DRAFT EIS

EAST LINK PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix H1

Transportation Technical Report

SOUNDTRANSIT
CENTRAL PUGET SOUND
REGIONAL TRANSIT AUTHORITY

Washington State
Department of Transportation

U.S. Department of Transportation
Federal Transit
Administration

December 2008

SOUND TRANSIT EAST LINK PROJECT

APPENDIX H1

Transportation Technical Report

Prepared for:
Sound Transit

Prepared by:
CH2M HILL
Fehr and Peers/Mirai Associates

December 2008

Contents

Appendices

Tables

Exhibits

Acronyms and Abbreviations

East Link Project Alternatives

Segment A. Interstate 90

A1, I-90 Alternative

Segment B. South Bellevue

B1, Bellevue Way
B2A, 112th SE At-Grade
B2E, 112th SE Elevated
B3, 112th SE Bypass
B7, BNSF

Segment C. Downtown Bellevue

C1T, Bellevue Way Tunnel
C2T, 106th NE Tunnel
C3T, 108th NE Tunnel
C4A, Couplet
C7E, 112th NE Elevated
C8E, 110th NE Elevated

Segment D. Bel-Red/Overlake

D2A, NE 16th At-Grade
D2E, NE 16th Elevated
D3, NE 20th
D5, SR 520

Segment E. Downtown Redmond

E1, Redmond Way
E2, Marymoor
E4, Leary Way

East Link Stations

Segment A. Interstate 90

Rainier
Mercer Island

Segment B. South Bellevue

South Bellevue
SE 8th
118th

Segment C. Downtown Bellevue

Old Bellevue
Bellevue Transit Center
East Main
Hospital
Ashwood/Hospital

Segment D. Bel-Red/Overlake

124th
130th
Overlake Village
Overlake Transit Center

Segment E. Downtown Redmond

Redmond Town Center
SE Redmond
Redmond Transit Center

East Link Maintenance Facilities

MF1, 116th
MF2, BNSF
MF3, SR 520
MF5, SE Redmond

General Acronyms and Abbreviations

acc./MVM	accident/million vehicle miles
ADA	Americans with Disabilities Act
ADT	average daily traffic
APC	automatic passenger counters
AVL	automatic vehicle location
AWSC	all-way stop controlled
CIP	Capital Improvement Program
CT	Community Transit
DSTT	Downtown Seattle Transit Tunnel
Eastside	east side of Lake Washington
EIS	Environmental Impact Statement
FFS	free flow speed
FGTS	Freight Goods Transportation System
FHWA	Federal Highway Administration
HAC	high-accident corridor
HAL	high-accident location
HCM	Highway Capacity Manual
HCT	high-capacity transit
HOT	high-occupancy toll
HOV	high-occupancy vehicle
HV	heavy vehicles

I-405	Interstate 405
I-90	Interstate 90
KCM	King County Metro or Metro
LOS	level of service
Metro	King County Metro
MEV	million entering vehicles
MF	maintenance facility
mph	miles per hour
N/A	not applicable
PDO	property damage only
PMT	person miles traveled
PSCR	Puget Sound Regional Council
RPZ	residential parking zone
RR	railroad
Sea-Tac Airport	Seattle-Tacoma International Airport
SOV	single-occupant vehicle
SR	State Route
ST	Sound Transit
ST2	Sound Transit 2
TCQSM	Transit Capacity and Quality of Service Manual
TCRP	Transit Cooperative Research Program
TFP	transportation facilities plan
TRB	Transportation Research Board
TWLT	two-way left turn
TWSC	two-way stop controlled
v/c	volume to capacity ratio
v/c ratio	volume/capacity ratio
VHT	vehicle hours traveled
VMT	vehicle miles traveled
WSDOT	Washington State Department of Transportation

1.0 Introduction

This Transportation Technical Report presents an evaluation of existing and future local, corridor, and regional transportation impacts and potential mitigation associated with the alternatives of the proposed Sound Transit East Link Project. These alternatives are described in Chapter 2 of the East Link Project Draft Environmental Impact Statement (EIS).

1.1 Transportation Elements and Study Area

The evaluation considered a number of transportation elements, including regional travel patterns and facilities, transit operations and levels of service, traffic operations and safety related to arterial and freeway system, parking, nonmotorized circulation, freight circulation, and navigable waterways. For each of these elements, this report describes the affected environment under current conditions (2007) and the environmental impacts for two future years, 2020 and 2030. The year 2020 was selected for analysis because it conservatively estimates the year of opening. Year 2030 provides a horizon-year analysis consistent with the regional and local agency planning period.

East Link is a light rail system that would connect Seattle with the growing urban areas on the east side of Lake Washington (the Eastside). The system would originate in south Downtown Seattle, where it would connect with Sound Transit's Central Link at the International District/Chinatown Station. It then would travel east across Lake Washington via Interstate 90 (I-90) to Mercer Island, Downtown Bellevue, and Bel-Red/Overlake, terminating in Downtown Redmond. The project that this report evaluates consists of 19 alternatives and associated light rail stations and maintenance facility sites. These project elements are described in Chapter 2 of the main document in the East Link Project Draft EIS. As shown in Exhibit 1-1, the project has been divided into the following five segments:

- Segment A, Interstate 90
- Segment B, South Bellevue
- Segment C, Downtown Bellevue
- Segment D, Bel-Red/Overlake
- Segment E, Downtown Redmond

The general study area for the transportation evaluation encompasses the I-90 corridor between Seattle and I-405, proceeding through Downtown Bellevue and the Bel-Red area, then following State Route (SR) 520 to Redmond. To assess regional and corridor operations throughout the study area, six screenlines were established to evaluate transit and vehicle travel performance. This study area includes the I-90 freeway between I-5 and I-405 and approximately 150 intersections on surface streets. To evaluate pedestrian circulation, a one-half-mile radius surrounding stations was established. Parking was evaluated within a one-quarter-mile radius surrounding the stations. Bicycle circulation was also evaluated, but within a larger, 1-mile radius from the stations. As described in the transit section of this report (Section 4.0), Sound Transit and King County Metro service planners reviewed future bus routes as part of this project. Exhibits 1-2 to 1-4 depict the transportation analysis areas within the five segments in the study area.

This technical report is organized to discuss each transportation element individually. The section on each element discusses its affected environment, environmental impacts (comparing the No Build Alternative, or no-build condition, to the East Link Project alternatives, or build condition), and potential mitigation.

The transportation planning process has involved local jurisdictions, state agencies, federal agencies, transit agencies, and other interested parties. The East Link Draft EIS and this technical report evolved through identification and prioritization of regional and local transportation needs and the development of local and regional transportation plans. During the preparation of this technical report and related elements of the Draft EIS, staff from the Federal Transit Administration, Sound Transit, and Washington State Department of Transportation (WSDOT) met and coordinated with staff planners and engineers representing the following agencies and jurisdictions:

- Federal Highway Administration
- King County Metro
- City of Seattle
- City of Mercer Island
- City of Bellevue
- City of Redmond

1.2 Meeting the Need for the Project

The analysis in this technical report demonstrates that the East Link Project would meet and exceed the need for the project in all the categories presented in Chapter 1 of the East Link Project Draft EIS:

- Increased demand for transit service
- Regional urban growth center plan requirements for high-capacity transit (HCT) investments
- Increased congestion on I-90
- Operating deficiencies in regional bus transit
- Limited transit capacity and connectivity

1.2.1 Increased Demand for Transit Services

Without East Link, existing and projected transit service would not meet transportation reliability and capacity needs for the Eastside corridor. In response to the combination of population and employment growth and associated congestion, transit demand across Lake Washington is expected to increase by approximately 70 percent by year 2030.

East Link would meet the growing demand for reliable transit alternatives. Within the East Link corridor, the travel mode in the future is predicted to shift, generally reducing the percent of single-occupant vehicles and increasing the percent of HOVs (vanpools and carpools) and transit (buses and light rail), a mode that carries more people within the limited transportation space. With the project, the percent of transit ridership across Lake Washington would increase by 25 to 33 percent during the PM peak period; therefore, about 25 percent of people traveling across the lake would be in transit vehicles. This shift to using transit indicates the growing demand for transit that is consistent with urban environments and is crucial to providing person mobility rather than vehicle capacity.

1.2.2 Regional Urban Growth Center Plan Requirements for High-Capacity Transit Investments

To meet planned growth in the corridor and the Growth Management Act objectives, Bellevue, Seattle, and Redmond have made land use and planning decisions for increased employment and residential density based in part on the long-term promise of HCT connections across I-90. Traffic projections indicate that most of the major roadways in the study area will be congested and will fail to effectively move vehicle travel by 2030. This would occur even with implementation of planned transportation improvements on SR 520, I-90 (without East Link), and I-405. With the East Link Project, HCT would connect the region's dense commercial and residential centers, as well as major employers, across Lake Washington without being hindered by the increasingly congested highway conditions.

1.2.3 Increased Congestion on I-90

Roads leading into and out of the urban centers of Seattle and Downtown Bellevue are forecast to be at capacity in the near future, increasing travel time between these two key employment and population centers. For example, I-90 is expected to reach its vehicular capacity within the near future (around year 2015) (WSDOT, 2006). This would further constrain travel for all modes, including freight, high-occupancy vehicles (HOVs), and buses. This highlights the need for increased transit use because it provides greater capacity and is more reliable than single-occupant vehicles and also provides a safer transportation alternative.

The East Link Project would increase the I-90 person capacity across Lake Washington without any roadway widening. Being able to move more people in both directions, especially in the reverse-peak direction (eastbound in the morning [AM] and westbound in the afternoon [PM]), where travel times are expected to double in the future, would improve the mobility into and out of the urban centers on both sides of Lake Washington that this project would serve: Seattle, Bellevue, Overlake, and Redmond.

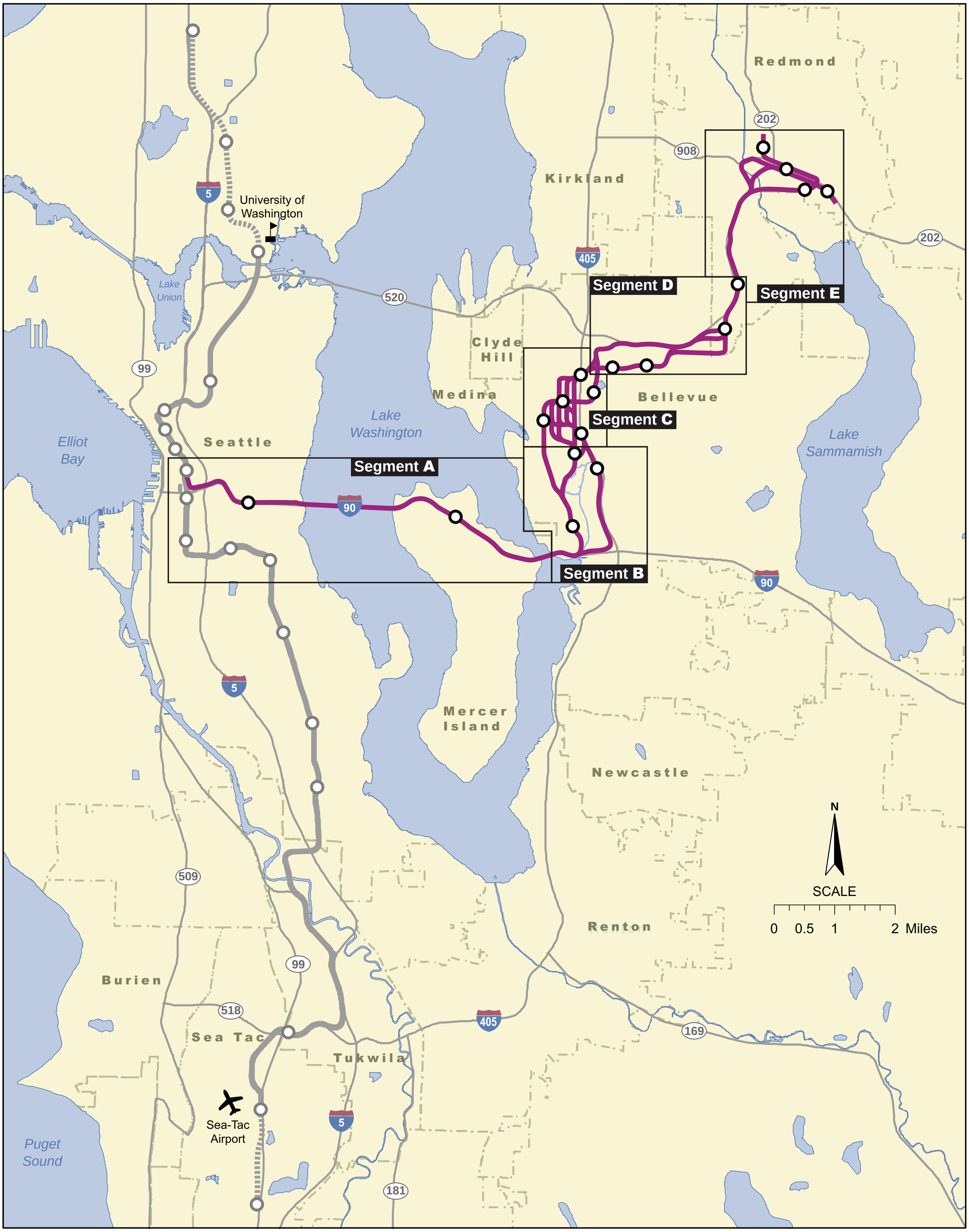
1.2.4 Operating Deficiencies in Regional Bus Transit

The travel time between the key urban centers of Seattle and Downtown Bellevue would improve with light rail service because light rail has faster travel time and better reliability than bus service or automobiles. The East Link Project analysis estimates that light rail travel between Seattle and Downtown Bellevue would take less than 20 minutes and between Seattle and Downtown Redmond, about 35 minutes, regardless of time of day or level of traffic congestion. This is a savings of up to 30 minutes compared to an automobile currently traveling between these locations. In the afternoon peak period, it can take up to 47 minutes to travel between Seattle and Bellevue (via I-90) and up to 63 minutes to travel between Seattle and Redmond (via SR 520) (WSDOT, 2008) In the future, these automobile times are expected to continue to worsen, and therefore light rail would provide an even greater travel time savings.

In addition, light rail service to the Eastside would substantially improve transit service reliability throughout the project vicinity. It is expected that bus reliability in the future will continue to operate at failing levels (i.e., not meeting level of service [LOS] standards) without the project and that most bus routes would not meet scheduled headways (i.e., the time between bus arrivals). Buses would continue to be an unreliable travel choice in the project area, for instance across Lake Washington and in Downtown Bellevue and Redmond, because bus service would be slowed by heavily congested roadways. Bus speeds between Seattle and Downtown Bellevue are predicted to decrease by up to 30 percent by year 2030 as congestion worsens, even with improvements to I-90, because arterials connecting I-90 to these urban centers would not be improved. This poor bus reliability would not benefit transit ridership and would not provide an attractive transportation choice for the region. The frequency of transit throughout the day would improve because light rail would arrive at least every 15 minutes, compared to average bus arrival increments of every 30 minutes or less frequently during off-peak hours. Light rail would also serve more hours of the day with expanded service coverage of 20 hours—a substantial improvement over existing and planned bus service.

1.2.5 Limited Transit Capacity and Connectivity

Light rail service not only would provide increased service frequency, faster travel times, and longer hours of service throughout the day but also would be able to carry more passengers to connecting bus routes. These connecting bus routes that share connections with the light rail system would likely experience higher ridership. By the year 2030, up to 10,000 new riders would choose to use transit each day with the addition of light rail serving Eastside communities. In addition, the East Link Project is forecasted to contribute between 42,500 and 48,000 daily riders to the region's light rail system. This is expected to eliminate about 215,000 vehicle miles traveled and about 15,000 hours of travel each day in the region in 2030. The East Link light rail project would have the capacity to carry between 9,000 to 12,000 people per hour in each direction, or the equivalent of about 6 to 10 freeway lanes of traffic. Without light rail's ability to move more people in both directions across Lake Washington, there would continue to be peak-directional roadway capacity that would not efficiently and reliably serve the growing residential and commercial land use densities on the Eastside.

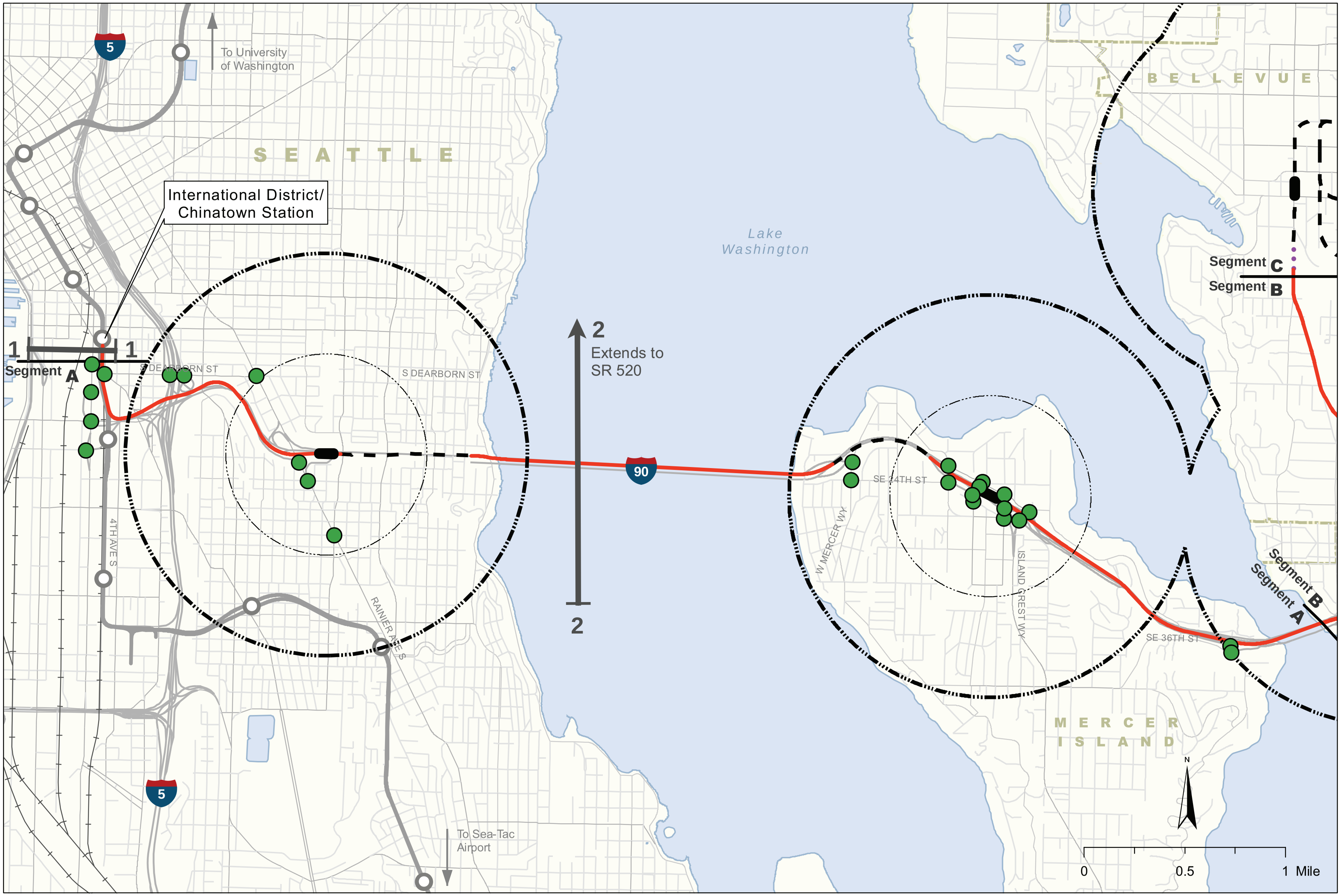


City Limits

Central Link Light Rail:
- Central Link Alignment and Station
- Central Link Extension

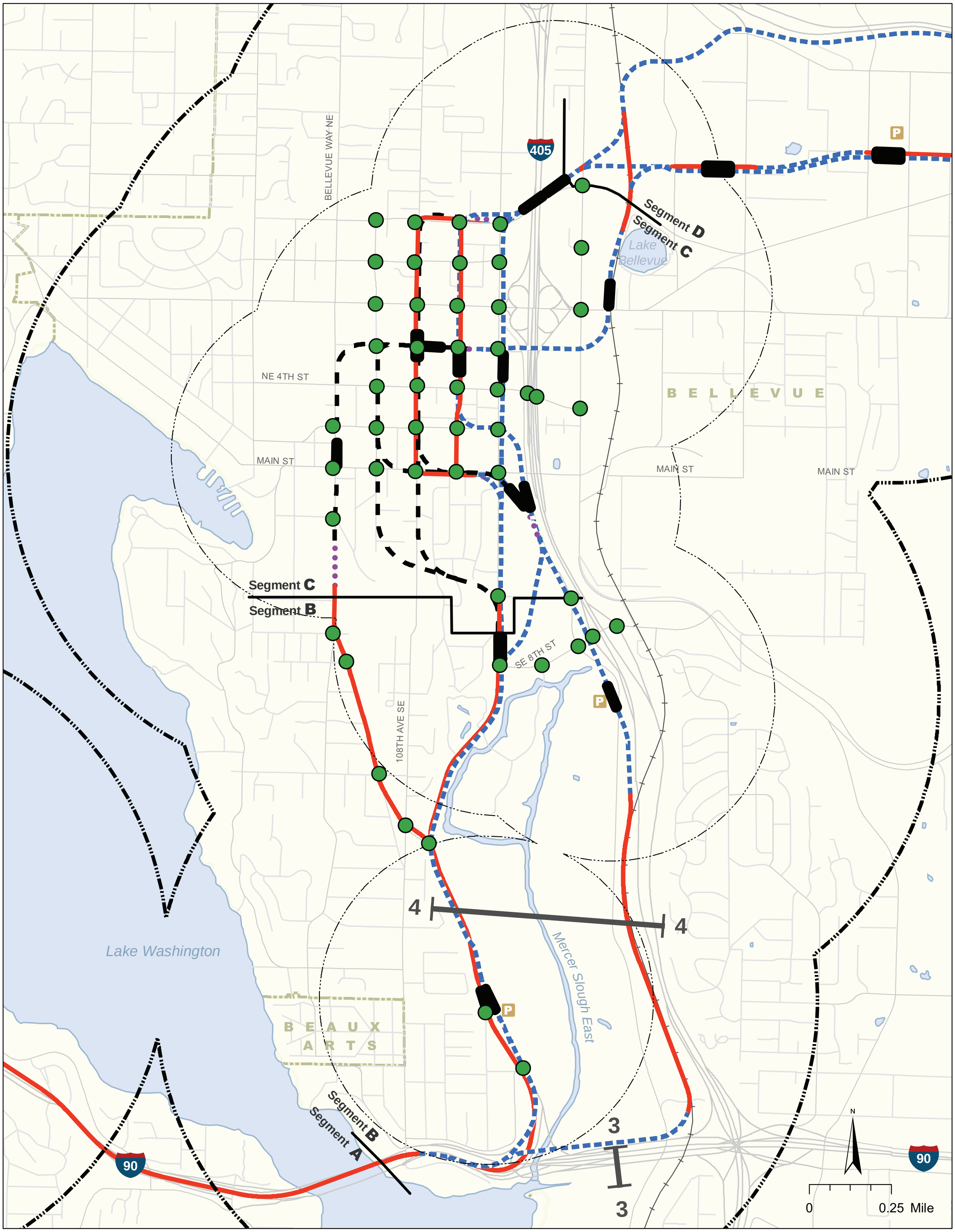
East Link Light Rail Alternatives:
- East Link Alternative Alignment and Station
- East Link Segment

