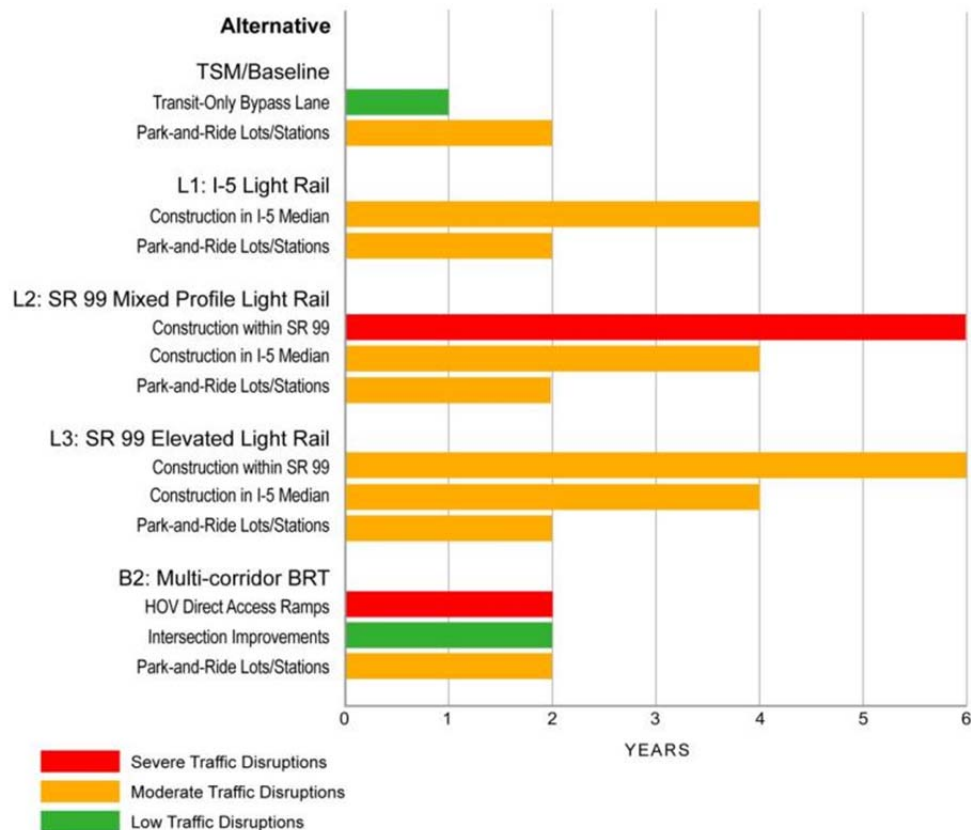


Figure 5-25. Construction Effects on Transportation System

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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.

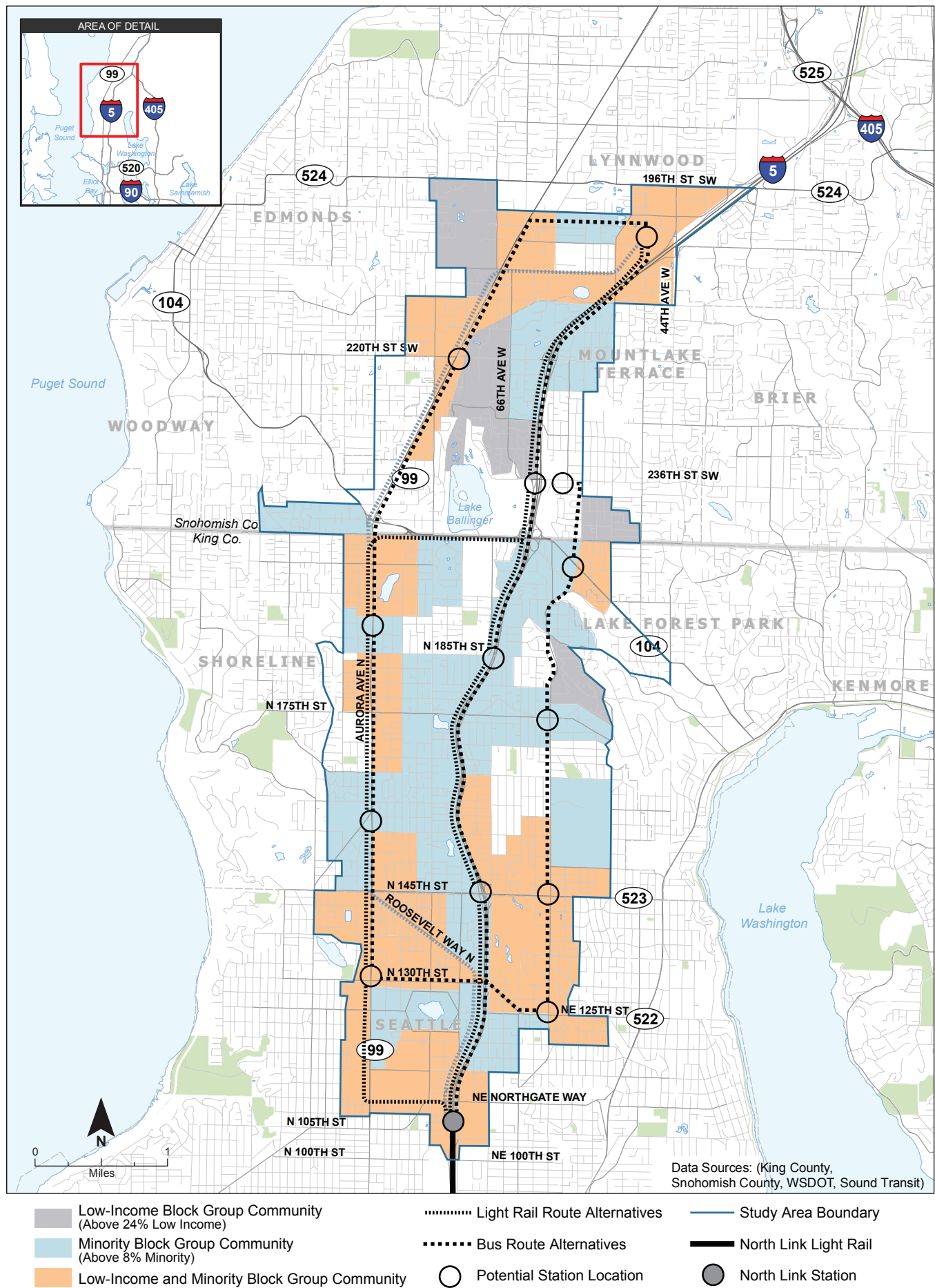


Figure 5-26. Environmental Justice Communities

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.

Table 5-28. Capital Cost Ranges for Level 2 Alternatives		
Alternative	Low (mid-2010 \$million)	High (mid-2010 \$million)
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.)

Table 5-29. Operation and Maintenance Cost Estimates

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

Alternative	Definition of High- Capacity Transportation System	Miles of Operation in General Purpose Lanes ¹	Consistent with Sound Transit's Regional Transit Long-Range Plan
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