Exhibit 1-1 **East Link Vicinity Map (with Central Link)**
East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

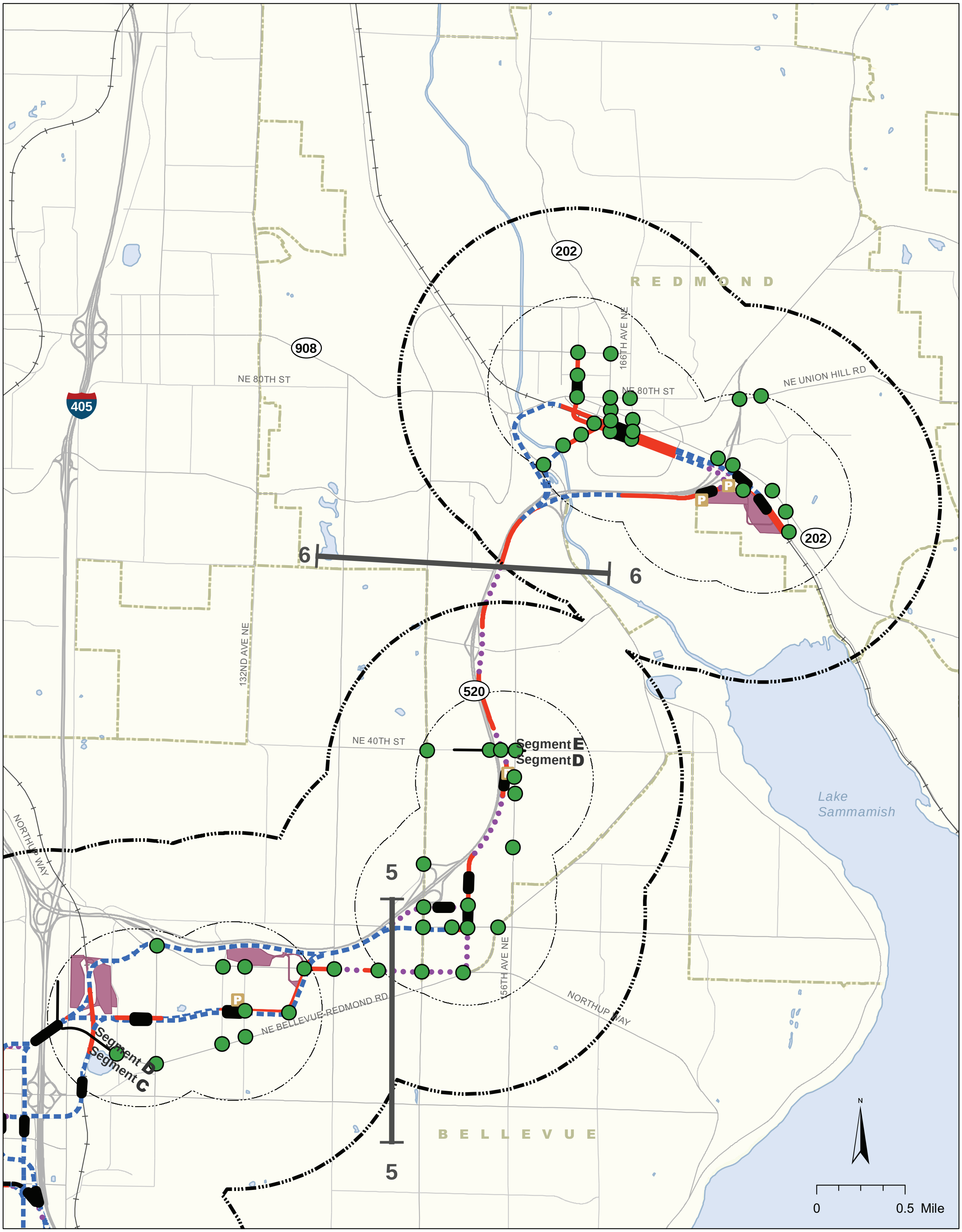
Exhibit 1-2 **Transportation and Local Street Analysis Study Area Segment A**
East Link Project



Source: Data from King County (2006).

Study Intersection
Screenline
Sidewalk and On-Street Parking Study Area (1/2 mile)
Bicycle Study Area (1 mile)
At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Proposed Station
New and/or Expanded Park-and-Ride Lot

Exhibit 1-3 **Transportation and Local Street Analysis Study Area Segments B and C**
East Link Project



Source: Data from King County (2006).

Study Intersection
Screenline
Sidewalk and On-Street Parking Study Area (1/2 mile)
Bicycle Study Area (1 mile)
At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Proposed Station
Maintenance Facility and Access Track
New and/or Expanded Park-and-Ride Lot

Exhibit 1-4 **Transportation and Local Street Analysis Study Area Segments D and E**
East Link Project

2.0 Methodology and Assumptions

The methodology and assumptions used to analyze the transportation impacts of the East Link Project have been compiled in a Transportation Methods and Assumptions Report. That report, provided in Appendix A of this technical report, presents the following information:

- Agency guidelines and regulations that govern or influence the analysis of local and project-wide impacts associated with the project
- Transportation analysis methodology, including relevant definitions, data collection, regional traffic analysis, corridor traffic analysis, and construction impact analysis
- Assessment methods related to data collection, travel demand forecasting, and local and project-wide level-of-service (LOS) standards
- Surface street and freeway traffic analysis and impact assessment methods that list the locations of the analyses, describe the LOS assessment for signalized and unsignalized intersections, and describe the local street and freeway safety analysis
- Assessment methods for impacts related to light rail station and park-and-ride areas, parking, nonmotorized facilities and modes, property access and circulation, freight, transit, and construction

The transportation evaluation was performed at three levels of assessment. The first two, the regional and corridor levels, provide information on the larger surrounding area and on screenlines through major transportation corridors. The third level, the operational level, analyzes specific locations and provides in-depth analysis to determine the operational impacts of the project. Table 2-1 identifies the types of analyses done at each level and lists the measures that were used to evaluate the performance of the project. All cooperating agencies reviewed these measures.

TABLE 2-1
East Link Transportation Analyses and Measures of Performance

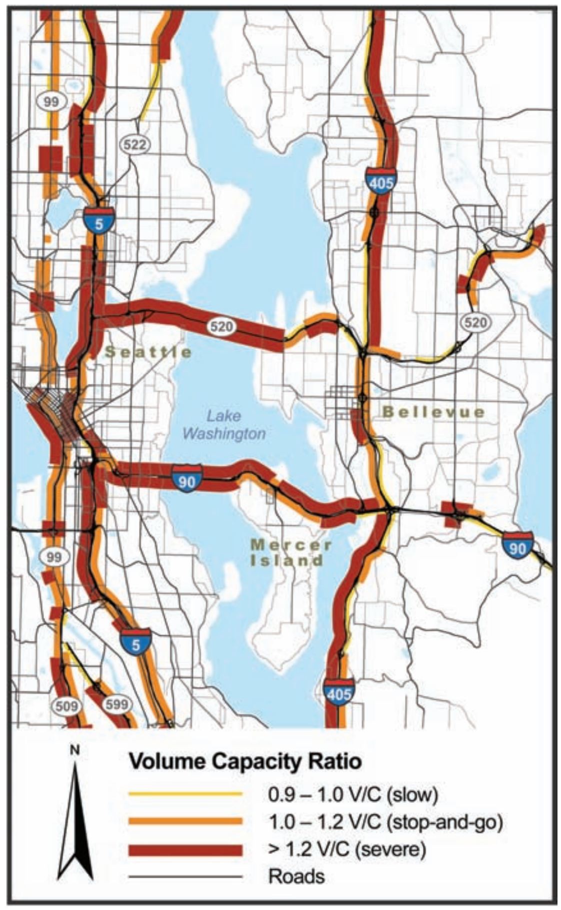
Assessment Level	Analysis Type	Measure of Performance
Regional Level	Ridership	East Link ridership patrons
	Vehicle Miles Traveled (VMT)/Vehicle Hours Traveled (VHT)	VMT/VHT values
Corridor Level	Screenline Analysis	Transit ridership
		Volume/capacity ratio (v/c ratio)
		Mode share
Operational Level	Intersection Analysis	LOS/delay
		Vehicle queue length
	Freeway Analysis	LOS/density
		Person and vehicle carrying throughput
		Travel times (general purpose, high-occupancy vehicle [HOV] and transit, rail, and freight)
		Access modifications
	Ridership	Station ridership patrons
	Freeway Safety	Predictive assessment with reversible center roadway conversion
	Alignment Safety	Qualitative assessment of at-grade or elevated alignments within or adjacent to surface streets
	Transit	Service frequency, hours of service, passenger load and reliability level of service, travel times, and transfers
	Nonmotorized	Station area pedestrian LOS
		Sidewalk, trail, and bicycle facility inventory, access, and circulation
	Parking	On-street supply/demand Direct alignment impacts

3.0 Regional Travel

3.1 Section Overview

This section describes existing conditions (year 2007) and potential project impacts on regional facilities in the central Puget Sound region. Regional travel metrics include vehicle miles traveled (VMT) and vehicle hours traveled (VHT), and volume/capacity ratio (v/c ratio) and mode choice at the six screenline locations through the study area. These regional metrics and screenline data are based on information from the Puget Sound Regional Council (PSRC) transportation demand model and Sound Transit's transit ridership model, which include the urbanized areas of King, Pierce, and Snohomish counties.

Without light rail service across Lake Washington, I-90 is expected to reach its vehicular capacity in the near future, and congestion would continue to worsen as v/c ratios approach 1.0 in the future. Without a more reliable transportation alternative across I-90, all modes would be affected, including HOV and transit. Roadways that lead into and out of the urban centers of Seattle and Downtown Bellevue will be at capacity in the near future, as indicated by v/c ratios at or near 1.0 on Screenlines 1, 2, and 4 (see Section 3.2.3). This condition will substantially constrain the ability to travel into key employment and population areas of the region and highlights the importance of increased use of transit because of its greater capacity and reliability for moving people compared to single-occupant vehicles. Exhibit 3-1 shows that travel across the lake and on I-5 and I-405 will operate in stop-and-go to severe traffic conditions by year 2030.



Source: PSRC, 2007.

EXHIBIT 3-1
PSRC 2030 PM Highway Volume-to-Capacity Ratios without East Link

The East Link Project would link Seattle, the region's main urban downtown area, with the Eastside communities, connecting the region's dense commercial and residential centers as well as major employers across Lake Washington. Light rail would support increased density in Bellevue, Redmond, and Seattle, consistent with regional land use plans and Washington Growth Management Act goals to preserve natural resources. Higher density provides economic growth and opportunities for more effective infrastructure development. Travel between the key urban centers (Seattle and Downtown Bellevue) would improve with light rail service because it would have greater capacity and be a more reliable mode of travel than single-occupant vehicles.

The analysis estimates that light rail travel between the International District/Chinatown Station in Seattle and the proposed Bellevue Transit Center Station would take less than 20 minutes. East Link light rail service between the International District/Chinatown Station and Downtown Redmond is expected to take approximately 35 minutes. These travel times are a savings of up to 30 minutes compared to an automobile currently traveling between these locations. Light rail travel times between key stations are further discussed in Section 4.3.3.5 (Transit Travel Times). Because of these travel time benefits, people would choose to use light rail in lieu of their vehicles, and the region-wide VMT and VHT are expected to decrease between 0.2 and 0.6 percent with the project. Within the project vicinity (the area encompassing the project alternatives between Bellevue and Redmond), the mode share is expected to shift from predominantly single-occupant vehicles to a more balanced mode share among single-occupant vehicles, HOVs, and transit. With East Link, transit ridership across Lake Washington would increase between 25 and 33 percent during the afternoon (PM) peak period.

Providing light rail along I-90 would remove vehicle access to and from the reversible center roadway. This change along I-90 would not affect other regional highways such as SR 520, I-5, and I-405. Travel on these highways with the project is forecasted to remain similar to the No Build Alternative, and diversion of traffic from them to other highways would be unlikely. The v/c ratios on Screenlines 1, 2, and 4 (Exhibits 1-2, 1-3, and 1-4), which cross these highways or connect to them, would be either similar or slightly improved with East Link.

3.2 Affected Environment

3.2.1 Vehicle Miles Traveled/Vehicles Hours Traveled

Today, more than 70 million vehicle miles of travel occur daily within the Puget Sound region. This results in close to 2 million hours of travel for all users of the transportation system. In the AM peak period (6 to 9 a.m.), about 12 million total vehicle miles occur each day, which equates to slightly more than 300,000 total vehicle hours. In the PM peak period (3 to 6 p.m.), there are about 15 million total VMT and over 400,000 total VHT. Thirty-seven percent of the daily vehicle miles traveled occur in the AM and PM peak periods, and over 40 percent of all daily hours of travel occur in the AM and PM peak periods. This indicates that the more congested periods in the Puget Sound region are during the AM and PM work commuting periods. Table 3-1 provides existing daily regional VMT and VHT information.

TABLE 3-1
Existing Regional Travel

Time of Day	Vehicle Miles Travel (VMT)	Vehicles Hours Travel (VHT)
AM Peak Period (6 – 9 a.m.)	11,843,700	307,000
Nonpeak Period	44,968,200	1,086,500
PM Peak Period (3 – 6 p.m.)	14,948,800	432,500
Daily Total	71,760,700	1,826,100

Source: PSRC 2007 Regional Travel model.

The regional highways within the study area serve a substantial number of vehicle trips in the central Puget Sound region and beyond in terms of vehicle travel and freight delivery, as noted in PSRC's regional transportation plan, *Destination 2030* (PSRC, 2001). Single-occupant vehicles were the dominant mode of region-wide travel in year 2006, accounting for 44 percent of the trips made. A large number of trips also occurred in vehicles with two or more passengers (HOV). Together, single-occupant vehicle and HOV travel accounted for 84 percent of the person trips made in 2006. The remaining trips were by transit, walk, and other modes (PSRC, 2007). Major regional transit service providers within the study area include King County Metro, Sound Transit, and Community Transit. Major highway facilities, including I-90, I-5, I-405, and SR 520, serve most of the regional trips within the study area.

3.2.2 Regional Highways

I-90 is a major east-west interstate highway facility that extends from Boston, through Chicago, all the way into the western portion of the East Link project corridor. In Washington, this interstate facility connects various freight and state routes originating in Seattle, through Mercer Island and Bellevue, to the eastern side of the state and beyond. I-90 has three general-purpose lanes in the westbound and eastbound directions. The segment of I-90 that crosses Lake Washington, including the floating bridge, has both general-purpose lanes and a reversible center roadway that operates as a peak directional expressway. Use of the reversible center roadway is for HOV, buses, and Mercer Island traffic. These reversible lanes are located between the Mount Baker Tunnel in Seattle and the Bellevue Way SE interchange in Bellevue. The reversible roadway is physically separated from the eastbound and westbound mainline lanes and operates in the westbound direction in the morning and eastbound in the afternoon and evenings. In 2006, average daily traffic (ADT) volumes on I-90 consisted of between 140,000 and 150,000 vehicles on the floating bridge midspan. This includes about 135,000 vehicles per day in the eastbound and westbound mainline lanes and about 15,000 daily vehicles in the reversible center roadway (WSDOT, 2007b).

I-5 is the primary north-south West Coast route in the region, running between the U.S. borders with Canada and Mexico. In Washington, this interstate is a major transportation corridor in the Puget Sound region and serves as a main highway connection among the urban communities between Portland and Seattle. In 2006, the ADT was slightly less than 160,000 vehicles (WSDOT, 2007b).

I-405 is an interstate route that travels through Segments B and C. This interstate facility parallels I-5 on the east side of Lake Washington and connects to and from I-5 in Tukwila and Lynnwood. I-405 has system interchanges that connect with I-90 and additional state routes such as SR 167, SR 520, and SR 526. In urban areas of the project corridor, specifically in Downtown Bellevue, I-405 consists of six lanes with HOV facilities. In 2006, the ADT was approximately 172,000 vehicles (WSDOT, 2007b).

SR 520 is a state route highway facility that provides east-west connections across Lake Washington between Seattle and the east Puget Sound communities, such as Kirkland, Bellevue, and Redmond. The floating bridge section of this corridor that spans Lake Washington is an important segment of the state highway network due to its connection to large employment centers in Bellevue, Redmond, and Seattle. In 2006, approximately 115,000 vehicles per day traveled on the bridge portion of this facility (WSDOT, 2007b).

3.2.3 Screenline Performance

Six screenlines were established to assess the travel in each corridor of the study area. As shown in Exhibits 1-2 through 1-4, the six screenlines include key arterials and highways at the following locations:

1. City of Seattle: A north-south screenline south of S Jackson Street that extends between and includes Alaskan Way, 4th Avenue S, and the I-90 D2 Roadway (included only in the Section 4.0 transit analysis).
2. Lake Washington (including SR 520 and I-90): An east-west screenline between the I-90 Mount Baker Tunnel and Mercer Island
3. Interstate 90 (at Mercer Slough): An east-west screenline between the Bellevue Way and I-405 interchanges
4. South Bellevue: A north-south screenline that extends between and includes Bellevue Way and I-405
5. Bellevue-Redmond (Bel-Red): An east-west screenline that extends between and includes SR 520 and NE 8th Street in the City of Bellevue
6. Redmond (Grasslawn Area): A north-south screenline that includes 140th Avenue NE and extends to Marymoor Park (City of Redmond Screenline 6 in the Redmond Transportation Master Plan)

These screenlines provided a snapshot of traffic operations and mode share along each corridor based on the travel demand estimated from the PSRC and Sound Transit models. Vehicle v/c is a ratio of demand to capacity for a highway facility and was used as the primary performance measure to assess regional travel on the highways. Capacity deficiencies may exist when a v/c ratio of 0.9 is exceeded, a v/c ratio of 1.0 suggests demand equals capacity, and v/c ratio over 1.0 suggests that demand exceeds capacity. Mode shares measure highway user demand in terms of vehicular mode type, including single-occupant vehicles, HOVs, and transit users.

These screenlines were also used to analyze transit LOS and ridership, as described in Section 4.0 (Transit). To better understand the impacts of the project on I-90, two screenline locations on I-90—west of Mercer Island and between the Bellevue Way and I-405 interchanges—were used to determine vehicle and person throughput, as described in Section 5.2. Throughput is a function of the operating condition and vehicle data from the *VISSIM* micro-simulation software program.

Table 3-2 shows the performance of screenlines for existing PM peak-hour conditions. Screenlines 2 and 4, which cross I-90 and SR 520 (Screenline 2) and I-405 (Screenline 4), are heavily congested in both directions in the PM peak hour as indicated by a v/c ratio above 0.90. This is expected because these three highways are some of the more heavily traveled roads in the region. A v/c ratio of 0.9 and above indicates capacity deficiencies and the need for improved travel efficiency. Most other screenlines have a v/c ratio less than 0.70. Although Screenline 3 is located on I-90, its v/c ratio is considerably less than at Screenline 2 because of the additional roadway capacity (collector-distributor system) provided between the Bellevue Way and I-405 interchanges to manage the flow of traffic to and from these closely spaced interchanges.

Person mode share in the study area varies depending on the transportation choice, congestion, and land use (e.g., commercial, residential, retail) surrounding the area. For instance, some of the higher HOV and transit mode shares are seen leaving Seattle (Screenline 1—southbound, and Screenline 2—eastbound). At Screenline 5—westbound (for instance, a trip to Seattle across SR 520), a higher HOV mode share occurs compared to its counter eastbound direction into Redmond. The highest transit mode share occurs at Screenline 1—southbound, and Screenline 2 —eastbound. Overall, the single-occupant vehicle mode is the dominant mode choice, with over a 50 percent usage. HOV usage generally varies between 25 and 40 percent, and transit is less than 10 percent.

TABLE 3-2
Existing PM Peak-Hour Screenline Performance

Screenline	Direction	Volume/Capacity Ratio	Person Mode Share (%) (Single Occupant/HOV/Transit)
1 (City of Seattle)	Northbound	0.57	53/45/2
	Southbound	0.78	60/31/9
2 (Lake Washington)	Westbound	0.99	62/33/5
	Eastbound	0.91	57/30/13
3 (I-90)	Westbound	0.58	59/39/2
	Eastbound	0.62	58/38/4
4 (South Bellevue)	Northbound	0.98	58/41/1
	Southbound	1.08	60/37/3
5 (Bel-Red)	Westbound	0.60	55/41/4
	Eastbound	0.67	63/32/5
6 (Redmond)	Northbound	0.64	71/26/3
	Southbound	0.41	58/40/2

Source: PSRC 2007 Regional Travel model.

3.3 Environmental Impacts

Regional travel conditions for the East Link Project were evaluated based on travel demand information obtained using the PSRC transportation demand model and Sound Transit's transit ridership model, which include King, Pierce, and Snohomish counties. Regional population and employment forecasts suggest that the regional highways within the project vicinity will continue to serve increasing travel demand. Future roadway capacity projects will continue to complete the HOV system and allow for an increase in carpool trips but generally do not include substantial improvements for high-capacity modes of travel. Based on these forecasts and driver travel patterns, the number of miles and hours traveled were estimated to create VMT and VHT. Within the project vicinity on each roadway, the future vehicle demand and mode share were predicted, giving the v/c ratios (congestion) and mode share at each of the project's six screenlines. The results of this analysis are presented in the following subsections.

3.3.1 Travel Demand Forecasts

Future year analysis was performed for the years 2020 and 2030 based on PSRC's current population and land-uses forecasts and regional model (spring 2007). Enhancements to the PSRC model were made by integrating the Bellevue-Kirkland-Redmond transportation network to provide a more detailed roadway system in the project vicinity. In the future 2020 and 2030 (both no-build and build) conditions, a substantial number of highway and arterial improvements were assumed. For the build condition, the PSRC model includes light rail to the Eastside and other highway and transit modifications that are not part of the no-build condition. Table 3-3 lists the transportation programs and/or projects and the future year when they were assumed to occur. Appendix A, Attachment 1, provides the complete list of future projects assumed in years 2020 and 2030.

TABLE 3-3
No Build Alternative Transportation Programs and Projects

Program/Project	Horizon Year 2020	Horizon Year 2030	Comments
Roadway			
Nickel Package	X	X	Approved 2003.
Transportation Partnership Account	X	X	Approved 2005.
I-90 Two Way Transit and HOV Operations Project	X	X	Stages 1 through 3 and also without Stage 3.
Local Agencies			
Capital Improvement Programs/Transportation Facilities Plans	X	X	Typically 6-year (or near term) funding commitments.
Comprehensive/Transportation Plans	X	X	Typically 15- to 20-year list of funded and unfunded projects. Funded projects included as part of capital improvement program (CIP)/ transportation facilities plan (TFP) lists.
Puget Sound Regional Council			
Destination 2030		X	Selected projects included (refer to Appendix A).
Transit			
Sound Transit			
Sound Move Program	X	X	Approved 1996.
ST2 Program[b]	X[a]	X	Approved November 2008. This package of projects is expected to be built over the next 15 years.
King County Metro			
6-Year Service Implementation Plans	X	X	None
Transit Service Integration Plan	X	X	Prepared for East Link Project.
Transit Now Plan	X	X	Approved 2006.

[a] Not all projects identified in this program are expected to be built by 2020. Refer to Appendix A, Attachment 1, for the project list by horizon year.

[b] The ST2 (Sound Transit 2) program is a package of high-capacity transit investments in the regional transit system, which includes light rail in the Eastside corridor.

Table 3-4 lists annual vehicle volumes and growth rates, based on the 2020 and 2030 PSRC travel demand model. Vehicle growth forecasted from the 2020 and 2030 PSRC travel demand model was applied to existing (2007) volumes to estimate future volumes. No-build traffic volumes in Segment A (which includes I-90) are predicted to grow at an average annual growth rate (up to year 2030) of about 2.0 percent in both AM and PM peak periods. The highest no-build vehicle growth until 2020 will occur in Segments C and E at about 2.7 percent per year, and the highest overall annual growth through 2030 will be about 2.0 percent in Segments A and E.

For the build condition, the Sound Transit ridership forecasting model was jointly used with the PSRC model to develop the 2020 and 2030 East Link light rail system ridership estimates associated with the project alternatives. For Sound Transit's planning purposes, a representative alternative was created as a "baseline" alternative used in the analysis. This representative alternative is the combination of alternatives that generally follows the path of the I-90 (A1), 112th SE Elevated (B2E), 110th NE Elevated (C8E), NE 20th (D3), and Redmond Way (E1) alternatives.

Although two methods were used to analyze roadways near potential stations in the build condition (discussed further in Section 6.0), the method that relies on auto forecasts from the PSRC model is more appropriate for the discussion of regional travel in this section. The PSRC model method was used to identify the shift in traffic demand and patterns within a congested transportation system. The transit ridership associated with the light rail alternatives and the transit service modifications (based on the 2020 and 2030 Transit Service Integration Plans developed by King County Metro and Sound Transit for East Link Project planning [Sound Transit, 2007c]) was also used to understand the change in auto demands and their patterns with the build condition forecasts.

Overall, in the build condition there would be a slight reduction in the auto forecasts, about 10,000 people are forecasted to shift their mode of transportation and choose to use light rail by year 2030. Further discussion of travel demand forecasts is provided in Sections 5.0 and 6.0.

TABLE 3-4
No-Build PM Peak-Hour Travel Demand Forecasts

Segment/Study Area	Existing (2007)	2020 No Build		2030 No Build	
	Vehicles	Vehicles	Annual Growth Rate	Vehicles	Annual Growth Rate
Segment A[a]	69,000	89,800	2.0%	108,400	2.0%
Segment B	7,100	8,800	1.7%	9,500	1.3%
Segment C	11,400	16,050	2.7%	17,350	1.8%
Segment D	12,400	15,500	1.7%	16,700	1.3%
Segment E	11,600	16,300	2.7%	18,200	2.0%

[a] Along I-90, the values represent 3-hour peak-period vehicle demand forecasts. The AM peak-period annual growth rate is 2.4 percent by 2020 and 2.1 percent by 2030.

Note: Vehicle totals were created by calculating the total number of entering and exiting vehicle volumes in each segment.

3.3.2 Vehicle Miles Traveled/Vehicles Hours Traveled

The impacts that the build conditions would have on regional travel were assessed in terms of both VMT and VHT. Changes in VMT indicated that people would travel either less or farther to get to their destinations. Changes in VHT generally reflect the change in congestion or the trip's length. For instance, less congestion may correlate to fewer hours of travel. Table 3-5 compares the region-wide VMT and VHT for both 2020 and 2030 no-build and build conditions. The build condition data in the table presents a range from a low to high ridership. By 2030, the alternatives that would produce the highest ridership in their segments, when combined with the representative alternative outside their segment, are B1 (with connections to C1), C3T, D2A, D2E, D5, and E2. These alternatives would generate a project-wide ridership between 46,000 and 48,000. The lowest ridership among alternatives by segment, when combined with the representative alternative outside their segment, would be with B7, C4A, C7E, D3, E1, and E4, resulting in a project-wide ridership ranging between 42,500 and 45,500 daily riders. The representative alternative is further described in the previous section, Section 3.3.1, and in Section 4.3.3 Light Rail Ridership.

In both 2020 and 2030, regional VMT and VHT conditions would improve with East Link compared to the no-build conditions. The greatest reduction in VMT/VHT would be with the highest daily ridership (project-wide ridership of about 48,000 in 2030). This would reduce VMT by about 215,000 miles (0.23 percent) and 15,000 hours of congestion (0.59 percent) each day. The lowest daily ridership (project-wide ridership of about 42,500 in 2030) would reduce the VMT by 0.20 percent and VHT by 0.58 percent each day. In all cases, the VMT and VHT would be lower in the build condition than in the no-build condition because the East Link Project would provide another mode of travel for people to use in lieu of the automobile. The forecasts support a conclusion that VMT and VHT would be lower with any of the East Link alternatives compared to the No Build Alternative.

TABLE 3-5
2020 and 2030 Regional Travel Impact Comparison Summary

Criterion/Time of Day	2020					2030				
	No Build	Low-Ridership Alternative	Percent Change	High-Ridership Alternative	Percent Change	No Build	Low-Ridership Alternative	Percent Change	High-Ridership Alternative	Percent Change
Daily New Transit Riders		8,400	N/A	9,600	N/A	N/A	8,200	N/A	10,100	N/A
Daily VMT	86,282,900	86,078,000	-0.24%	86,058,300	-0.26%	93,666,900	93,478,300	-0.20%	93,451,300	-0.23%
Daily VHT	2,263,600	2,262,700	-0.04%	2,262,500	-0.05%	2,486,400	2,472,100	-0.58%	2,471,700	-0.59%

Source: PSRC and Sound Transit demand models.

N/A = not applicable

3.3.3 Screenline Performance

The following subsections summarize screenline vehicle performance results during the PM peak hour in no-build and build conditions for years 2020 and 2030. Generally, with the East Link Project in 2020 and 2030, roadway v/c ratios would remain the same or improve slightly compared to the no-build condition. The mode share would generally become less dominated by single-occupant vehicles as the transit share increases. This mode shift is critical to providing increased person mobility in an area with limited opportunities for road expansion. Diversion to other highways with the conversion of the I-90 reversible center roadway to light rail is not expected, because v/c ratios across Screenlines 1, 2, and 4 (which include I-90, SR 520, and I-405) remain similar to or less than the no-build condition with implementation of the project. Removing vehicle use from the center roadway to accommodate light rail would not affect other regional highways, such SR 520, I-5, and I-405. Table 3-6 shows year 2020 and 2030 v/c ratios at each screenline. Exhibits 3-2 and 3-3 show the PM peak-hour mode share at each screenline for years 2020 and 2030. For discussion of I-90 operations, including vehicle and person throughput and capacity, travel time, LOS and congestion, and safety, refer to Section 5.0.

TABLE 3-6
2020 and 2030 PM Peak-Hour Volume/Capacity Ratios at Screenlines

Screenline	Direction	2020 V/C Ratio		2030 V/C Ratio	
		No Build	East Link	No Build	East Link
1 (City of Seattle)	Northbound	0.54	0.55	0.56	0.55
	Southbound	0.72	0.71	0.72	0.68
2 (Lake Washington)	Westbound	0.98	1.01	0.95	0.91
	Eastbound	0.93	1.12	0.90	1.04
3 (I-90)	Westbound	0.54	0.48	0.58	0.49
	Eastbound	0.65	0.57	0.70	0.59
4 (South Bellevue)	Northbound	0.92	0.88	0.94	0.88
	Southbound	0.99	0.92	1.03	0.97
5 (Bel-Red)	Westbound	0.72	0.72	0.77	0.72
	Eastbound	0.83	0.82	0.84	0.84
6 (Redmond)	Northbound	0.51	0.68	0.69	0.68
	Southbound	0.67	0.51	0.53	0.53

Source: PSRC travel demand model.

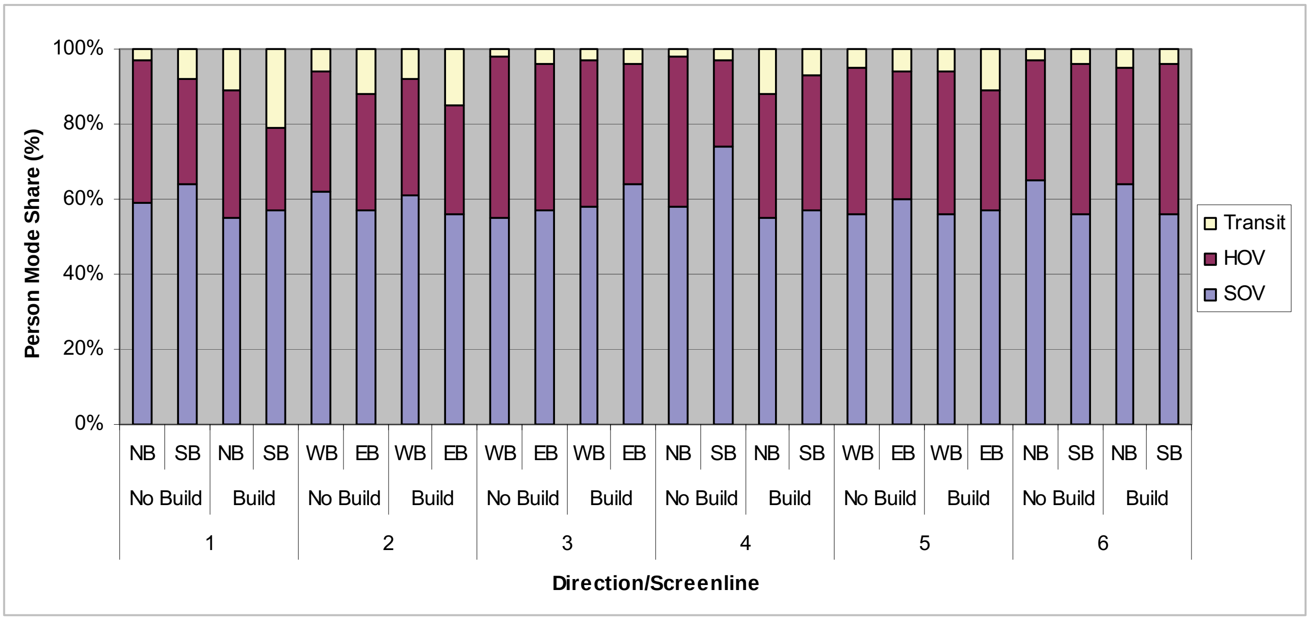


EXHIBIT 3-2
2020 PM Peak-Hour Person Mode Share at Screenlines

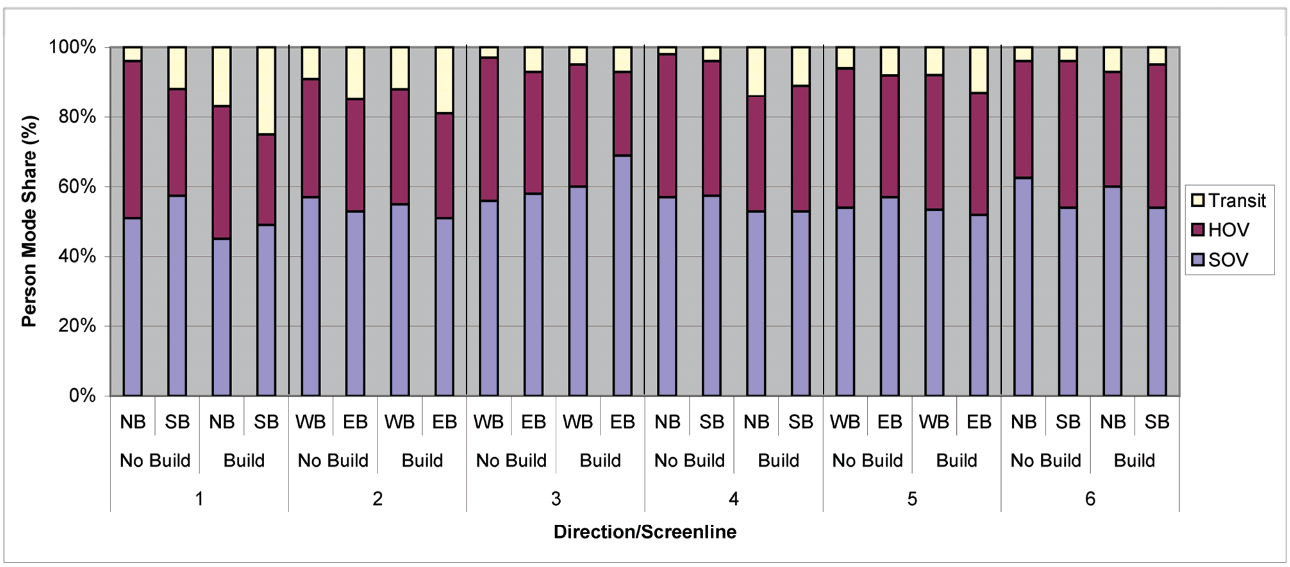


EXHIBIT 3-3
2030 PM Peak-Hour Person Mode Share at Screenlines

3.3.3.1 Screenline 1 – City of Seattle

In the 2020 and 2030 no-build conditions, the mode share among single-occupant vehicle, HOV, and transit users across Screenline 1 would generally stay constant. Heading south from downtown Seattle, the v/c ratios in the no-build condition were near 0.90, indicating congested conditions. In the 2020 and 2030 build conditions, the mode share would change, with transit usage more than doubling. With a shift to transit, a slight improvement to the screenline v/c ratios is predicted in the build condition. This increase in transit share is due to the addition of light rail service and modifications in transit service across this screenline.

3.3.3.2 Screenline 2 – Lake Washington (Includes I-90 and SR 520)

In the future no-build and build conditions, the westbound and eastbound v/c ratios crossing Screenline 2 would remain similar to existing conditions because they are near 1.0 and indicate highly congested conditions. By 2030, improvements to the SR 520 bridge are assumed; therefore, the v/c ratios would slightly improve from 2020 conditions but would remain at or over 0.90. With the build condition, the v/c ratio in the peak directions (eastbound in the afternoon and westbound in the morning) are expected to increase slightly because vehicle access to the reversible center roadway would be prohibited, but overall conditions on I-90 would improve with the project. Additionally, increased transit use with the project would increase person throughput and provide increased capacity for future growth (Section 5.3.3). In the westbound direction, the v/c ratio is expected to improve with the build condition because providing light rail would shift the modes across the lake to a higher transit emphasis and thus reduce congestion. By year 2030, almost a 10 percent reduction in v/c ratio is forecast in this direction in the build condition.

The travel modes across Screenline 2 would shift among single-occupant vehicles, HOV, and transit in the future. The percentage of single-occupant vehicle users in both westbound and eastbound directions would slightly decrease in the future no-build conditions as congestion worsens and people choose alternative modes, such as HOV and transit. In both the 2020 and 2030 build conditions, both single-occupant vehicle and HOV usage would decrease as people choose to use transit. Providing light rail across Lake Washington would increase the transit usage in 2030 by up to 33 percent, suggesting a substantial shift from auto to transit.

Although not shown in the 2030 build condition mode share statistics, there is an expectation for HOVs to slightly shift from I-90 to SR 520 due to the available HOV capacity on each facility. Part of the reason for this HOV shift from I-90 to SR 520, for the purposes of project analysis, is based on the WSDOT and Mercer Island Access Plan, which allows joint use by Mercer Island traffic and HOV users in the I-90 HOV lanes between Seattle and Island Crest Way. According to the letter (provided in Appendix G) from WSDOT to the City of Mercer Island dated December 22, 2006, "The Governor's Office and the Washington State Department of Transportation intend to honor our understanding of the agreement reached by the signatories regarding Mercer Island access to HOV lanes. We have concluded that when the center roadway is converted to high-capacity transit, Mercer Island residents should be permitted HOV lane access until the HOV lanes are converted to high occupancy toll (HOT) lanes or another tolling regimen." Nevertheless, overall volumes on SR 520 are expected to remain similar to the no-build condition.

3.3.3.3 Screenline 3 – Interstate 90 (at Mercer Slough)

In the future no-build condition across this screenline, v/c ratios would increase slightly in the eastbound direction and stay relatively similar in the westbound direction compared to existing conditions. In the build condition, v/c ratios would decrease (to under 0.60) in both directions, indicating that levels of congestion would improve. The overall slight decrease in the v/c ratio across Screenline 3 could be attributed to the slight shift in travel patterns associated with the East Link Project at this location.

Mode shift patterns indicate that in the future no-build condition, single-occupant vehicle usage would decrease and HOV and transit usage would increase similar to screenline 2. In the year 2030 no-build condition, the HOV mode share would still be higher than the existing conditions but less than what is projected in 2020 because additional HOV capacity is assumed on SR 520 in year 2030 and drivers will adjust to this change. In the build condition, the HOV share would continue to decline because the I-90 HOV lanes would be jointly used by HOV and Mercer Island traffic between Seattle and Mercer Island (refer to Screenline 2). The transit mode share would stay relatively similar between the no-build and build conditions, because East Link would not cross I-90 east of Bellevue Way.

3.3.3.4 Screenline 4 – South Bellevue

Existing v/c ratios on Bellevue Way and I-405 exceed 0.95 in both directions, indicating that vehicle demand is near or above the roadway capacities. In the 2020 and 2030 no-build conditions, v/c ratios would slightly improve in both directions as the I-405 program provides additional capacity through this corridor. Even with these improvements, the v/c ratio across this screenline is expected to be near or at 0.95. This indicates that travel into and out of this key Eastside urban center, Downtown Bellevue, would remain constrained and vehicle mobility and access would continue to be hindered. By 2030, the v/c ratios in the build condition would decrease but still operate with a minimum v/c ratio of 0.88 in both directions. This suggests that high levels of vehicular congestion would still occur, but at a lower v/c ratio resulting from a mode shift from auto to light rail.

The mode share for the northbound and southbound directions is expected to remain similar in existing and future no-build conditions. In the build condition, however, the transit mode share would substantially increase as people's travel patterns adjust to use light rail into and out of Bellevue and the Eastside. Overall, by 2030 the transit share of total trips is expected to reach close to 15 percent with the project. This is an increase of over 300 percent from the 2 to 4 percent transit share in the 2030 no-build condition. This increase in transit share is due to the addition of light rail service across this screenline. For a discussion of cross-lake transit mode share, refer to the Screenline 2 (Lake Washington) discussion (Section 3.3.3.2).

3.3.3.5 Screenline 5 – Bellevue-Redmond (Bel-Red)

The v/c ratios in the no-build condition are expected to increase and further constrain vehicle travel in the future. By year 2030, v/c ratios are expected to reach up to 0.82. In the build condition, v/c ratios would slightly decrease in the westbound direction as people use light rail. The v/c ratios in the eastbound direction would remain similar between the no-build and build conditions.

In the year 2020 and 2030 no-build conditions, the mode share percentages would remain similar to the existing conditions, with approximately 50 to 60 percent single-occupant vehicle users and 35 to 40 percent HOV users. Transit users would account for between 6 and 8 percent in either direction. In the build condition, transit use is expected to increase by over 60 percent (up to a 13 percent mode share) in the eastbound direction and by about 33 percent (to an 8 percent mode share) in the westbound direction as people shift to light rail in lieu of an automobile. This is expected to decrease single-occupant vehicle usage to between 50 and 55 percent by 2030.

3.3.3.6 Screenline 6 – Redmond (Grasslawn)

Compared to existing conditions, the future no-build v/c ratios across Screenline 6 are expected to remain similar in the northbound direction (approximately 0.70 by 2030) and increase to over 0.50 in the southbound direction. In the build condition, v/c ratios would remain similar to the no-build ratios in both the northbound and southbound directions for both the 2020 and 2030 years.

The 2020 and 2030 no-build condition mode share is expected to have slightly less emphasis on the single-occupant vehicle compared to the existing conditions and show a slight increase in HOV usage. Transit would continue to account for less than 5 percent in both directions along the corridor. In the build condition, transit usage is expected to increase between 25 and 75 percent (5 to 7 percent mode share) by 2030. This is expected to further reduce dependence on vehicle travel and reduce the single-occupant vehicle mode share from the no-build condition.

3.4 Potential Mitigation

No mitigation to regional travel would be required because, overall, highways and arterials would not experience adverse changes in operations. The v/c ratios and mode share would remain similar or improve with the East Link Project. For specific mitigation along I-90, refer to Section 5.0.

4.0 Transit

4.1 Section Overview

This section describes the existing and no-build condition regional transit facilities, operations, and services within the study area and the East Link Project impacts on transit facilities and services.

The ridership forecasts show that by year 2030, between 42,500 and 48,000 riders would use East Link each day, and up to 10,000 new daily transit riders would benefit from light rail being provided along the East Link corridor. Transit usage across Lake Washington would increase by as much as 33 percent. Direct connections would be created between Northgate, the University District, Mercer Island, South Bellevue, Bel-Red, Overlake, and Downtown Redmond areas. In addition, light rail to the Eastside would substantially improve transit service reliability. It is expected that bus reliability in the future would continue to operate at failing levels without the project, with most transit routes operating at a reliability of LOS E or F. Data from similar light rail services in North America suggest that the reliability of light rail would be LOS A. The frequency of transit throughout the day would also improve because light rail would operate with headways of 15 minutes or less, compared to bus headways of 30 minute or longer expected in the future during off-peak hours without the project. Light rail would also serve more hours of the day with expanded service coverage of 20 hours, which is a substantial improvement over bus services that are constrained by specific schedules.

Without the project, bus transit would continue to be an unreliable travel choice in the study area—for instance, across Lake Washington between Seattle and Bellevue and in Downtown Bellevue and Redmond—because bus service would be slowed by heavily congested traffic on roadways. Between Downtown Seattle and Downtown Bellevue bus speeds are predicted to decrease by up to 30 percent by year 2030, even with improvements to I-90 because improvements to the roadways connecting I-90 to these urban centers, especially to and from Bellevue, are not planned. Bus reliability would continue to operate poorly as scheduled headways are not met. The poor reliability of bus service would not benefit transit ridership and would not provide an attractive transportation choice for the region.

4.2 Affected Environment

Within the study area, transit services are provided by King County Metro, Sound Transit, and Community Transit. Regional express buses and local buses provide service to several transit centers and park-and-ride facilities. The frequency and number of bus routes in service increase during the peak periods, primarily in the peak direction of travel.

4.2.1 Regional Transit Facilities, Operations, and Services

The major transfer points within the study area are transit centers and park-and-ride facilities. King County Metro, Sound Transit, and Community Transit provide service to these facilities. There are four transit centers along the project corridor. The largest are the International District/Chinatown Station, Bellevue Transit Center, and the Overlake Transit Center; the transit center in Downtown Redmond is smaller. Within the study area, there are park-and-ride facilities in all project segments except Segment C. Table 4-1 lists the existing transit facilities in the study area. In addition to bus service, private shuttles in Downtown Bellevue and Overlake provide service between the transit centers and various commercial destinations.

Sound Transit Regional Express buses provide most regional transit service to commuters in the study area. King County Metro provides express and local service throughout King County and most of the local service within the study area. Community Transit provides service between Snohomish County and King County, and has one express bus route, CT 441, within the study area. Sound Transit and King County Metro bus services that cross Lake Washington and connect Downtown Seattle to Downtown Bellevue, Overlake, and Downtown Redmond currently serve over 13,000 daily transit riders (King County Metro, 2008a).

In the study area, King County Metro provides fixed-route local and express buses. It also provides American Disability Act (ADA) Paratransit, dial-a-ride, vanpool, ride matching, and park-and-ride services. During peak periods, the average headway for King County Metro buses is about 30 minutes. Metro has implemented its Six-Year Transit Plan (2002-2007) as an effort to continue to improve service between residential areas and transit hubs and activity centers. This plan was last updated in fall of 2004. Metro's first 6-year plan, spanning the years 1996-2001, was the catalyst for a major redesign of King County's Metro Transit system.

Within the study area, Sound Transit has Regional Express buses with approximate average headways of 30 minutes. A few Sound Transit routes (such as ST 550) have more frequent headways of about 10 to 15 minutes. In Downtown Seattle, the project study area overlaps with other Sound Transit rail services, including the Sounder Commuter Rail and the Central Link light rail system (currently under construction). The International District/Chinatown Station, a future Central Link station, also provides a connection to Sounder and Amtrak services at the nearby King Street Station. Central Link light rail (opening 2009) will initially offer light rail service from Downtown Seattle to the Seattle-Tacoma International Airport (Sea-Tac Airport). Headways for the light rail lines are anticipated to be 6 minutes in each direction for the peak period. Sounder Commuter Rail operates during the peak periods, running trains from Tacoma and Everett. The Seattle to Tacoma Sounder Commuter Rail has five peak direction trains and one reverse-peak direction train for both peak periods. The Seattle to Everett Sounder Commuter Rail has three peak direction trains.

In general, during the peak periods, the number of buses and routes in the peak direction are greater than the number of buses running in the opposite "reverse-peak" direction. Midday, off-peak, and weekend transit service is limited, and many of the routes in the study area do not operate as often during these times. Available routes during these times operate with less frequent headways, generally about 1 hour. Existing bus routes provided within the study area are listed in Table 4-2.

TABLE 4-1
Existing Transit Facilities in Study Area

Transit Facility	Type of Facility	Rider Amenities	Served by Routes[a]	Park-and-Ride Stalls
International District/ Chinatown Station	Station	Bike Racks	KCM 41, 71, 72, 73, 74X, 101, 106, 150, 174, 194, 212, 217, 225, 229, 255, 256, 301 ST 550	none
Bellevue Transit Center	Transit Center Station	Bike Racks, Rider Services Building	KCM 220, 222, 230, 232, 233, 234, 237, 240, 243, 249, 253, 261, 271, 280, 342, 630, 885, 886, 921 ST 532, 535, 550, 555, 556, 560, 564, 565	none
South Bellevue Park-and-Ride Lot	Park-and-Ride Facility	Bike Racks	KCM 222, 240, 942 ST 550, 560	519
Wilburton Park-and-Ride Lot	Park-and-Ride Facility	Bike Racks	KCM 167, 243, 280, 342, 885, 921, 952 ST 560	186
Mercer Island Park-and-Ride Lot	Park-and-Ride Facility	Bike Lockers and Racks	KCM 201, 202, 203, 204, 205, 213, 216, 942 ST 550, 554	447
Bear Creek Park-and-Ride Lot	Park-and-Ride Facility	Bike Lockers	KCM 216, 233, 251, 253, 266, 268, 269, 922 ST 540, 545	283
Overlake Village Park-and-Ride Lot	Park-and-Ride Facility	Bike Racks	KCM 222, 242, 247, 249, 250, 253, 261, 269 CT 441	203
Overlake Transit Center	Transit Center Station, Park-and-Ride Facility	Bike Lockers and Racks, Bicycle Service Center, Customer Service Office	KCM 222, 225, 229, 230, 232, 233, 245, 247, 256, 268, 269, 644 CT 441 ST 545, 564, 565	170
Redmond Transit Center	Transit Center Station, Park-and-Ride Facility	Bike Lockers and Racks	KCM 220, 249, 250, 251, 253, 254, 265, 266, 291, 922, 929 ST 540, 545	377

Note: Transit routes and park-and-ride stalls listed as of spring 2007, except the Mercer Island Park-and-Ride Lot, which was inventoried in February 2008 (King County Metro, 2008b).

[a] ST = Sound Transit, KCM = King County Metro, CT = Community Transit

TABLE 4-2
Existing Transit Routes Evaluated in Study Area

Route	Stop Locations in Study Area	Service Area	Schedule (with headways)
KCM 111	I-90	Downtown Seattle, I-90 and Rainier, Newport Hills P&R, Kennydale, Renton Highlands P&R, Renton Highlands, Maplewood Heights, Lake Kathleen	Weekdays (5:15 a.m. to 7:30 a.m., 3:30 p.m. to 6:00 p.m.) every 30 minutes
KCM 114	I-90	Downtown Seattle, I-90 & Rainier, Newport Hills P&R, Kennydale, Renton Highlands P&R, Renton Highlands, Maplewood Heights, Lake Kathleen	Weekdays (5:30 a.m. to 7:45 p.m., 4:00 p.m. to 5:30 p.m.) every 30 minutes
KCM 202	North Mercer Island	Downtown Seattle, North Mercer Island, South Mercer Island	Weekdays (6:15 a.m. to 8:30 a.m., 3:00 p.m. to 7:30 p.m.) every 15 to 30 minutes
KCM 205	North Mercer Island	University District, Montlake, First Hill Seattle, North Mercer Island, South Mercer Island	Weekdays (6:30 a.m. to 8:30 a.m., 1:30 p.m. to 5:30 p.m.) every 60 minutes
KCM 210	I-90	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate, Issaquah Transfer Point	Weekdays (6:00 a.m. to 7:30 a.m., 3:30 p.m. to 5:30 p.m.) every 20 to 30 minutes
KCM 212	I-90, Overlake	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate I-90 Freeway Station, Eastgate P&R	Weekdays (6:30 a.m. to 9:30 a.m., 3:30 p.m. to 7:15 p.m.) every 10 minutes
KCM 214	I-90	Downtown Seattle, I-90 & Rainier, Issaquah Transfer Point, Issaquah, Preston, Fall City, Snoqualmie Falls, Snoqualmie, North Bend, Factory Stores of North Bend	Weekdays (4:45 a.m. to 7:30 a.m., 3:30 p.m. to 6:30 p.m.) every 15 to 30 minutes
KCM 216	I-90, North Mercer Island, Redmond	Downtown Seattle, I-90 & Rainier, North Mercer Island, Pine Lake, South Sammamish P&R, Redmond, Bear Creek P&R	Weekdays (5:45 a.m. to 8:15 a.m., 3:30 p.m. to 8:00 p.m.) every 30 minutes
KCM 217	I-90	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate P&R, Eastgate, North Issaquah	Weekdays (6:45 a.m. to 7:45 a.m., 4:45 p.m. to 5:45 p.m.) every 30 minutes
KCM 218	I-90	Issaquah Highlands P&R, Eastgate I-90 Freeway Station, I-90 & Rainier, Downtown Seattle	Weekdays (6:00 a.m. to 9:00 a.m., 3:30 p.m. to 6:45 p.m.) every 20 minutes
KCM 220	Bellevue, Redmond	Redmond P&R, Redmond Town Centre, Rose Hill, South Kirkland P&R, Bellevue	Weekdays (6:30 a.m. to 5:45 p.m.) every 30 to 60 minutes
KCM 225	I-90, Overlake	Downtown Seattle, I-90 & Rainier, Eastgate I-90 Freeway Station, Eastgate P&R, Phantom Lake, Overlake, Overlake Transit Center	Weekdays (5:30 a.m. to 6:00 a.m., 3:45 p.m. to 5:00 p.m.) every 30 minutes
KCM 229	I-90, Overlake	Overlake Transit Center, Overlake, Crossroads, Phantom Lake, Eastgate P&R, Eastgate I-90 Freeway Station, I-90 & Rainier, Downtown Seattle	Weekdays (6:00 a.m. to 7:45 a.m., 4:00 p.m. to 6:00 p.m.) every 30 to 60 minutes
KCM 230	Bellevue, Overlake, Redmond	Kingsgate P&R, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd, South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR 520, Redmond	Weekdays (4:30 a.m. to 11:45 p.m.) every 30 minutes Saturday (5:30 a.m. to 11:30 p.m.) every 30 minutes Sunday (6:30 a.m. to 11:30 p.m.) every 60 minutes
KCM 232	Bellevue, Overlake, Redmond	Duvall, Cottage Lake, English Hill, Redmond, SR 520, I-405, Overlake, Bellevue, Bellevue Transit Center	Weekdays (5:30 a.m. to 8:00 a.m., 4:15 p.m. to 6:30 p.m.) every 20 minutes
KCM 233	Bellevue, Overlake, Redmond	Avondale Rd NE & Avondale Pl NE, Bear Creek P&R, 148th Ave NE, 156th Ave NE, Microsoft, Overlake, Bell-Red Rd, Bellevue Transit Center	Weekdays (6:00 a.m. to 7:30 p.m.) every 30 minutes Saturday (8:00 a.m. to 6:00 p.m.) every 60 minutes

TABLE 4-2
Existing Transit Routes Evaluated in Study Area

Route	Stop Locations in Study Area	Service Area	Schedule (with headways)
KCM 249	Bellevue, Overlake	Redmond P&R, West Lake Sammamish Pkwy, Sammamish Viewpoint Park, Overlake, Overlake P&R, NE 20th St, 116th Ave NE, Bellevue Transit Center	Weekdays (6:15 a.m. to 6:45 p.m.) every 30 minutes Saturday (7:15 a.m. to 7:15 p.m.) every 60 minutes
KCM 253	Bellevue, Overlake	Bear Creek P&R, Redmond P&R, Redmond Civic Center, 148th Ave NE, Overlake, Overlake P&R, Crossroads, Bellevue Transit Center	Weekdays (5:15 a.m. to 11:00 p.m.) every 30 minutes Saturday (6:00 a.m. to 11:00 p.m.) every 30 minutes Sunday (8:00 a.m. to 11:00 p.m.) every 60 minutes
KCM 268	Overlake, Redmond	Downtown Seattle, Montlake, SR 520 Stops, Overlake Transit Center, Bear Creek P&R, 185th Ave NE & Redmond-Fall City Rd	Weekdays (6:00 a.m. to 7:30 a.m., 3:30 p.m. to 5:45 p.m.) every 30 minutes
KCM 269	Overlake, Redmond	Issaquah Transfer Point, Issaquah Highlands P&R, Issaquah-Pine Lake Rd, South Sammamish P&R, 228th Ave NE, Sahalee Way NE, Redmond-Fall City Rd, Bear Creek P&R, Overlake, Overlake P&R	Weekdays (6:00 a.m. to 8:45 a.m., 4:45 p.m. to 7:30 p.m.) every 30 to 60 minutes
KCM 271	Bellevue	Issaquah, Issaquah Transfer Point, Eastgate, Eastgate P&R, Bellevue Community College, Bellevue Transit Center, Medina, University District	Weekdays (5:15 a.m. to 10:15 p.m.) every 20 to 30 minutes Saturday (6:30 a.m. to 10:15 p.m.) every 30 minutes Sunday (7:30 a.m. to 10:15 p.m.) every 60 minutes
ST 545	Bellevue, Overlake, Redmond	Bear Creek P&R, Redmond P&R, Redmond City Hall, Downtown Seattle	Weekdays (5:00 a.m. to 12:00 p.m.) every 10 to 30 minutes Weekends (6:15 a.m. to 11:30 p.m.) every 30 minutes
ST 550	Bellevue, South Bellevue, North Mercer Island, I-90	Bellevue Square, Bellevue Transit Center, South Bellevue P&R, North Mercer Island, I-90 & Rainier, Downtown Seattle	Weekdays (4:45 a.m. to 11:45 p.m.) every 15 minutes Weekends (6:00 a.m. to 11:45 p.m.) every 30 minutes
ST 554	North Mercer Island, I-90	South Sammamish P&R, Issaquah Highlands P&R, Downtown Issaquah, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Eastgate I-90 Freeway Station, North Mercer Island, I-90 & Rainier, Downtown Seattle	Weekdays (4:30 a.m. to 11:30 p.m.) every 30 minutes Weekends (6:00 a.m. to 11:30 p.m.) every 30 minutes
ST 555	Bellevue	Issaquah Highlands P&R, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Factoria, Bellevue Transit Center, SR 520 Freeway Stations, Northgate Transit Center	Weekdays (5:45 a.m. to 8:00 a.m., 3:30 p.m. to 6:00 p.m.) every 30 minutes
ST 556	Bellevue	Issaquah Highlands P&R, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Bellevue Transit Center, SR 520 Freeway Stations, University District, Northgate Transit Center	Weekdays (5:30 a.m. to 8:00 a.m., 3:15 p.m. to 6:00 p.m.) every 30 minutes
ST 564	Bellevue, Overlake	South Hill Mall Transit Center, South Hill P&R, Sumner Station, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Weekdays (4:45 a.m. to 7:30 p.m.) every 30 minutes
ST 565	Bellevue, Overlake	Federal Way Transit Center, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Weekdays (4:45 a.m. to 9:45 p.m.) every 30 minutes

Note: Transit routes from spring 2007 schedules obtained from King County Metro and Sound Transit web sites: http://www.kingcounty.gov and http://www.soundtransit.org. (King County Metro, 2007b; Sound Transit, 2007a).

ST = Sound Transit, KCM = King County Metro, P&R = park and ride

4.2.2 Methodology and Analysis for Transit Operations and Level of Service

The six screenlines described in Section 3.2, in addition to the service areas served by the project and key transit hubs within the study boundaries, were used to measure transit (bus and light rail) LOS performance in the study area. Although there are numerous other transit routes that cross these screenlines or serve these transit hubs or areas, the bus routes that were selected for evaluation are those most likely to have their ridership influenced by the East Link Project. The analysis of project alternatives includes both light rail and bus service on the Eastside, whereas the No Build Alternative includes only bus service on the Eastside. Existing and future regional and local transit services were evaluated based on the following categories:

- Service coverage and circulation
- Service frequency LOS
- Hours of service LOS
- Passenger load LOS
- Reliability of service LOS (on-time performance and headway adherence)
- Transit travel times
- Transfers
- Light rail ridership

The transit LOS performance levels were analyzed using the methodology defined by the *Transit Capacity and Quality of Service Manual* (TCQSM) and Transit Cooperative Research Program (TRCP) Report 100 (Transit Research Board, 2003). The Transportation Methods and Assumptions Report in Appendix A of this Transportation Technical Report provides a detailed discussion of the transit LOS transit methodology.

Transit LOS measures were analyzed for the PM peak hour (5:00 to 6:00 p.m.) to describe transit performance during the period when traffic congestion and transit ridership are the highest. For transit LOS performance, LOS A indicates more frequent service, more hours served during the day, high reliability, and minimal passenger crowding in a transit vehicle. LOS F indicates infrequent service, minimal hours served during the day, low reliability, and passenger crowding in a transit vehicle. The coverage area is defined as the area(s) for which transit provides service. Circulation is defined as the route(s) on which transit operates. Appendix B of this report provides the TCQSM descriptions of each of the transit LOS levels, their ranges, and their grade descriptions. The existing and future transit LOS values for each of the LOS measures are provided in Appendix C, Tables C-3, C-4, C-5, and C-6. The individual components of transit LOS performance are defined as follows:

- **Service frequency LOS** is the number of times within the PM peak hour that a bus or light rail train stops at a specific location. Generally, the shorter the headway between buses for a transit route, the less time a rider has to wait between bus arrivals, the better the service frequency LOS. Bus routes that have headways of less than 10 minutes are considered LOS A, whereas headways higher than 60 minutes are LOS F. Within the evaluated service areas, several routes do not offer service in the reverse peak direction during the PM peak hour. These routes were not included in calculating service frequency.

- The **hours of service LOS** measures the total transit operating hours provided within a 24-hour (daily) period. Hours of service LOS is intended to measure the availability of transit service to riders and potential users. The longer that transit service is provided throughout the day, the better the LOS. From a bus rider's perspective, all individual bus routes that serve two areas can sometimes be perceived as a single service between these two areas.

  Transit performance between service areas was evaluated for service frequency LOS and hours of service LOS. To reflect these connections, pairs of specific areas served by East Link were evaluated. These areas evaluated are Northgate, University District, Downtown Seattle, Mercer Island, South Bellevue, Downtown Bellevue, Bel-Red, Overlake, and Downtown Redmond.

- The **passenger load LOS** is intended to measure passenger comfort and the ability of a rider to find a seat during the on-board portion of the trip during the PM peak hour. Passenger load LOS also measures crowding in the transit vehicle. For buses, passenger load LOS is defined by the number of passengers per seat. For light rail, passenger load LOS is a measurement of square footage available for standing per standing passenger. Passenger load LOS A indicates that riders are able to spread out on the vehicle along with the potential to use empty seats for storing parcels and/or bags instead of carrying them on their laps. A passenger load LOS at or worse than LOS D may reflect overcrowding, and the transit service provider may need to increase service frequency. In addition, a large number of passengers can cause the bus to wait longer at stops (i.e., dwell time) as a result of crowded passenger boarding and alighting. The longer dwell time can negatively affect travel time and service reliability. Table 4-3 lists the existing transit routes evaluated for the passenger load LOS at each of the screenlines. Passenger load LOS was calculated at each screenline by averaging the total number of passengers per seat or square feet per standing passenger on transit routes within the PM peak hour.

- **Reliability of service LOS** was analyzed at major transit hubs within the East Link project vicinity. The reliability LOS measures the degree to which a transit vehicle meets or misses its scheduled headway at its arrival station. This includes not only a transit vehicle arriving late, but also a transit vehicle leaving early from a stop. A bus leaving early would mean that some transit users would miss their bus. Two methods were used to determine transit reliability. For transit routes with scheduled headways greater than 10 minutes, on-time reliability was analyzed in terms of on-time performance, defined as being 0 to 5 minutes late. For transit routes operating at scheduled headways of 10 minutes or less, headway adherence (calculated as the coefficient of variation) was used to determine reliability. Headway adherence reliability was calculated using the TCQSM methodology, which compares the standard deviation of actual headways to scheduled headways of transit routes at major transit centers and park-and-ride lots associated with the study area. On-time performance reliability was calculated using weekday automatic vehicle location (AVL) data collected by King County Metro for the selected transit hubs during spring 2007. It was assumed that in the future 2020 and 2030 conditions both Metro and Sound Transit would adjust their bus services according to the demand and congestion levels to maintain existing reliability, although unforeseen conditions may limit what is implemented. The following major transit hubs were used to evaluate service reliability:
  - International District /Chinatown Station
  - Mercer Island Park-and-Ride Lot
  - Bellevue Transit Center
  - Overlake Transit Center
  - Redmond Transit Center

4.2.3 Level of Service for Service Frequency

In the existing condition, the bus routes between the Bel-Red area and Downtown Bellevue, Overlake, and Downtown Redmond operate at average headways between 10 to 15 minutes (LOS C or better). Service frequency between Overlake and Downtown Redmond operates similarly. Downtown Seattle to Downtown Bellevue and the Downtown Seattle to Downtown Redmond connections have a service frequency of LOS B or better. In general, most direct bus service connecting to Downtown Bellevue operates at headways that average more than 10 minutes (LOS B). However, services between Downtown Bellevue and Northgate and the University District operate at average headways of 30 minutes or less (LOS D). Only one route within the study area provides service between the University District and Mercer Island areas, and service frequency between these areas operates at headways that average over an hour (LOS F). Direct bus service between many of the service areas is not provided. Direct service between Bel-Red, Overlake, and Downtown Redmond with Northgate and the University District areas does not exist. In addition, there is no direct service between Mercer Island and South Bellevue with the Bel-Red Overlake and Downtown Redmond areas. Exhibit 4-1 shows the service frequency LOS for existing conditions between areas connected by the bus routes evaluated in the East Link transit analysis.

4.2.4 Level of Service for Hours of Service

Under existing conditions, service between Downtown Bellevue and each of the following areas operates an average of 17 hours to 20 hours during the day (LOS B or better): the University District, Downtown Seattle, Mercer Island, South Bellevue, Overlake, and Downtown Redmond. Service between Downtown Seattle and Downtown Bellevue, as well as between Downtown Seattle and Downtown Redmond, operates over 19 hours during the day (LOS A). Service between the University District and Mercer Island areas and between the Northgate and Downtown Bellevue areas operates at an average of 3 hours (LOS F) and approximately 7 hours (LOS E), respectively. Most bus routes between these areas operate in peak periods, resulting in a poor hours of service LOS. Service between the Bel-Red area and the Overlake and Downtown Redmond areas operate similarly (LOS D) because most routes that serve these areas operate during peak periods. Bel-Red, Overlake, and Downtown Redmond do not have direct service to Northgate and the University District. In addition, there is no direct service between the Mercer Island area and the South Bellevue area with the Bel-Red, Overlake, and Downtown Redmond areas. Exhibit 4-2 shows the hours of service LOS for existing conditions between areas connected by the bus routes evaluated in the East Link Project transit analysis.

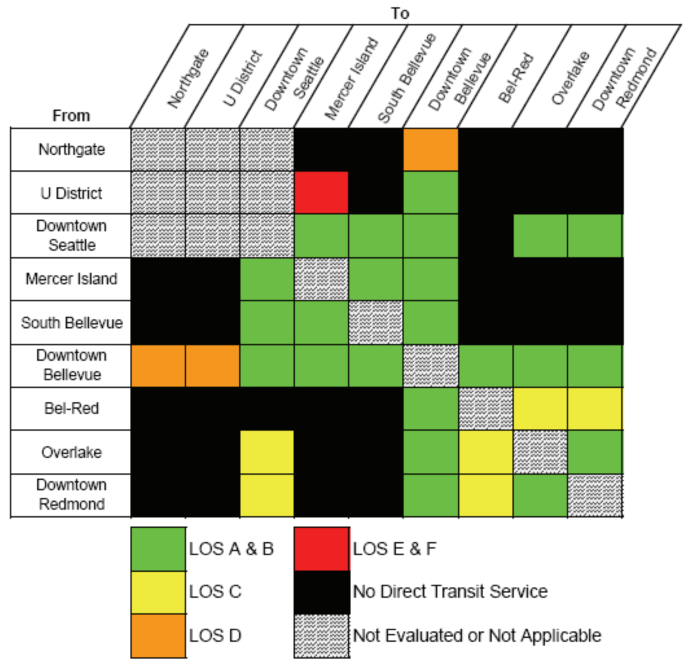


Exhibit 4-1
Existing PM Peak-Hour Service Frequency LOS

4.2.5 Level of Service for Passenger Load

Passenger load LOS A was calculated for all screenlines within the corridor, which indicates that passenger crowding and comfort does not affect delayed dwell times in terms of travel time and service frequency. Transit vehicles on Screenlines 5 (Bel-Red) and 6 (Redmond) are the least crowded, allowing passengers to stow parcels and bags in vacant seats and flexibility for passengers to sit anywhere they choose on the vehicle. Screenlines 1 (Seattle) and 2 (Lake Washington) have the highest passenger load, about 0.50 passengers per seat, at which passengers can still choose where to sit. Although Screenline 2 overall operates at LOS A for passenger loads, there are over 0.60 passengers per seat on the Seattle to Bellevue service, which operates at LOS B. Table 4-4 summarizes the existing PM peak hour passenger load LOS associated with the study area screenlines.

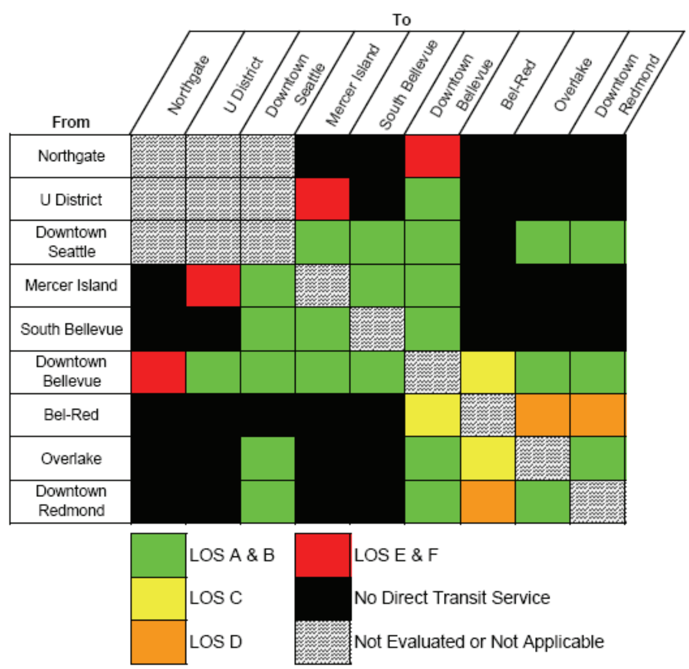


Exhibit 4-2
Existing Hours of Service LOS

4.2.6 Level of Service for On-Time Performance and Reliability

Most transit routes at the International District/Chinatown Station, Mercer Island Park-and-Ride Lot, Bellevue Transit Center, Overlake Transit Center, and Redmond Transit Center operate at LOS E or F. None of the bus routes at the International District/Chinatown and Mercer Island stations have a reliability LOS better than LOS E. Only three routes at the Bellevue Transit Center operate better than LOS E; one of the bus routes with a LOS better than LOS E is Sound Transit Regional Express Route 550 (ST 550), in the westbound direction. In the westbound direction, ST 550 starts its route at the Bellevue Transit Center; therefore, it is expected to have an acceptable reliability because it has not yet experienced any delays or congestion in this area. Following this route into Seattle along I-90, the ST 550 on-time performance at Mercer Island is only at 50 percent, corresponding to LOS F. Once ST 550 reaches the International District/Chinatown Station, its on-time performance even further degrades, to 30 percent and a continued LOS F reliability. This route is a good example of how roadway congestion impedes transit and restricts it from providing a reliable service to the region. Table 4-5 lists the reliability LOS calculated for selected stations in the project corridor in the PM peak hour.

TABLE 4-3
Existing Transit Routes Evaluated (for Passenger Load LOS only) at Screenlines

Screenline 1 (City of Seattle)		Screenline 2 (Lake Washington)		Screenline 3 (I-90)		Screenline 4 (South Bellevue)		Screenline 5 (Bel-Red)		Screenline 6 (Redmond)	
Route[a]	Location	Route[a]	Location	Route[a]	Location	Route[a]	Location	Route[a]	Location	Route[a]	Location
KCM 111	I-90 D2 Roadway	KCM 111	I-90	KCM 111	I-90	ST 550	Bellevue Way SE	KCM 220	NE 20th St at 140th Ave	KCM 220	140th Ave NE at 61st St
KCM 114	I-90 D2 Roadway	KCM 114	I-90	KCM 114	I-90	ST 564	I-405	KCM 230	NE 8th St at 140th Ave	KCM 230	SR 520 at 61st St
KCM 202	4th Avenue South	KCM 202	I-90	KCM 210	I-90	ST 565	I-405	KCM 232	SR 520 at 140th Ave	KCM 232	SR 520 at 61st St
KCM 210	I-90 D2 Roadway	KCM 205	I-90	KCM 212	I-90			KCM 233	Bel-Red Rd at 140th Ave	KCM 233	SR 520 at 61st St
KCM 212	I-90 D2 Roadway	KCM 210	I-90	KCM 214	I-90			KCM 249	NE 20th St at 140th Ave	KCM 249	Lake Sammamish Pkwy
KCM 214	I-90 D2 Roadway	KCM 212	I-90	KCM 216	I-90			KCM 253	NE 8th St at 140th Ave	KCM 253	148th Ave NE at 61st St
KCM 216	I-90 D2 Roadway	KCM 214	I-90	KCM 217	I-90			KCM 268	SR 520 at 140th Ave	KCM 268	SR 520 at 61st St
KCM 217	I-90 D2 Roadway	KCM 216	I-90	KCM 218	I-90			ST 545	SR 520 at 140th Ave	KCM 269	SR 520 at 61st St
KCM 218	I-90 D2 Roadway	KCM 217	I-90	KCM 225	I-90			ST 564	SR 520 at 140th Ave	ST 545	SR 520 at 61st St
KCM 225	I-90 D2 Roadway	KCM 218	I-90	KCM 229	I-90			ST 565	SR 520 at 140th Ave		
KCM 229	I-90 D2 Roadway	KCM 225	I-90	ST 554	I-90						
ST 550	I-90 D2 Roadway	KCM 229	I-90								
ST 554	I-90 D2 Roadway	ST 550	I-90								
		ST 554	I-90								
		KCM 268	SR 520								
		KCM 271	SR 520								
		ST 545	SR 520								
		ST 555	SR 520								
		ST 556	SR 520								

[a] ST = Sound Transit, KCM = King County Metro

TABLE 4-4
Existing PM Peak-Hour Bus Passenger Loads

Screenline	Existing Routes	Direction	Average Seated Passenger/Seat	LOS
1 (City of Seattle)	11 local, 2 express	Eastbound	0.48	A
		Westbound	0.42	A
2 (Lake Washington	14 local, 5 express	Eastbound	0.50	A
		Westbound	0.50	A
3 (I-90)	10 local, 1 express	Eastbound	0.50	A
		Westbound	0.33	A
4 (South Bellevue)	0 local, 3 express	Eastbound	0.49	A
		Westbound	0.33	A
5 (Bel-Red)	7 local, 3 express	Eastbound	0.30	A
		Westbound	0.31	A
6 (Redmond)	8 local, 1 express	Eastbound	0.28	A
		Westbound	0.13	A

Source: King County Metro automatic passenger count (APC) data (Sound Transit, 2007d).

TABLE 4-5
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	% On-Time Performance	Coefficient of Variation	LOS
International District/Chinatown	KCM 210	Eastbound	25	41.7%	-	F
	KCM 212	Eastbound	8.7	-	0.56	E
	KCM 214	Eastbound	13	49.2%	-	F
	KCM 216	Eastbound	26	40.7%	-	F
	KCM 218	Eastbound	9.6	-	0.53	E
	KCM 225	Eastbound	>60	59.4%	-	F
	KCM 229	Eastbound	>60	44.8%	-	F
	ST 550	Eastbound	6.6	-	0.68	E
	ST 554	Eastbound	35	51.7%	-	F
	KCM 111	Southbound	20	66.0%	-	F
	KCM 114	Southbound	27	56.3%	-	F
	KCM 202	Southbound	30	43.1%	-	F
	KCM 212	Westbound	30	46.0%	-	F
	ST 550	Westbound	10.1	30.3%	-	F
	ST 554	Westbound	30	56.9%	-	F
Station Average[a]				48.8%	0.59	F/E

(table continues on next page)

TABLE 4-5
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	% On-Time Performance	Coefficient of Variation	LOS
Mercer Island	ST 550	Eastbound	6.5	-	1.02	F
	ST 554	Eastbound	35	52.8%	-	F
	KCM 202	Southbound	11	50.6%	-	F
	KCM 216	Southbound	33	34.0%	-	F
	KCM 202	Westbound	32	71.4%	-	F
	KCM 203	Westbound	32	36.5%	-	F
	ST 550	Westbound	10.2	50.0%	-	F
	ST 554	Westbound	30	70.0%	-	F
Station Average				52.2%	1.02	F/F
Bellevue Transit Center	KCM 233	Eastbound	30	91.0%	-	B
	KCM 249	Eastbound	30	84.8%	-	D
	KCM 271	Eastbound	15	66.2%	-	F
	ST 550	Eastbound	6	-	0.68	E
	ST 556	Eastbound	37	55.9%	-	F
	ST 564	Northbound	30	39.0%	-	F
	ST 565	Northbound	60	3.3%	-	F
	ST 564	Southbound	30	39.0%	-	F
	ST 565	Southbound	30	23.8%	-	F
	KCM 233	Westbound	30	48.3%	-	F
	KCM 249	Westbound	30	41.3%	-	F
	KCM 253	Westbound	30	38.2%	-	F
	KCM 271	Westbound	22	71.0%	-	F
	ST 550	Westbound	11.25	82.4%	-	D
	ST 555	Westbound	39	71.0%	-	F
	KCM 230	N/A	14.5	59.5%	-	F
	KCM 230	N/A	30	61.8%	-	F
	KCM 232	N/A	23.5	29.3%	-	F
Station Average[a]				53.3%	0.68	F/E

(table continues on next page)

TABLE 4-5
Existing PM Peak-Hour Reliability Level of Service

Station	Route Number	Direction	Headway (minutes)	% On-Time Performance	Coefficient of Variation	LOS
Overlake Transit Center	KCM 232	Eastbound	17	35.8%	-	F
	KCM 268	Eastbound	36	34.0%	-	F
	ST 545	Eastbound	10	-	0.39	C
	KCM 230	Eastbound	29	74.6%	-	E
	ST 564	Northbound	60	21.9%	-	F
	ST 565	Northbound	60	13.3%	-	F
	ST 564	Northbound	60	47.8%	-	F
	ST 565	Northbound	60	17.4%	-	F
	KCM 245	Northbound	29	87.5%	-	C
	ST 564	Southbound	30	77.8%	-	E
	ST 565	Southbound	30	89.5%	-	C
	KCM 245	Southbound	30	84.8%	-	D
	ST 545	Westbound	10	-	0.31	C
	KCM 230	Westbound	32	75.0%	-	E
	KCM 232	Westbound	30	50.0%	-	F
	ST 545	Westbound	10	-	0.30	D
	KCM 247	N/A	31	21.5%	-	F
	KCM 225	N/A	31	46.7%	-	F
	KCM 229	N/A	36	33.3%	-	F
	KCM 256	N/A	28	95.2%	-	A
	KCM 249	N/A	22	36.6%	-	F
Station Average[a]				52.4%	0.33	F/C
Redmond Transit Center	KCM 230	N/A	31	32.3%	-	F
	KCM 232	Eastbound	20.5	26.3%	-	F
	KCM 253	Eastbound	30	40.0%	-	F
	ST 545	Eastbound	10.8	27.8%	-	F
	KCM 220	Eastbound	29	18.0%	-	F
	KCM 220	Westbound	25	100.0%	-	A
	KCM 250	N/A	44	29.2%	-	F
	KCM 253	Westbound	25	88.7%	-	C
	ST 545	Westbound	10	-	0.48	D
Station Average[a]				45.3%	0.48	F/D

[a] Station average = LOS X/Y, where X= LOS for percent on-time performance station average, Y= LOS for coefficient of variation station average.

N/A = The transit route does not provide service to one specific direction.

ST = Sound Transit, KCM = King County Metro

Source: AVL data provided by Metro in spring 2007.

Note: While the data used in this analysis was collected during the Downtown Seattle Transit Tunnel closure, data that had been collected before the tunnel closure showed LOS F.

4.3 Environmental Impacts

The East Link Project would improve transit service within the regional transportation system in terms of operations and LOS. In addition, the project would provide regional travel benefits by extending transit access and mobility in the growing eastern part of the urban Puget Sound region. Enhancing transit service between the two major business centers of the Puget Sound region—Seattle and Bellevue, Overlake, and Redmond—with light rail would improve transit usage and provide these communities with more reliable direct transit service. As described in this section, light rail would contribute to improved headways for rail and bus service, providing improved service frequency and hours of service throughout the day. East Link would also serve the peak and reverse-peak directions of travel equally. Bus routes would be tailored to feed the light rail system, closing gaps in the existing transit network. Light rail would provide shorter headways and travel times that would further improve the transit LOS for riders. In addition, light rail would increase the passenger capacity compared to bus service in similar areas.

The representative East Link route—the combination of the I-90 (A1), 112th SE Elevated (B2E), 110th NE Elevated (C8E), NE 20th (D3), and Redmond Way (E1) alternatives—was used to assess the transit LOS measures for the project because there would not be a substantial variation to these LOS results among the project alternatives.

4.3.1 Future Transit Service Coverage and Circulation

As part of the East Link Project, King County Metro and Sound Transit service planners developed a transit integration plan for both the 2020 and 2030 no-build and build conditions (Sound Transit, 2007c). The transit integration plan identified future transit routes and included changes to current bus headways and operating hours to attempt to meet future demand. Although the service plans would not be finalized until close to system operation, the draft plans provide a snapshot of how bus service would look with and without the project. Some of these plans are being implemented now through Transit Now, an initiative to expand Metro Transit service approved by King County voters in the general election in November 2006.

The future bus service frequency and coverage area would increase both with and without the East Link Project. With the project, future express and local bus routes and service would change. For example, bus routes that serve the same markets as light rail and that are far less reliable would be eliminated. Most changes would reflect travel demand patterns and regional growth. The routes with service changes in the no-build and build conditions are described in Appendix C.

For the no-build condition, several existing routes are proposed to be deleted or modified by 2020 and 2030 as part of the future transit integration plan. Bus service between Eastgate and Seattle would be improved. For example, the frequency of KCM 212, which serves Eastgate, is expected to increase; however, KCM 217, which has limited service to Eastgate, would be deleted. King County routes traveling locally on Mercer Island, then extending to Downtown Seattle, would be deleted. Routes providing service between Mercer Island and Downtown Seattle would have improved frequency. KCM 253 would be modified to travel between Redmond and Downtown Bellevue as a RapidRide route, which means that its stops would be spaced farther apart compared to other routes covering the same area. Additionally, routes would be modified and/or deleted to decrease the number of parallel routes. Even with these changes in future service, the coverage areas would stay relatively constant.

For the build condition, direct light rail service would be created between Downtown Seattle, Mercer Island, Downtown Bellevue, Overlake, and Redmond. Most bus routes that provide parallel service to the light rail service areas would be eliminated; some routes would be modified to terminate at light rail stations, and bus layover areas would be provided; other routes would continue from stations, and, therefore, the coverage area would remain constant. Several major routes that would see changes are ST 545 and 550, and 554. Specific circulation changes in transit services are described by segment in the following subsections. Community Transit service in the area would remain unaffected.

4.3.1.1 Segment A

Along I-90, between Seattle and the Bellevue Way interchange, light rail would use the reversible center roadway. Peak-direction buses would be rerouted from the reversible center roadway to the HOV lanes in the outer roadways that will be constructed as part of the I-90 Two Way Transit and HOV Operations Project. Bus access to and from Mercer Island and the Rainier Avenue transit flyer stop would be maintained in all directions with a combination of the existing ramps provided on the outer roadways and the future HOV lanes and ramps built as part of the I-90 Two Way Transit and HOV Operations Project.

In Seattle, if the D2 Roadway (the ramp connection between I-90 at Rainier Avenue and Airport Way and the 5th Avenue intersection) is not designated as joint-use for bus and light rail; bus routes that use the D2 Roadway would likely be rerouted to 4th Avenue S via SR 519. Section 5.3.3 identifies the travel times with and without join-use operations in the D2 Roadway. Also in Seattle, as evaluated in the North Link Supplemental Final EIS (Sound Transit, 2006), buses may not operate in the Downtown Seattle Transit Tunnel once light rail extends to Northgate, which is an assumption for the East Link Project in the No Build Alternative and East Link (build) alternatives in both 2020 and 2030 conditions.

Direct service between Mercer Island and the University District would not occur in the No Build Alternative because the bus route that connects these areas would be deleted per the future bus service plan. With East Link, light rail would reestablish the direct connection between these areas. Additional connections would also be created with light rail between Mercer Island and Northgate, Bel-Red, Overlake, and Downtown Redmond.

With the project, bus stops would be relocated on Mercer Island to serve Sound Transit Regional Express Route 554 (ST 554) at the Mercer Island Station. These stops would serve ST 554 when it arrives from the east and would travel in a clockwise pattern around the station and use the HOV ramps on 80th Avenue SE to access and exit I-90. Although ST 554 may be planned to continue into Seattle, the project analysis assumed ST 554 will terminate at Mercer Island. In the build condition, ST 550 would be eliminated because it would provide parallel service to light rail.

4.3.1.2 Segment B

For the BNSF Alternative (B7) at the 118th Station, some transit bus routes would be rerouted to begin and end at this station, using 118th Avenue SE. In the no-build condition, these routes would originate and end at the Wilburton Park-and-Ride Lot located on SE 8th Street. With B7, bus service would change to connect Mercer Island with the South Bellevue Park-and-Ride Lot and Downtown Bellevue. Other bus service coverage and circulation would remain similar in the no-build and build conditions. In the build condition, ST 550 would be eliminated.

The East Link project would not cause bus service to be impacted by the closure of the eastbound HOV direct-access off-ramp or westbound HOV direct-access on-ramp at Bellevue Way SE because buses that would use these ramps would be eliminated, except in Alternative B7, which would include bus service between Mercer Island and Bellevue that would be rerouted to use the general-purpose ramps at the Bellevue Way SE interchange. Section 5.3.3.2 identifies the travel times with and without the eastbound and westbound I-90 direct-access HOV ramps at the Bellevue Way interchange.

With the No Build Alternative, direct connections to South Bellevue would not change. However, with light rail, South Bellevue would be directly connected to Bel-Red, Overlake, Downtown Redmond, Northgate, and the University District.

4.3.1.3 Segment C

In the build condition, routes ST 550 and 556 would be eliminated. Other bus routes, such as ST 555 and ST 564/565, would be truncated to end at the Bellevue Transit Center to eliminate the redundancy with light rail service. In both the no build and build conditions, a Metro RapidRide route would be added to connect Downtown Bellevue, Overlake, and Redmond. With light rail, more direct connections would be established between Downtown Bellevue and all the areas served by East Link.

Under the Couplet Alternative (C4A), transit that uses 106th Avenue NE, 108th Avenue NE, and 110th Avenue NE would switch to parallel streets based on the revised direction of the one-way vehicle couplet in Downtown Bellevue. All other modifications to the future bus service that serves the Segment C area would be similar in the no-build and build conditions.

4.3.1.4 Segment D

To serve the 124th Station in the build condition, some bus routes would have modified circulation patterns that differ from the no-build condition. These routes would use 124th Avenue NE instead of 116th Avenue NE between NE Bel-Red Road and NE 20th Street. Some services between the Bellevue Transit Center and the Overlake Transit Center would be eliminated if light rail extends to the Overlake Transit Center. ST 545 would be eliminated if light rail terminates in Downtown Redmond. If light rail terminates at Overlake Village Station, some bus routes would be changed to serve that station. All other modifications to the future bus service that serves the Segment D area would be similar in the no-build and build conditions.

Without the East Link Project, there would be no direct connection between Bel-Red and Downtown Redmond because the routes connecting these areas would be deleted or modified per the bus integration plan. East Link would provide a direct connection between these areas. In addition, light rail would directly connect Bel-Red and Overlake to South Bellevue, Mercer Island, the University District, and Northgate areas. Light rail would also directly connect the Bel-Red area to Downtown Seattle.

4.3.1.5 Segment E

With East Link, the addition of the SE Redmond Station would change transit service. Some bus routes would be revised to serve the SE Redmond Station. These buses would use NE Redmond Way and NE 70th Street to access the SE Redmond Station. Some bus routes would continue using the Bear Creek Park-and-Ride Lot as they would in the no-build condition. All other modifications to the future bus service that serves the Segment E area would be similar in the no-build and build conditions.

With the No Build Alternative, there would be no direct connection between the Downtown Redmond and Bel-Red areas. With light rail, new direct transit connections would be established between Downtown Redmond and Bel-Red, South Bellevue, Mercer Island, the University District, and Northgate areas.

4.3.2 Transit Level of Service and Operations Impacts

Transit service in the future no-build and build conditions was evaluated using a methodology similar to that used for evaluating the affected environment. Transit LOS on routes in the no-build and build conditions were evaluated for the weekday PM peak hour. Determining the future LOS was based on incorporating the transit integration plan into the analysis and on the forecasted ridership. Table 4-6 lists the future transit routes at each of the six screenlines used in calculating the passenger load LOS, and the following subsections present the results for each of the measures used to evaluate transit LOS performance.

TABLE 4-6
Future No-Build and Build Transit Route Changes at Screenlines in Study Area

Service Change	Screenline 1 (Seattle)	Screenline 2 (Lake Washington)	Screenline 3 (I-90)	Screenline 4 (South Bellevue)	Screenline 5 (Bel-Red)	Screenline 6 (Redmond)
No Change at Screenline[a]	KCM 212, 214, 216, 218	KCM 212, 214, 216, 218, 271	KCM 111, 114, 210, 212, 214, 216, 218 ST 554	ST 564, 565	KCM 233, 249, 253	KCM 232, 253, 269
Routes Added to the Screenline to All Future Conditions	KCM 214.5	KCM 214.5	KCM 214.5	KCM 234		KCM 239
Routes Eliminated from the Screenline from Build Conditions Only	KCM 111, 114, 210 ST 550, 554	KCM 111, 114, 210, 268 ST 550, 554, 545, 555, 556		ST 550	KCM 232, 268 ST 545, 564, 565	KCM 268 ST 545
Routes Added to the Screenline to Build Conditions	Light Rail	Light Rail		KCM 111, 114 ST 532, 535 Light Rail	Light Rail	Light Rail
Routes Eliminated from the Screenline from All Future Conditions	KCM 202, 217, 225, 229	KCM 202, 205, 217, 225, 229	KCM 217, 225, 229		KCM 220, 230	KCM 220, 230, 233, 249

[a] East Link route crosses screenline under existing conditions.

KCM = King County Metro; ST = Sound Transit

4.3.2.1 Service Frequency Level of Service

Overall, the transit integration plans for 2020 and 2030 propose redeploying or truncating several routes to increase transit service frequency among the local routes that would feed and serve light rail stations, resulting in more frequent bus service by 2020 and 2030 with the project. Table C-3 in Appendix C provides the service frequency LOS between the service areas.

In the no-build condition, in years 2020 and 2030 some areas would be connected by frequent service, but many other areas would not have direct transit connections. Service frequency between Overlake and Downtown Seattle, and between Downtown Redmond and Downtown Seattle, would improve from the existing LOS C to LOS A. This service frequency improvement would be due to plans for more frequent headways of route ST 545 in the reverse-peak direction. Between Downtown Seattle and Downtown Bellevue, the service frequency would remain at a LOS B or better. The University District, Mercer Island, Bel-Red, Overlake, and Downtown Redmond areas would not have direct bus service among them. Planned modification of some routes (i.e., elimination, truncation, rerouting) would also decrease the service frequency LOS with some of the connections to and from the Bel-Red area. Service frequency would improve from LOS D to LOS C between the Downtown Bellevue and University District areas because headways would improve from 25 minutes to 15 minutes. Even though many of the bus routes are planned to have more frequent headways, buses would likely be unable to meet their scheduled headways in the future due to additional congestion on roadways. Refer to the Section 4.3.2.4 Transit Reliability Level of Service for discussion of future bus reliability. The chart on the left in Exhibit 4-3 shows the service frequency LOS for the No Build Alternative during the PM peak hour. Because the transit integration plan did not alter the transit service frequencies enough to cause a LOS shift between years 2020 and 2030 conditions, Exhibit 4-3 provides the analysis for both years.

In years 2020 and 2030, East Link would connect all the areas with more frequent service. East Link trains would have peak headways between 9 and 10 minutes (LOS A and B, respectively). The Eastside areas would be directly connected by light rail service, with frequent direct connections with Bel-Red, Overlake, and Downtown Redmond. The chart on the right in Exhibit 4-3 shows the service frequency LOS with the project during the PM peak hour.

Compared to bus service in the no-build condition, light rail would also provide a substantial improvement in the frequency of service not only in the peak periods but also throughout the day. Outside of the morning and afternoon peak periods, bus service would operate with frequencies of LOS D or worse. By contrast, light rail would operate with headways of LOS C or better and headways of 15 minutes or less throughout the day.

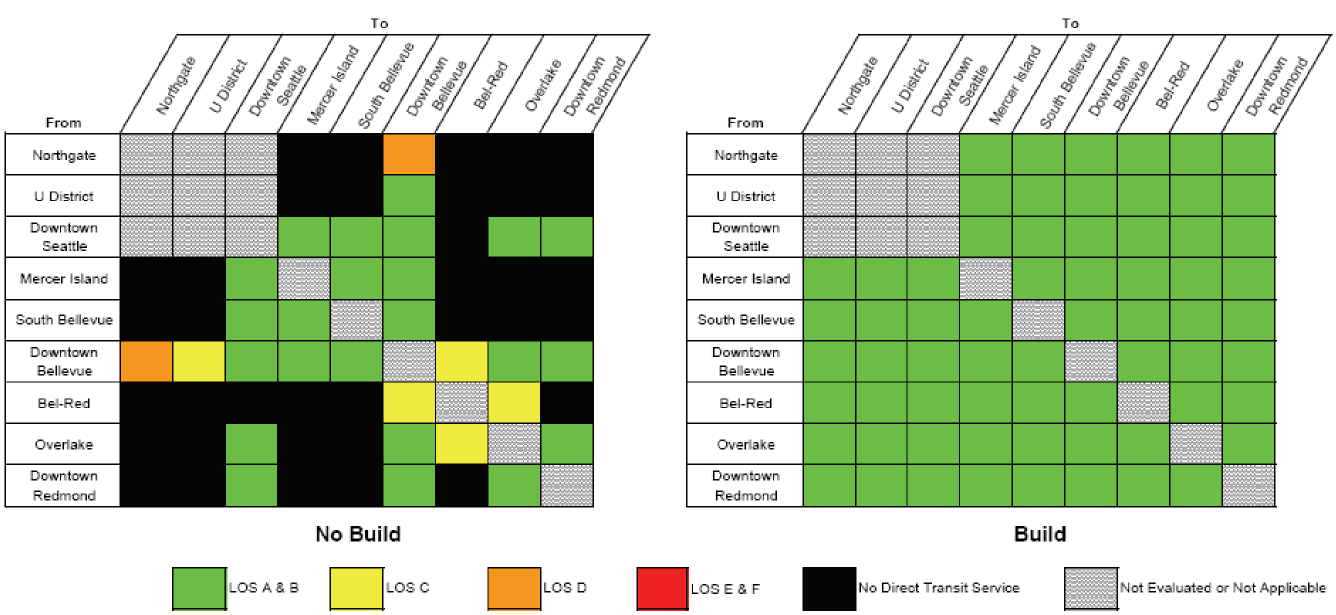


EXHIBIT 4-3
2020 and 2030 PM Peak-Hour Service Frequency LOS

4.3.2.2 Hours of Service Level of Service

Hours of service LOS represents the number of hours that a transit service is available throughout the day. Existing routes that continue in the future, without major changes, were assumed to have the same existing hours of service as they do currently. New routes that are comparable to an existing route were assigned the existing route's hours of service.

In the no-build condition, direct service between the Mercer Island, South Bellevue, Bel-Red, Overlake, and Downtown Redmond areas with the Northgate and the University District areas would not exist. In addition, Mercer Island and South Bellevue would not have direct bus service with the Bel-Red, Overlake, and Downtown Redmond areas. No-build bus service between Downtown Bellevue and Downtown Seattle, the University District, Mercer Island, South Bellevue, Overlake, and Downtown Redmond would operate at LOS B or better. The hours of service LOS between the service areas is provided in Table C-4 in Appendix C.

With light rail, in years 2020 and 2030, there would be substantial improvements in the hours of service LOS between most of the service areas because East Link would introduce new direct connections among them. East Link would operate for 20 hours each day, a longer operating duration than most bus routes. The Eastside areas would be directly connected with light rail service, with most noticeable hours of service improvements in the connections with Bel-Red, Overlake, and Downtown Redmond. Downtown Seattle to Downtown Bellevue, and Downtown Seattle to Downtown Redmond would continue to have hours of service LOS A. Northgate and the University District, with light rail, would have direct connections with Mercer Island and all the Eastside areas (i.e., South Bellevue, Downtown Bellevue, Bel-Red, Overlake, and Downtown Redmond). In addition, the hours of service would be LOS A between all areas directly connected by light rail. The chart below in Exhibit 4-4 shows the hours of service LOS with the project between areas connected by transit. Because the transit integration plan did not alter the hours of transit service enough to cause a LOS shift between years 2020 and 2030 conditions, Exhibit 4-4 provides the analysis for both years.

4.3.2.3 Passenger Load Level of Service

Passenger load measures a rider's ability to find a seat on a transit vehicle. Although intended to measure passenger comfort from the rider's perspective, it is an important factor in measuring transit LOS because the ease of passengers in finding a seat or space on the transit vehicle can influence the transit vehicle's dwell time and reliability at the transit stop or station.

Existing bus passenger data was provided by King County Metro (King County Metro, 2007a). Future passenger load LOS relied on the Sound Transit ridership model, which predicts passenger usage for each transit route. The

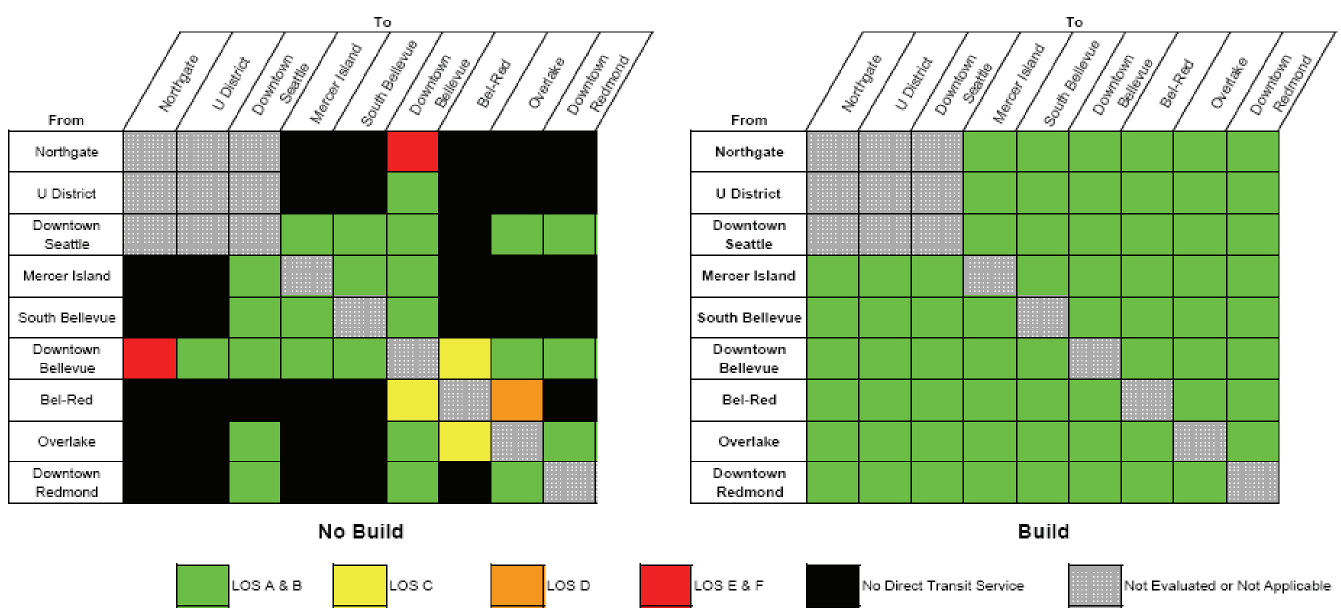


EXHIBIT 4-4
2020 and 2030 Hours of Service LOS

sizes of the buses were assumed to be the same as the current buses unless bus sizes for new routes were specified. The calculation to determine the passenger load for buses and light rail is different based on the calculation of transit capacity per the Transit Capacity and Quality of Service Manual (Transit Cooperative Research Program, 2003). Calculating the bus passenger load included only the number of bus seats in the calculations. Bus passenger load was calculated in this way because buses are intended to provide mostly seated transit service. Light rail is intended to provide both seated and standing transit service. It was assumed that when the number of passengers exceeds the number of available seats, some passengers must stand. Passenger load for light rail was calculated as square footage available per standing passenger. As the available square footage decreases, the LOS worsens. Because of the different passenger load LOS for bus and rail, the passenger load LOS values were not combined at the screenlines in the build condition. Table 4-7 and in Table C-5 in Appendix C summarize the screenline passenger load LOS.

TABLE 4-7
No Build and Build PM Peak-Hour Passenger Load LOS

Screenline	Direction	2020 No Build	2020 Build		2030 No Build	2030 Build	
		Bus	Bus	Light Rail	Bus	Bus	Light Rail
1 (City of Seattle)	Southbound	B	A	A	B	A	B
	Northbound	A	A	A	B	A	A
2 (Lake Washington)	Eastbound	B	A	A	C	A	B
	Westbound	B	A	A	C	A	A
3 (I-90)	Eastbound	A	A	N/A	B	A	N/A
	Westbound	B	A	N/A	C	A	N/A
4 (South Bellevue)	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	B	A	A
5 (Bel-Red)	Eastbound	A	A	A	B	A	A
	Westbound	A	A	A	A	A	A
6 (Redmond)	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A

N/A = not applicable because light rail would not cross this screenline.

Compared to existing conditions, the 2020 no-build conditions showed fluctuations in the passenger loads on buses. A greater number of passengers per bus would occur at Screenlines 1 (Seattle) and 2 (Lake Washington). All of the other screenlines would have a decrease in the number of people per bus in at least one direction due to more frequent bus service in the future that would distribute riders over a greater number of buses. Overall, the 2020 no-build passenger load LOS would be either A or B.

In 2020 build condition, passenger load LOS across all screenlines would be LOS A. The improvement to LOS A is notable across Screenline 2, where the bus passenger load would operate at LOS B in the eastbound and westbound directions without light rail. Even though the passenger load LOS would change from LOS B to LOS A, the number of transit users would increase over no-build conditions. The reason for the improved LOS is that light rail provides a higher capacity service than buses do. The number of passengers per bus would decrease from the no-build to build conditions because more people would choose to travel on light rail; therefore, improved bus passenger load LOS would be expected in the build condition. This is because of light rail's more frequent and reliable service and because most bus routes that would parallel the light rail service would be deleted in the build condition.

By 2030, the passenger load LOS reflects an increase in transit usage without or with East Link. Passenger load LOS with East Link would operate at LOS B or better across all screenlines in comparison to no-build bus service that would operate at LOS C or better. The passenger load LOS would improve with light rail because light rail provides higher capacity service than buses. The 2030 light rail passenger load LOS B across Screenlines 1 and 2 in the southbound/eastbound direction indicate an increase in passengers destined to the Eastside communities during the PM peak hour and an increase in riders from the 2020 build condition.

In the future, if the light rail passenger load LOS becomes unacceptable, the light rail operating plan could be adjusted to improve the passenger load LOS and passenger comfort. Adjustments to light rail operations could be made more easily than adjusting bus service operations.

In Segment A, if the D2 Roadway does not operate as joint-use for bus and light rail, the buses that use the D2 roadway would be rerouted to other roadways, such as SR 519, to access downtown Seattle. This rerouting would increase travel time and possibly decrease bus ridership, potentially affecting the passenger load on these buses.

4.3.2.4 Transit Reliability Level of Service

Bus Reliability

In the 2020 and 2030 no-build conditions, most bus transit routes at the International District/Chinatown Station, Mercer Island Park-and–Ride Lot, Bellevue Transit Center, Overlake Transit Center, and Redmond Transit Center are expected to operate at LOS E or F. It was assumed that in the future both King County Metro and Sound Transit would adjust their bus services according to the demand and congestion levels, although unforeseen conditions may limit what is implemented.

None of the 23 transit routes at either the International District/Chinatown Station or Mercer Island Park-and-Ride Lot are expected to have a reliability LOS better than LOS E. Only 3 of the 18 evaluated routes at the Bellevue Transit Center operate better than LOS E. ST 550, a key transit route in the study area that follows a route similar to the light rail alternatives between Seattle and Downtown Bellevue, is expected to operate at LOS F in both directions at the Mercer Island Park-and-Ride Lot, which indicates that this route is almost always “bunched” and arrives on time about 50 percent of the time. The continuation of poor reliability between Downtown Seattle and Downtown Bellevue is expected because bus speeds between these two major urban centers are predicted to decrease by up to 30 percent by year 2030, even with improvements to I-90. This would occur because there are no improvements planned to roadways connecting I-90 to these urban centers, especially to and from Bellevue. On average, bus routes operate with an LOS E or F at all six of the major transit hubs evaluated. Only a few bus routes at the Overlake Transit Center and Redmond Transit Center operate with a reliability LOS better than LOS D.

In Segment A, if the D2 Roadway does not operate as joint-use (bus and light rail), rerouting buses to other roadways to access downtown Seattle would add up to 7 minutes in the westbound direction and up to 12 minutes in the eastbound direction to bus travel time, thus increasing travel time. In addition, with light rail using the center roadway, buses—during both construction and light rail operation—would use the HOV lanes in the outer roadway. If performance of these HOV lanes is degraded and does not meet the HOV lane policy of 45-mile-per-hour (mph) speeds for 90 percent of the peak-period duration, buses will likely not be able to maintain acceptable reliability.

With an interim terminus station at the Ashwood/Hospital or Hospital station, current bus service along SR 520 would continue to serve the Bel-Red and Overlake areas with poor reliability. With an interim terminus farther east, the transit reliability in Bel-Red and Overlake areas would improve with the direct service from light rail.

Light Rail Reliability

The poor bus reliability discussed above indicates that buses frequently arrive close together rather than at their desired intervals and that buses are unable to meet their scheduled arrival times. This poor performance is indicative of a highly congested transportation network that does not serve transit well. Furthermore, poor reliability does not create an attractive mode for potential users and is a major deterrent to transit. Light rail would not experience the same disruptions in transit reliability as buses because it would operate in its own dedicated right-of-way, separate from vehicle congestion, and therefore it would be better able to handle higher demand through a more frequent and reliable service. For at-grade routes with dedicated right-of-way allowing vehicles to cross traffic, such as the Bellevue Way (B1), 112th SE At-Grade (B2A), NE 16th At-Grade (D2A), and Marymoor (E2) alternatives, light rail would have priority at traffic signals. Only with the Couple Alternative (C4A), in downtown Bellevue, would light rail operate with vehicles as a joint bus-use lane. The joint-use lane would operate only between NE 4th Street and NE 8th Street and 108th Avenue NE to provide bus access to the Bellevue Transit Center from all directions.

Because a light rail line similar to East Link currently is not in operation in the Puget Sound region, future light rail reliability was estimated using the St. Louis light rail system's on-time performance data. Similar to East Link's proposed light rail system, the St. Louis light rail system provides at-grade and tunnel profiles. St. Louis light rail is reported to be 93 percent on time; however, their method considers any vehicle arriving more than 1 minute early not to have arrived on-time. This differs from the conservative method that was used for the bus on-time performance, which considered only vehicles arriving 0 to 5 minutes late to have arrived on time. For the St. Louis light rail system, only 1 percent of trips arrive late, and just over 6 percent arrive early. Other light rail lines in the United States report between 92 and 98 percent on-time performance. Table C-7 in Appendix C provides Saint Louis light rail data supporting these findings.

Measuring on-time performance and reliability LOS for transit included analysis of deviations of transit routes from their scheduled headways. Analysis of future on-time performance and reliability LOS in the no-build and build conditions used data from existing conditions because future headway deviations cannot be predicted. Transit reliability LOS can be viewed in Appendix C, Table C-6.

4.3.2.5 Transit Travel Times

Door-to-door (from the beginning to the end of a trip—for instance from when a commuter leaves his or her work to when that commuter enters his or her home) travel time is a key factor in estimating transit ridership. For some potential transit riders, especially riders who have other travel mode choices available to make a trip, the comparison between transit and auto travel time is probably as important as the actual travel time. The number and ease of transfers is important as well. These travel times were forecasted by Sound Transit's ridership model and include the following factors:

- Bicycle, or walk time to stop or station
- Wait time
- Transfer wait time(s), if any
- In-vehicle time (in bus and/or light rail)
- Drive, bicycle, or walk time to destination

The drive time to a person's destination is included as Sound Transit's PM peak-period ridership forecasting model estimates park-and-ride vehicles leaving the station. Tables 4-8 and 4-9 provide average transit travel time comparisons for the area around the stations in each segment in the years 2020 and 2030, respectively. The comparisons reflect each person's travel time weighted by the number of trips (buses and rail) at each of the stations in the PM peak period. Three combinations of East Link alternatives were selected to represent a range of possible travel-time savings with light rail:

- Representative: A1, B2E, C8E, D3, E1
- Fastest: A1, B2E, C7E, D5, E4
- Slowest: A1, B2A, C4A, D3, E2

A description of each alternative is provided in Chapter 2 of the Draft EIS.

Compared to the no-build condition (PM peak transit travel times between 49 and 71 minutes), East Link riders would save between 6 and 17 minutes in 2020 and between 5 and 17 minutes in 2030. The average travel-time savings weighted over the study area would be 9 minutes in 2020 and 8 minutes by 2030. The fastest and slowest East Link alternatives would have little impact on the travel time savings when compared to the representative alternative. In both 2020 and 2030, the fastest alternative would further reduce door-to-door travel times on average by 2 minutes. The slowest alternative would, on average, add 1 minute of door-to-door travel time over the representative alternative.

At individual stations, the transit travel times between the representative, fastest, and slowest alternatives for Segments A, B, and C would generally be similar. In Segments D and E, the differences among the three alternative combinations would widen, with as much as 4 to 7 minutes of additional savings achieved with the fastest alternative compared to the representative alternative at all the potential stations in Segment D and at the Redmond Town Center station. At stations in Segments D and E, the representative alternative would achieve up to 3 minutes more savings than the slowest alternative.

TABLE 4-8
Year 2020 Comparative Analysis of Average Door-to-Door[b] PM Peak Transit Travel Times

Station	Travel Time (minutes)			
	No Build	Representative Light Rail	Fastest Light Rail	Slowest Light Rail
Segment A, Interstate 90				
Rainier	52	44	44	45
Mercer Island	49	42	42	42
Segment B, South Bellevue				
South Bellevue	51	45	45	46
SE 8th	57	49	47	49
118th[a]	58	47	N/A	N/A
Segment C, Downtown Bellevue				
Old Bellevue[a]	59	51	N/A	N/A
Bellevue Transit Center	59	51	51	53
East Main[a]	61	51	N/A	N/A
Hospital[a]	63	54	N/A	N/A
Ashwood/Hospital	59	52	50	52
Segment D, Bel-Red/Overlake				
124th	62	53	50	53
130th	63	55	50	55
Overlake Village	66	53	49	56
Overlake Transit Center	63	53	49	56
Segment E, Downtown Redmond				
Redmond Town Center	69	53	50	53
SE Redmond	64	47	44	49
Redmond Transit Center	69	N/A	N/A	57
Weighted Average Over All Stations	**60**	**51**	**49**	**52**

[a] Travel times for these stations were derived from the alternative in which each station would be located, which is not among the alternatives used in the representative, fastest, or slowest segment alternative combinations. These alternatives are the Bellevue Way Tunnel Alternative (C1T) and the BNSF Alternative (B7).

[b] Door-to-door means from the beginning to the end of a trip, for instance from when a commuter leaves his or her place of work to when that commuter enters his or her home.

N/A = not applicable

TABLE 4-9
Year 2030 Comparative Analysis of Average Door-to-Door[b] PM Peak Transit Travel Times

Station	Travel Time (minutes)			
	No Build	Representative Light Rail	Fastest Light Rail	Slowest Light Rail
Segment A, Interstate 90				
Rainier	53	46	46	46
Mercer Island	50	43	43	43
Segment B, South Bellevue				
South Bellevue	51	46	46	46
SE 8th	57	49	48	50
118th[a]	59	48	N/A	N/A
Segment C, Downtown Bellevue				
Old Bellevue[a]	61	52	N/A	N/A
Bellevue Transit Center	61	53	52	54
East Main[a]	63	53	N/A	N/A
Hospital[a]	64	56	N/A	N/A
Ashwood/Hospital	60	53	51	54
Segment D, Bel-Red/Overlake				
124th	63	55	50	57
130th	65	57	50	59
Overlake Village	66	55	51	58
Overlake Transit Center	64	55	51	58
Segment E, Downtown Redmond				
Redmond Town Center	71	55	51	55
SE Redmond	64	47	45	49
Redmond Transit Center	71	N/A	N/A	59
Weighted Average Over All Station Areas	**61**	**53**	**51**	**54**

[a] Travel times for these stations were derived from the alternative in which each station would be located, which is not among the alternatives used in the representative, fastest, or slowest segment alternative combinations. These alternatives are the Bellevue Way Tunnel Alternative (C1T) and the BNSF Alternative (B7).

[b] Door-to-door means from the beginning to the end of a trip, for instance from when a commuter leaves his or her place of work to when that commuter enters his or her home.

N/A = not applicable

Overall, transit riders making trips where their origin and destination area are both served by the East Link Project would have the greatest travel-time benefits, shorter waits, no transfer times, and high in-vehicle speeds.

Another measure of light rail travel time is the time a train takes to travel between stations. A passenger's travel time between Downtown Seattle and Downtown Redmond would be between 29 and 39 minutes . Light rail travel time between Downtown Seattle and Downtown Bellevue would be less than 20 minutes. This is a savings of up to 30 minutes compared to an automobile currently traveling between these locations, as in the afternoon peak period it now takes up to 47 minutes to travel between Seattle and Bellevue (via I-90) and up to 63 minutes to travel between Seattle and Redmond (via SR 520) (WSDOT, 2008). In the future, these automobile times are expected to continue to worsen, and therefore light rail would provide an even greater travel time savings. Exhibit 4-5 shows light rail travel times between key stations.

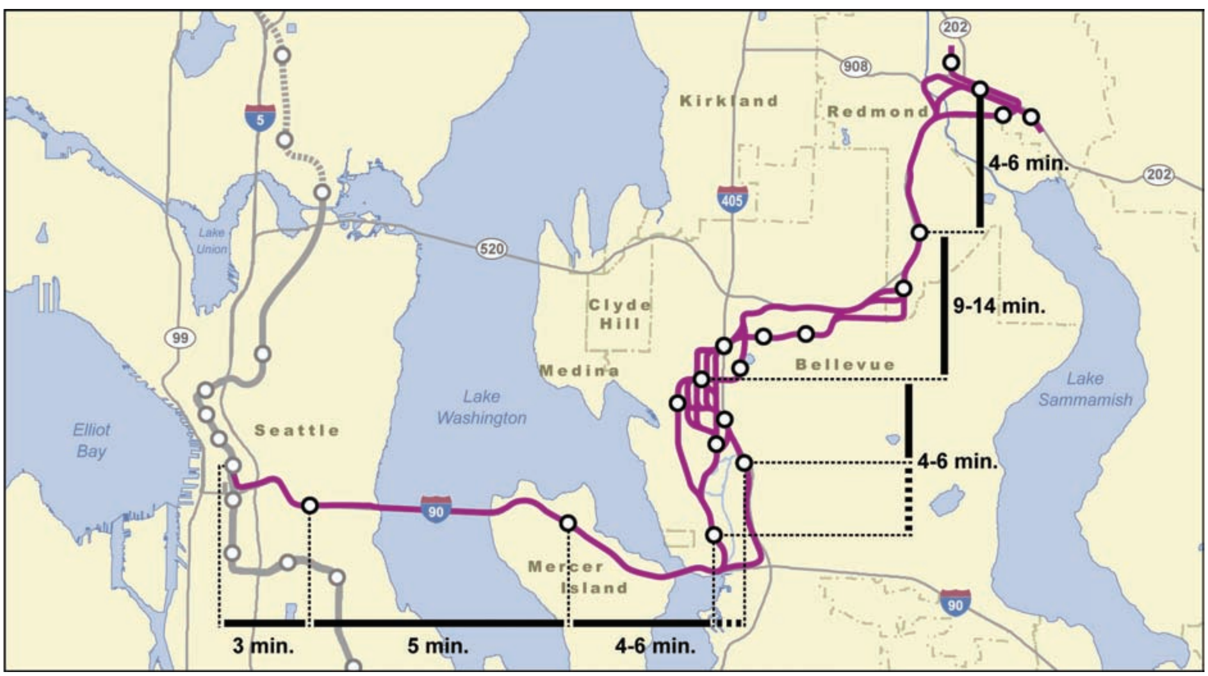
4.3.2.6 Transfers

The requirement for transit riders to transfer is often perceived as a negative attribute of transit systems and an impediment to transit use. However, the quality of transfers, whether between buses or between bus and rail, has a dramatic impact on how negatively transfers are perceived. Factors determining quality of transfers include proximity of transfer location, wait time, waiting area conditions, and service reliability.

Wait time is a function of the service frequency on the route to which a transit user is transferring and/or the ability to provide reliable "timed transfer" connections. There is evidence that quality transfers are acceptable and can be only a minor impediment. For example, King County Metro, which in the past was one of the strongest advocates of the "one-seat ride," is implementing a new "multi-centered" route structure focused on a series of transit "hubs" where convenient transfers can be made to multiple destinations. Key to the acceptance and success of these systems are safe, appealing, and protected transfer facilities and a combination of more frequent service and/or timed transfer, resulting in negligible impacts on ridership.

Transfers can be measured by a systemwide transfer rate, which is the average number of transit boardings per transit trip. The transfer rate in the study area was 1.29 in 2006. Table 4-10 provides the projected transfer rates for 2020 and 2030 no-build and build conditions. The transfer rate would be expected to stay relatively similar between no-build and build conditions in 2020. A slight reduction in transfer rate is predicted in 2030 in the build condition because East Link is assumed to connect with the planned North Link light rail line in this year and provide a one-seat transit trip between north Seattle and the Eastside. Traveling between these two points would then not require a transfer between rail and bus in the build condition, as it would in no-build condition.

Passengers transferring from bus to East Link would have shorter wait times compared to bus-to-bus transfers because the East Link operating plan, as noted earlier, assumes East Link trains in the peak periods will arrive every 10 minutes in 2020 and every 9 minutes in 2030. Even during off-peak hours, East Link would operate with



Note: Estimated East Link travel time between the Mercer Island Station and the South Bellevue Station is about 4 minutes (solid line), between the Mercer Island Station and the 118th Station it is about 6 minutes (solid plus dashed line), between the South Bellevue Station and Bellevue Transit Center it is between 4 and 6 minutes (solid plus dashed line), and between the 118th Station and the Bellevue Transit Center it is about 4 minutes.

EXHIBIT 4-5
East Link Travel Times Between Key Stations

15-minute headways. Transfer wait times from East Link to a bus would sometimes be longer, particularly when the buses would run less frequently than East Link, although bus-route frequencies are planned to generally improve over time with implementation of the light rail system. Some bus service savings with East Link could be redeployed to improve bus feeder system frequencies.

TABLE 4-10
Transit Transfer Rates

	2006[a]	2020 No Build	2020 Build	2030 No Build	2030 Build
Transfer Rate	1.29	1.40	1.41	1.45	1.43
Daily (24 hours) Transit Trips	329,000	417,400	426,400	547,000	556,100
Daily Transit Boardings	424,000	584,000	601,500	792,500	796,800

[a] Source: Sound Transit 2 – The Regional Transit System (Sound Transit, 2007b).

4.3.2.7 Station Parking

With the No Build Alternative, no expansion or changes would occur to the existing park-and-ride capacities. With East Link, parking provided at the Mercer Island, Overlake Village, and Redmond Transit Center stations would remain unchanged. With the project, park-and-ride lots would be expanded, depending on the segment alternative, at the South Bellevue (proposed from 1,455 to 1,476 stalls), 118th (proposed 1,030 stalls), and Overlake Transit Center (proposed 320 stalls) stations to better accommodate the expected ridership. New park-and-ride lots would be constructed at the 130th Station (proposed 300 stalls) with NE 16th At-Grade (D2A), NE 16th Elevated (D2E), and NE 20th (D3) alternatives and at SE Redmond Station (proposed 1,400 stalls) with all segment E alternatives. Section 6.2 provides further details on parking and parking utilization at East Link stations.

4.3.3 Light Rail Ridership

To forecast transit ridership, Sound Transit uses an incremental model that was developed in the early 1990s. The model is structured so that transit ridership results are based on observed origins and designations of transit users and observed transit line volumes that provide a realistic depiction of observed transit service characteristics. External changes in demographics, highway travel time, and costs are distinctly incorporated into the process in phases, prior to estimating the impacts of incremental changes in transit service. The Sound Transit model relies on the PSRC model for data on external changes. Refer to Attachment 3 of Appendix A for a further description of the Sound Transit ridership model.

The Sound Transit ridership forecasting model was used to develop the 2020 and 2030 light rail system ridership estimates associated with the project alternatives. For Sound Transit's long-range planning in ST2 (Sound Transit, 2007b), a representative alternative was created to serve as a baseline alternative. For consistency with this long-range planning, this representative alternative (generally follows a combination of the I-90 [A1], 112th SE Elevated [B2E], 110th NE Elevated [C8E], NE 20th [D3], and Redmond Way [E1] alternatives, as discussed in Section 3.3.1) was used to gauge light rail ridership for the East Link Project. To assess each alternative within a segment, the segment alternatives outside the segment being analyzed were maintained, and, within the segment, each alternative was coded and ridership forecasts were prepared. This method provides a common baseline to assess the alternatives within segments. One exception to this method occurred with the Bellevue Way (B1) and Bellevue Way Tunnel (C1T) alternatives, which are uniquely connected to each other, and, therefore, the ridership forecasts prepared for each of these alternatives included its "counterpart" alternative. The methodology used to forecast light rail ridership is described in Appendix A, Attachment 3. The ridership estimates were validated against transit ridership in the 2004 base year. The East Link ridership forecasts used 2020 and 2030 land use forecasts based on the PSRC projections developed in 2005 and released in spring 2006. Ridership is presented for daily conditions.

The ridership for each project alternative is the sum of the daily boardings at the stations in that alternative. Because the route, profile, and station locations vary for each alternative, changes are expected not only in the station boardings but also in the segment and project-wide ridership. The project-wide ridership is the total number of daily riders that would use East Link. Daily ridership differences can be considered substantial if the forecast variation for total East Link ridership among alternatives exceeds about 2,000 daily boardings. In general, the projected variation between East Link segment alternatives would not be considered substantial because many of the segments would include a similar number of stations serving the same areas and the projected travel times are not substantially different enough to cause a dramatic change in ridership. Station mode of access information is discussed in Section 6.2.

Year 2020 ridership estimates in Tables 4-11 through 4-17 assume light rail service between Northgate and South 200th Street and Seattle to Redmond (East Link). By 2030, ridership estimates assume light rail will extend between Ash Way and Tacoma Dome and Seattle to Redmond (East Link).

Although not included in these ridership results, ridership between the Eastside and Seattle would be expected to be higher on days with special events at Safeco Field, Qwest Field, or other venues near the light rail system (e.g., for concerts, trade shows, other sporting events). East Link ridership is anticipated to increase more than 8 percent on days with special events.

4.3.3.1 Segment A Alternative and Project-Wide Ridership

Although there is only one build alternative in Segment A (the I-90 Alternative [A1]), the adjacent Segment B alternatives would adjust the daily boardings within Segment A due to the proximity of the station in Segment B to Segment A. The Segment A ridership forecasts are similar for the Bellevue Way (B1), 112th SE At-Grade (B2A), 112th SE Elevated (B2E), and 112th SE Bypass (B3) alternatives because they would include a station at the South Bellevue Park-and-Ride Lot. The BNSF Alternative (B7) would not have a station at South Bellevue but instead at 118th Avenue NE, and therefore would create a shift in travel patterns to the surrounding stations. The 2020 daily boardings at the Mercer Island Station are expected to increase by 500 to a total of 2,000 with B7 and in 2030 to increase by 500 to a total of 2,500 daily boardings. Although this boarding information suggest a potential to increase the number of riders at the Mercer Island Station, the park-and-ride lot would only accommodates 447 stalls; therefore, potential riders exceeding this parking capacity would either use another station or use another mode to access the station. Table 4-11 lists 2020 and 2030 daily station boardings and East Link project-wide ridership. Project-wide ridership would be between 30,500 to 32,000 riders in 2020 and between 43,500 to 45,500 riders in 2030.

TABLE 4-11
Year 2020 and 2030 Ridership Forecasts in Segment A

Station	2020		2030	
	A1 (combined with alternatives B1, B2A, B2E, or B3)	A1 (combined with B7)	A1 (combined with alternatives B1, B2A, B2E, or B3)	A1 (combined with B7)
Rainier	2,500	2,500	3,500	3,500
Mercer Island	1,500	2,000	2,000	2,500
Segment A Totals	4,000	4,500	5,500	6,000
Project-Wide Ridership	31,500 - 32,000	30,500	44,500 - 46,000	43,500

Note: Due to rounding, station ridership may not sum exactly to segment totals.

4.3.3.2 Segment B

Within Segment B there are five alternatives: The Bellevue Way Alternative (B1, connected only to the Bellevue Way Tunnel Alternative [C1T], or combined as B1-C1), the 112th SE At-Grade Alternative (B2A), the 112th SE Elevated Alternative (B2E), the 112th SE Bypass Alternative (B3), and the BNSF Alternative (B7). B1 and B2A would be at-grade profiles, and B2E would be an elevated profile. B3 and B7 would combine both at-grade and elevated profiles. As part of these five alternatives, there are three proposed stations: South Bellevue, SE 8th, and 118th. The 118th and South Bellevue stations would be park-and-ride facilities.

Segment B Alternative and Project-Wide Ridership

In the year 2020, Segment B ridership for each alternative would range from a low of 1,000 daily boardings for B7 to a high of 3,000 daily boardings generated by B1-C1, B2A, B3, and B2E. By 2030, total Segment B ridership for each alternative would range from a low of 1,000 daily boardings in B7 to a high of 4,500 daily boardings in B2E and B2A. B2E and B2A would provide stations at South Bellevue and SE 8th.

B3 and B7 also would have an East Main Station just north of the Segment B boundary. This station in B3 is expected to generate 1,500 and 2,500 daily boardings in years 2020 and 2030, respectively, while in B7, the station would generate 1,500 to 2,000 and 3,000 to 3,500 daily boardings in these same forecast years.

The South Bellevue Station ridership would be similar for all alternatives that include this station. The year 2020 daily boardings at the station would range from 2,500 generated from B2A to 3,000 daily boardings generated from B1, B2E, and B3. In year 2030, this station would generate 4,000 daily boardings for all alternatives that include this station (i.e., B1, B2A, B2E, and B3).

In years 2020 and 2030, the SE 8th Station would generate 500 daily boardings for both alternatives with this station (B2E and B2A). B7 is the only route that would stop at the 118th Station, which would produce 1,000 daily boardings in both years 2020 and 2030 at this station. Table 4-12 shows the breakdown of 2020 and 2030 daily boardings expected at each station in Segment B.

TABLE 4-12
Year 2020 and 2030 Ridership Forecasts in Segment B

Station	2020					2030				
	B1-C1	B2E	B2A	B3	B7	B1-C1	B2E	B2A	B3	B7
South Bellevue	3,000	3,000	2,500	3,000	-	4,000	4,000	4,000	4,000	-
SE 8th	-	500	500	-	-	-	500	500	-	-
118th	-	-	-	-	1,000	-	-	-	-	1,000
Segment B Totals	3,000	3,000	3,000	3,000	1,000	4,000	4,500	4,500	4,000	1,000
Project-Wide Ridership	32,500	32,000	31,500	31,500	30,500	46,000	45,500	44,500	45,500	43,500

- Station not included in alternative.

Note: Due to rounding, station ridership may not sum exactly to segment totals.

Of all the Segment B alternatives, Alternative B1-C1 would contribute most to the project-wide ridership in year 2020 and 2030, resulting in a total of 32,500 daily riders in 2020 and 46,000 daily riders in 2030. The additional station, Old Bellevue Station, just north of the Segment B boundary, contributes to the higher ridership in this alternative. The Old Bellevue station is surrounded by a high concentration of medium-to-high density mixed use neighborhoods, with easy access to commercial, retail and office properties.

Compared to other Segment B alternatives, the BNSF Alternative (B7) would result in the lowest project-wide ridership in both 2020 and 2030, with 30,500 daily riders in 2020 and 43,500 daily riders in 2030. B7 would travel along the BNSF Railway/I-405 route and would not stop at the South Bellevue Station.

4.3.3.3 Segment C

There are six alternatives in Segment C: the Bellevue Way Tunnel (C1T), 106th NE Tunnel (C2T), 108th NE Tunnel (C3T), Couplet (C4A), 112th NE Elevated (C7E), and 110th NE Elevated (C8E) alternatives. C1T, C2T, and C3T would have tunnel profiles; C4A would have an at-grade profile; and C7E and C8E would have elevated profiles. As part of these six alternatives, there are five proposed stations: East Main, Old Bellevue, Bellevue Transit Center, Ashwood/Hospital, and Hospital. None of these stations would be park-and-ride facilities because they are located within Downtown Bellevue.

Segment C Alternative and Project-Wide Ridership

In forecast year 2020, total Segment C ridership for each alternative would range from a low of 3,500 daily boardings for C7E to a high of 5,000 daily boardings generated by C3T and B1-C1. By 2030, Segment C total ridership is expected to increase from a low of 5,500 daily boardings in C7E to a high of 8,000 daily boardings in C3T and B1-C1.

The Old Bellevue Station, which is only included in B1-C1, would generate 1,500 and 2,000 daily boardings in years 2020 and 2030, respectively.

The Bellevue Transit Center station would have a range of ridership between 3,000 and 4,500 daily boardings in 2020 and between 4,500 and 7,500 daily boardings in 2030. C3T would generate the highest daily boardings at the Bellevue Transit Center, with 4,500 daily boardings in year 2020 and 7,500 daily boardings in year 2030. In contrast, in 2020, C7E and B1-C1 would generate the lowest daily boardings of 3,000, in year 2020. C7E would generate 4,500 daily boardings at the Bellevue Transit Center, the lowest daily boardings in 2030.

Both the Ashwood/Hospital and Hospital stations are projected to generate 500 daily boardings in both years 2020 and 2030 for all alternatives except C3T, which would produce about 1,000 daily boardings in year 2030. Table 4-13 shows the 2020 and 2030 daily boardings expected at each station in Segment C for the project alternatives.

TABLE 4-13
Year 2020 and 2030 Ridership Forecasts in Segment C

Station	2020						2030					
	B1-C1[a]	C2T[b]	C3T[b]	C4A[b]	C7E[b]	C8E[b]	B1-C1[a]	C2T[b]	C3T[b]	C4A[b]	C7E[b]	C8E[b]
Old Bellevue	1,500	-	-	-	-	-	2,000	-	-	-	-	-
Bellevue Transit Center	3,000	4,000	4,500	4,000	3,000	3,500	5,000	6,500	7,500	6,000	4,500	5,500
Ashwood/Hospital	-	-	500	500	500	500	-	-	1,000	500	500	500
Hospital	500	500	-	-	-	-	500	500	-	-	-	-
Segment C Totals	5,000	4,500	5,000	4,000	3,500	4,000	8,000	7,500	8,000	6,500	5,500	6,500
Project-Wide Ridership	32,500	33,000	33,500	31,000	31,000	32,000	46,000	46,500	48,000	44,000	44,000	45,500

[a] B1-C1 indicates the Bellevue Way Tunnel Alternative (C1T) connecting with the Bellevue Way Alternative (B1).

[b] Data for C2T, C3T, C4A, C7E, and C8E is only applicable to the 112th SE At-Grade (B2A) and Elevated (B2E) alternatives.

- Station not included in alternative.

Note: Due to rounding, station ridership may not sum exactly to segment totals.

In forecast year 2020, the project-wide ridership with the Segment C alternatives would range from 31,000 to 33,500. By 2030, the project-wide ridership with the Segment C alternatives would increase from 44,000 to 48,000. The relatively small range in project-wide ridership results from all alternatives serving Downtown Bellevue and the Hospital District.

The 108th NE Tunnel Alternative (C3T) would result in the highest East Link project-wide ridership by connecting to the center of the commercial, retail, and office core of Downtown Bellevue and the Bellevue Transit Center. C3T is also expected to have one of the shortest Segment C travel times because it is a tunnel profile with a relatively direct route. The project-wide ridership with C3T would be 33,500 daily boardings in year 2020 and 48,000 daily boardings in year 2030.

In year 2020, the Couplet (C4A) and 112th NE Elevated (C7E) alternatives would result in the lowest East Link ridership among the Segment C alternatives, with 31,000 daily riders. By year 2030, C4A and C7E would result in the lowest East Link ridership, 44,000 riders. Because C4A is an at-grade couplet along 108th and 110th avenues NE, it would operate at a lower speed than the other alternatives but provide good access to Downtown Bellevue and the Bellevue Transit Center. Although C7E, which would parallel 112th Avenue NE, would have the fastest travel time of the Segment C alternatives, it would stop at the eastern edge of Downtown Bellevue. This would require a longer walk to the office and retail core of downtown and the Bellevue Transit Center than the other Segment C alternatives. However, a pedestrian bridge connecting the light rail station at 112th to the current

Bellevue Transit Center would be constructed to better connect these transit facilities. These reasons contribute to the lower East Link ridership with C4A and C7E compared to the other Segment C alternatives.

Regarding the connections to the 112th SE Bypass (B3) and BNSF (B7) alternatives, which include the East Main Station, similar trends would occur among the alternatives (Table 4-14). The 108th NE Tunnel Alternative (C3T) would result in the highest East Link ridership among Segment C alternatives, and the 112th NE Elevated Alternative (C7E) would result in the lowest. Compared to each other, project-wide ridership with B3 would be slightly higher than project-wide ridership with B7 because the South Bellevue Station would provide better bus connections and closer proximity to I-90 and therefore higher ridership than the 118th Station. As seen by comparing Tables 4-13 and 4-14, Bellevue Transit Center Station boardings would decline due to the proximity of the East Main Station. Depending on the alternative, Bellevue Transit Center Station daily boardings with the East Main Station would be between 2,000 and 3,500 in year 2020 and between 3,000 and 6,000 in year 2030. Other station boardings in Segment C would be unaffected by the East Main Station.

TABLE 4-14
Year 2020 and 2030 Ridership Forecasts in Segment C with East Main Station

Station	2020					2030				
	C2T	C3T	C4A	C7E	C8E	C2T	C3T	C4A	C7E	C8E
East Main [a]	1,500 (2,000)	1,500 (2,000)	1,500 (2,000)	1,500 (1,500)	1,500 (2,000)	2,500 (3,000)	2,500 (3,000)	2,500 (3,000)	2,500 (3,500)	2,500 (3,000)
Bellevue Transit Center [a]	3,000 (3,500)	3,500 (3,500)	3,000 (3,000)	2,000 (2,000)	2,500 (3,000)	5,000 (5,000)	5,500 (6,000)	4,500 (4,500)	3,000 (3,000)	4,000 (4,500)
Ashwood/Hospital [a]	--	500 (500)	500 (500)	500 (500)	500 (500)	--	500 (1,000)	500 (500)	500 (500)	500 (500)
Hospital [a]	500 (500)	--	--	--	--	500 (500)	--	--	--	--
Segment C Totals [a]	5,000 (6,000)	5,500 (6,000)	4,500 (5,500)	4,000 (4,000)	4,500 (5,500)	8,000 (9,000)	8,500 (10,000)	7,000 (8,500)	6,500 (7,500)	7,000 (8,500)
Project-Wide Ridership [a]	32,000 (31,500)	33,500 (32,500)	31,000 (30,500)	30,500 (29,500)	31,500 (30,500)	46,000 (44,500)	47,500 (46,500)	45,000 (43,500)	44,000 (42,500)	45,500 (43,500)

[a] Station ridership with the 112th SE Bypass Alternative (B3) connection is outside parentheses; station ridership with the BNSF Alternative (B7) connection is inside parentheses.

-- Station not included in alternative.

Note: Due to rounding, station ridership may not sum exactly to segment totals.

4.3.3.4 Segment D

There are four alternatives in Segment D: the NE 16th At-Grade (D2A), NE 16th Elevated (D2E), NE 20th (D3), and SR 520 (D5) alternatives. D2A would have an at-grade profile, D2E and D5 would have elevated profiles, and D3 would have a combination of at-grade, elevated, and retained-cut profiles. As part of these four alternatives, there are five proposed stations: 124th, 130th, Overlake Village at 151st Avenue or 152nd Avenue, and Overlake Transit Center. Three of these stations would be park-and-ride facilities: 130th Avenue, Overlake Village, and Overlake Transit Center.

Segment D Alternative and Project-Wide Ridership

In forecast year 2020, ridership for all Segment D alternatives would be 4,500 daily boardings. By 2030, Segment D total ridership for all Segment D alternatives is expected to increase to between 6,000 and 6,500 daily boardings.

The 124th Station, which is included in D2A, D2E, and D3, would generate less than 250 daily boardings in year 2020. In 2030, daily boardings at the 124th Station would be 500 for all the associated alternatives (D2A, D2E and D3). The 130th Station, which is also included in D2A, D2E, and D3, would generate 1,000 daily boardings in years 2020 and 2030.

The Overlake Village Station would have 1,000 daily boardings for all alternatives in year 2020 and between 1,000 and 1,500 daily boardings in 2030. D2A and D3 are expected to generate 1,000 daily boardings at this station in 2030, whereas D2E and D5 are expected to generate 1,500 daily boardings at this station.

In year 2020, Overlake Transit Center is expected to generate 2,500 daily boardings for all alternatives except D5, for which it would generate 3,000 daily boardings. In year 2030, the daily boardings would range from a low of 3,500 with D3 to a high of 4,500 with D5, while the other alternatives (D2A, D2E) would generate about 4,000 daily boardings. Because only two stations would serve the Bel-Red and Overlake areas in D5, it would generate slightly higher station ridership at these stations than the other alternatives. Nearby stations in adjacent segments also would have slightly higher ridership due to D5 having a faster travel time than the other alternatives. Table 4-15 lists the 2020 and 2030 daily boardings expected at each station in Segment D for the project alternatives.

TABLE 4-15
Year 2020 and 2030 Ridership Forecasts in Segment D

Station	2020				2030			
	D2A	D2E	D3	D5	D2A	D2E	D3	D5
124th	<250	<250	<250	-	500	500	500	-
130th	1,000	1,000	1,000	-	1,000	1,000	1,000	-
Overlake Village	1,000	1,000	1,000	1,000	1,000	1,500	1,000	1,500
Overlake Transit Center	2,500	2,500	2,500	3,000	4,000	4,000	3,500	4,500
Segment D Totals	4,500	4,500	4,500	4,500	6,500	6,500	6,000	6,000
Project-Wide Ridership	32,500	32,500	32,000	32,500	46,000	46,000	45,500	46,000

Note: Due to rounding, station ridership may not sum exactly to segment totals.

- Station not included in alternative.

In year 2020, D2A, D2E, and D5 would result in 32,500 daily project-wide riders, slightly higher than D3, which would result in 32,000 daily project-wide riders. In year 2030, D3 would again result in the lowest project-wide ridership of 45,500 compared to the other Segment D alternatives. By 2030, D2A, D2E, and D5 would result in the highest number of project-wide riders, 46,000. Overall, the differences in daily boardings among the Segment D alternatives are not considered substantial. Thus, all alternatives are projected to have similar ridership.

Although both the 124th and 130th stations were analyzed for alternatives D2A, D2E, and D3, only one station might ultimately be constructed. If this were to occur, ridership would not substantially change from what is shown in Table 4-16 because these stations' coverage areas overlap. As a result, riders would likely consolidate to the one station.

Due to the assumed land use in the ridership model for Segment D, the station boardings at the 124th Avenue and 130th Avenue locations are relatively low. This results in a similar segment ridership and project-wide ridership for all Segment D alternatives. The subtle difference in ridership could be explained by the travel-time savings from D5, which offsets the lower ridership at the 124th and 130th stations in this alternative.

Bel-Red and Overlake Ridership

Sound Transit's ridership model uses population and employment growth for future forecast years that have been adopted by the regional planning agency, PSRC. The future growth from the City of Bellevue and City of Redmond studies (Bel-Red Corridor Project Subarea Plan [City of Bellevue, 2007] and Overlake Neighborhood Plan [City of Redmond, 2007]) has yet to be fully adopted by the PSRC. These two studies will be included in both cities' long-range development and economic goals. The expected growth could lead to increased ridership in this area than predicted by the Sound Transit model, as discussed below.

For the four light rail stations in the Bel-Red and Overlake Village area (Ashwood/Hospital, 124th, 130th, and Overlake Village), the 2030 Sound Transit ridership forecast is 3,000 to 3,500 daily boardings, assuming

500 boardings at the Ashwood/Hospital Station. As part of its Bel-Red Corridor Project, which will be adopted by early 2009, the City of Bellevue identified 5,000 new households and over 9,200 additional jobs in the Bel-Red Corridor by 2030 (Bel-Red Corridor Project Final EIS, Table A-12) (City of Bellevue, 2007). Many of these households and jobs would be concentrated near the four proposed light rail stations. The City of Bellevue predicts that growth under its Bel-Red Corridor Plan would generate 10,200 daily light rail boardings at the Ashwood/Hospital, 124th, 130th, and Overlake Village stations.

Additionally, the City of Redmond has recently adopted the Overlake Neighborhood Plan providing for nearly 9,000 households and nearly 20 million square feet of commercial space by 2030. Almost 5,000 multifamily residences and more than 3 million square feet of commercial space, guided by transit-oriented development, would be located near the Overlake Village light rail station. Redmond predicts that its Action Alternative will nearly triple the transit mode share of all trips generated by the Overlake Neighborhood, from 5.4 percent to 15.3 percent (Overlake Neighborhood Plan Final Supplemental EIS, Tables 2-2 and 3-6, and section 3.6.3.3) (City of Redmond, 2007).

The ridership and transit analysis for the Bellevue and Redmond plans indicate potentially greater ridership by 2030 due to proposed land use changes in the Bel-Red and Overlake area. Much of these land use changes would include transit-oriented development around light rail stations that would encourage Bel-Red and Overlake residents, workers, and shoppers to access the stations by walking, bicycling, or taking transit. These ridership increases would occur among all alternatives within Segment D; however, the SR 520 Alternative (D5) would have the least ridership increases because it does not include the 124th and 130th stations.

4.3.3.5 Segment E

There are three alternatives in Segment E: the Redmond Way (E1), Marymoor (E2), and Leary Way (E4) alternatives. All the alternatives would parallel SR 520 north of the Overlake Transit Center outside the roadway right-of-way. Through Downtown Redmond, all alternatives would operate at-grade along the converted BNSF Railway. As part of these three alternatives, there are three proposed stations: SE Redmond, Redmond Transit Center, and Redmond Town Center. The SE Redmond Station would be primarily a park-and-ride station. The Redmond Transit Center Station would have a park-and-ride lot nearby.

Segment E Alternative and Project-Wide Ridership

In forecast year 2020, total Segment E ridership for each alternative would range from a low of 2,000 daily boardings for E1 and E4 to a high of 2,500 daily boardings for E2. By 2030, Segment E total ridership is expected to increase to 3,000 daily boardings for all alternatives, as shown in Table 4-16.

TABLE 4-16
Year 2020 and 2030 Ridership Forecasts In Segment E

Station	2020			2030		
	E1	E2	E4	E1	E2	E4
Redmond Town Center	1,000	1,000	1,500	1,500	1,000	1,500
Redmond Transit Center	-	500	-	-	500	-
SE Redmond	1,000	1,000	1,000	1,500	1,500	1,500
Segment E Totals	2,000	2,500	2,000	3,000	3,000	3,000
Project-Wide Ridership	32,000	32,500	32,000	45,500	46,000	45,500

Note: Due to rounding, station ridership may not sum exactly to segment totals.

- Station not included in alternative.

The SE Redmond Station, for all alternatives, is expected to generate 1,000 and 1,500 daily boardings in years 2020 and 2030, respectively. The Redmond Town Center station, for all alternatives, is expected to generate between 1,000 and 1,500 daily boardings in years 2020 and 2030, respectively. The Redmond Transit Center station, which would only be included with E2, is expected to generate 500 daily boardings in both 2020 and 2030.

Relative to the other Segment E alternatives, E2 would result in the highest project-wide ridership of 32,500 and 46,000 in years 2020 and 2030, respectively, possibly due to the additional station at Redmond Transit Center. E1 and E4 would generate approximately 500 fewer project-wide riders in each of the analysis years. These differences do not constitute a substantial difference in ridership between Segment E alternatives. If E2 terminates at the Redmond Town Center Station, the project-wide ridership is expected to be similar to the E1 and E4 alternatives in years 2020 and 2030.

4.3.3.6 East Link Ridership Comparison Summary

Based on the segment ridership forecasts discussed in the previous sections, the East Link representative alternative would generate 32,000 riders in 2020 and 45,500 in 2030. In terms of new transit riders (i.e., people who do not use transit in the No Build Alternative), there would be about 9,300 new daily riders in 2020 and 9,500 by 2030.

In year 2030, alternatives that would produce the highest project-wide ridership in their segments are the Bellevue Way Alternative connecting to the Bellevue Way Tunnel Alternative (B1-C1) and the 108th NE Tunnel (C3T), NE 16th At-Grade (D2A), NE 16th Elevated (D2E), SR 520 (D5), and Marymoor (E2) alternatives, ranging between 46,000 to 48,000 daily riders. The lowest ridership among the alternatives would be with the BNSF (B7), Couplet (C4A), 112th NE Elevated (C7E), NE 20th (D3), Redmond Way (E1), and Leary Way (E4) alternatives, resulting in a project-wide ridership ranging between 42,500 and 45,500 daily riders. Daily ridership differences can be considered substantial if the forecast variation for total East Link ridership among alternatives exceeds about 2,000 daily boardings.

There are several reasons for the variation in ridership among the alternatives. C3T would generate the highest ridership among Segment C alternatives by connecting the commercial, retail, and office core of Downtown Bellevue through a tunnel profile that would provide a relatively fast travel time. Alternatives generating lower project-wide ridership are B7, C4A, and C7E. B7, which would travel along the BNSF Railway/I-405 route, would not stop at the South Bellevue Park-and-Ride Lot. C7E would not enter the business and retail core of Downtown Bellevue as much as the other Segment C alternatives, and, therefore, would require a longer walk distance to access the station. C4A would generate lower project-wide ridership mostly due to slower travel speeds. Exhibit 4-6 displays the 2030 project-wide ridership.

4.3.3.7 Interim Terminus Ridership

The Ashwood/Hospital, 124th, 130th, Overlake Village, Overlake Transit Center, Redmond Town Center, and SE Redmond stations could all potentially serve as interim terminus stations. Table 4-17 at the conclusion of this section compares the projected year 2020 and 2030 daily system boardings, by station, for the full-length representative alternative to the possible interim terminus station alternatives.

An interim terminus at either the Redmond Town Center or SE Redmond stations would reduce the East Link project-wide ridership from the full length project by approximately 500 in the year 2020 and approximately 1,000 in year 2030. At these individual stations, the daily boardings would increase by 500 in both of the interim terminus conditions in 2020 and 2030.

With an interim terminus at the Overlake Transit Center, the East Link station total daily boardings would decrease by 1,000 in the year 2020 and by 1,500 in year 2030. At the station, the daily boardings would increase by as much as 1,500 and 2,500 in years 2020 and 2030, respectively. With an interim terminus at Overlake Village, East Link's project-wide ridership would decrease by 4,500 and 6,000 in the years 2020 and 2030, respectively. However, there would be a substantial increase in the Overlake Village station's daily boardings. The Overlake Village station's daily boardings would increase by 2,000 in year 2020 and up to 3,000 in year 2030. The increase in ridership at these stations would be mainly due to the changes in transit service and the increase in riders transferring between rail and bus. This expected increase in transit ridership at these two stations is further discussed in Section 6.2.

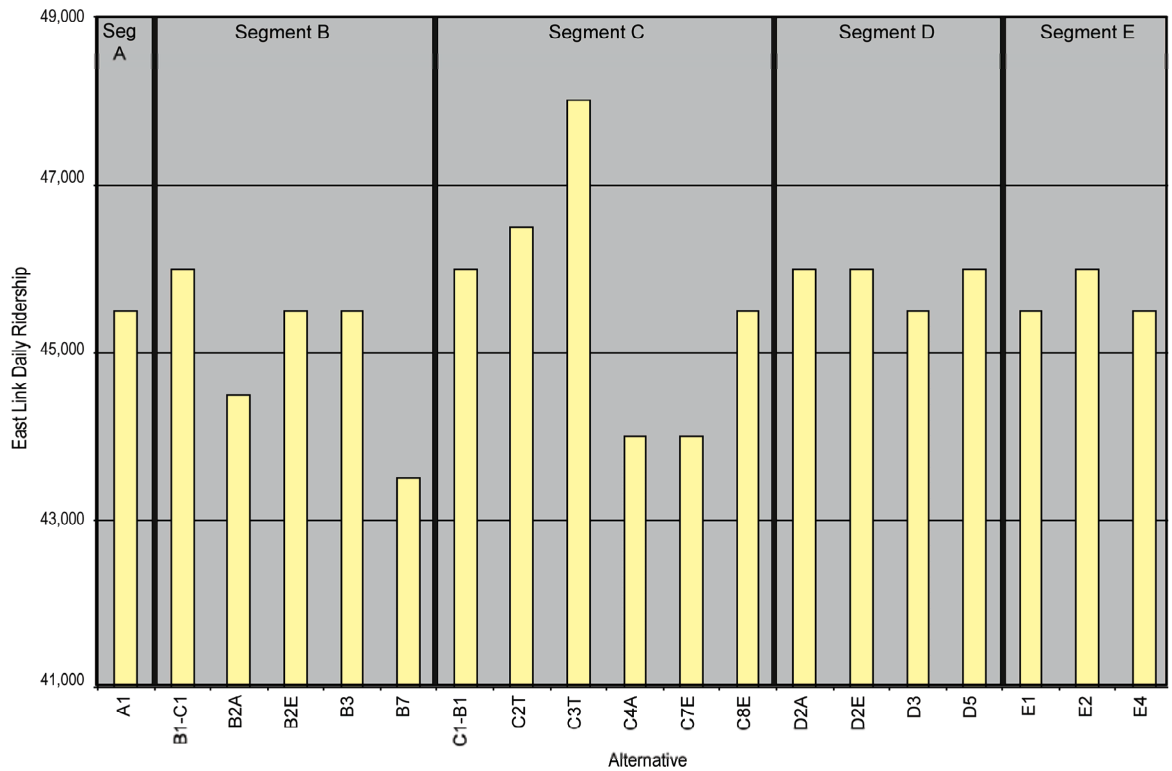


EXHIBIT 4-6
2030 Project-Wide Daily Ridership

East Link project-wide ridership with an Ashwood/Hospital, 124th, or 130th interim terminus station would decrease from the full-length project by between 7,500 and 8,500 daily boardings in year 2020 and between 10,000 and 11,000 daily boardings in year 2030. At each of these three potential interim terminus stations, the individual station daily boardings would be similar to their station ridership in the full-length project. The substantial decrease in project-wide ridership with these three interim terminus stations would occur because light rail service would not extend into the Overlake and Redmond areas.

4.4 Construction Impacts

During construction of East Link, current bus service would be affected at some locations along the corridor. Bus reliability could potentially degrade along arterials with construction for East Link due to lane closures and other construction-related activity. For areas with construction in the roadway right-of-way, arterials may be reduced to one lane in each direction, affecting roadway operations, including bus service along those arterials. In general, alternative construction outside the roadway right-of-way would have minimal impacts on bus routes.

East Link construction impacts on Central Link operations would be minimal. Any impacts would occur with the East Link connection to Central Link in the Downtown Seattle Transit Tunnel. The Downtown Seattle Transit Tunnel construction activities would be scheduled to occur during nighttime hours when ridership is the lowest and/or outside of operating hours.

Along I-90, construction impacts would occur for bus service at Rainier Avenue S and at Mercer Island. Bus service would continue at these locations during the D2 Roadway construction, but buses would use the outer I-90 mainline roadways to access the Rainier Avenue S and Mercer Island stops. During light rail construction on the D2 Roadway, buses would be rerouted to the I-90 mainline and this would likely affect the reliability of buses.

At the South Bellevue Park-and-Ride Lot, all or a portion of the parking lot would be closed due to construction of the parking garage and the construction staging areas, but bus service would remain on Bellevue Way SE. For the Bellevue Way (B1), 112th SE At-Grade (B2A), and 112th SE Bypass (B3) alternatives, the at-grade profile would require reconstruction of the roadway for all or a portion of the length of Bellevue Way SE. B2A and B3 would require reconstruction of the roadway on 112th Avenue SE. This at-grade construction would require lane closures that would reduce the reliability of buses that travel along these roads. For the BNSF Alternative (B7), bus service at the Wilburton Park-and-Ride Lot would continue but all or some parking would be removed.

At the Bellevue Transit Center, during construction of the station for the Bellevue Way Tunnel (C1T), 106th NE Tunnel (C2T), and 108th NE Tunnel (C3T) alternatives, bus service would not be able to access the transit center. The Bellevue Transit Center would be closed for over a year for the construction of the underground station for these three tunnel alternatives. Therefore, bus service and stops associated with these alternatives would be rerouted and relocated along 106th, 108th, and 110th Avenues NE. The remaining Segment C alternatives would likely be able to retain current service within the Bellevue Transit Center during the construction period. Cut-and-cover construction on Bellevue Way (for C1T) between SE 6th Street and NE 6th Street and on 106th Avenue NE (for C2T) between Main Street and NE 6th Street would affect bus routes traveling along these roadways. In the Couplet Alternative (C4A), construction would be at-grade and would require reconstruction of 108th Avenue NE and 110th Avenue NE, which would affect bus service. The elevated construction of 110 NE Elevated Alternative (C8E) could potentially affect bus routes traveling on 110th Avenue NE. All of these potential effects could increase bus travel times.

During construction at the Overlake Transit Center station, bus service and stops would be routed along 156th Avenue NE. Additionally, a portion of the parking lot is expected to be closed for construction of the parking garage. For The NE 20th Alternative (D3), buses traveling on 152nd Avenue NE, north of NE 24th Street, would be affected due to the at-grade station construction in the median and also along NE 20th Street between 136th Avenue NE and 152nd Avenue NE, due to median trench construction. These effects could increase bus travel times. Buses traveling along 161st Avenue NE, between Cleveland Street (SR 202) and NE 87th Street, would be affected by at-grade construction for the Leary Way Alternative (E2) and may need to be rerouted. If E2 terminates at the Redmond Town Center Station, this potential impact along 161st Avenue NE would be avoided.

4.5 Potential Mitigation

If the D2 Roadway is not designated for joint-use operations for bus and light rail, bus routes that use the D2 Roadway are expected to be rerouted to 4th Avenue S to access downtown Seattle via SR 519. Transit signal priority could be implemented on 4th Avenue S at the I-90 western terminus Airport Way S to improve bus reliability for these affected routes.

With East Link, bus routes on I-90 would not require any mitigation because the I-90 Two Way Transit and HOV Project would be completed prior to East Link construction. The I-90 Two Way Transit and HOV Project would provide HOV lanes in both directions on I-90 between Mercer Island and the Rainier Avenue S interchange. Consistent with the state's HOV policy of a vehicle able to travel at least 45 mph during the peak commuting hour 90 percent of the time, bus reliability would remain similar to that of the No Build Alternative.

No other transit mitigation during operations would be required for the East Link Project because the project would have a beneficial impact on transit service. The transit integration plan provides coordinated bus service with the light rail system, and major park-and-ride lots in the study area would be expanded to better accommodate the increase in transit ridership with the project.

During construction, existing park-and-ride lots that are proposed to be expanded would close fully or partially, and the measures to mitigate the loss of parking at park-and-ride lots (South Bellevue and Overlake Transit Center) could include interim parking lots, shuttle service connecting the park-and-ride lot with interim lots, or additional bus service.

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

Refer to Section 5.0 for mitigation regarding future I-90 operations and Section 6.0 for mitigation regarding arterial and local street traffic operations.

TABLE 4-17
Year 2020 and 2030 Daily Station Ridership (Boardings) Forecasts for Interim Termini Stations

Station	2020								2030							
	Rep. Alternative	Interim Termini Stations							Rep. Alternative	Interim Termini Stations						
		Ashwood/ Hospital	124th	130th	Overlake Village	Overlake Transit Center	SE Redmond	Redmond Town Center		Ashwood/ Hospital	124th	130th	Overlake Village	Overlake Transit Center	SE Redmond	Redmond Town Center
Rainier	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Mercer Island	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
South Bellevue	3,000	2,500	2,500	2,500	2,500	2,500	3,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
SE 8th	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Bellevue Transit Center	3,500	5,000	5,000	4,500	3,500	4,000	3,500	4,000	5,500	7,500	7,500	7,000	5,500	6,000	5,500	6,000
Ashwood/ Hospital	500	500	500	500	500	500	500	500	500	1,000	500	500	500	1,000	500	500
124th	<250	-	500	<250	<250	-	<250	<250	500	-	1,000	500	500	-	500	500
130th	1,000	-	-	1,000	1,000	-	1,000	1,000	1,000	-	-	1,000	1,000	-	1,000	1,000
Overlake Village	1,000	-	-	-	3,000	1,000	1,000	1,000	1,000	-	-	-	4,000	1,500	1,000	1,000
Overlake Transit Center	2,500	-	-	-	-	4,000	3,000	2,500	3,500	-	-	-	-	6,000	4,000	4,000
SE Redmond	1,000	-	-	-	-	-	1,500	-	1,500	-	-	-	-	-	2,000	-
Redmond Town Center	1,000	-	-	-	-	-	-	1,500	1,500	-	-	-	-	-	-	2,000
Station Totals	18,000	12,500	13,000	13,500	15,000	17,000	17,500	17,500	25,500	18,500	19,000	19,000	21,500	24,000	25,000	25,000
Project-Wide Ridership	32,000	23,500	24,000	24,500	27,500	30,500	31,000	31,500	45,500	34,500	35,000	35,500	39,500	43,500	44,500	44,500
Compared to Full Length System		(8,500)	(8,000)	(7,500)	(4,500)	(1,500)	(1,000)	(500)		(11,000)	(10,500)	(10,000)	(6,000)	(2,000)	(1,000)	(1,000)

Notes:

Due to rounding, station ridership may not sum exactly to segment totals.

Results show only the interim stations with the project alternative having the highest full-length ridership. The SR 520 Alternative (D5) at the Overlake Transit Center does not stop at the 124th and 130th stations.

Station and project-wide ridership may vary depending on which alternative connects to the terminus station.

5.0 Highway Operations and Safety

5.1 Section Overview

This section describes the highway operations within the study area and the potential impacts on highways from the East Link Project. I-90 is the only regional highway that would be directly affected during East Link operations. Direct impacts that would occur during East Link operations to SR 520 and I-405 would be limited to light rail transit overpasses and parallel routes. (For discussion of regional travel, including vehicle miles traveled [VMT], vehicle hours traveled [VHT], volume/capacity ratio [v/c ratio], and mode share at the six project screenline locations, refer to Section 3.0.) Key analyses in this section are vehicle and person throughput and capacity, travel time, congestion and level of service (LOS) data, and safety. Analysis was conducted for the AM and PM peak periods in the existing conditions, the East Link Project's year of opening (2020), and the horizon year, consistent with the regional and local agency planning period (2030).

Consistent with long-standing regional objectives of connecting the urban communities in the Puget Sound region, the I-90 center roadway has always been intended to be an HCT connection between Bellevue and Seattle to support higher-density employment and residential land uses on both sides of Lake Washington. The East Link Project would provide a reliable and safe transportation alternative between the region's dense commercial and residential centers, while connecting major employers, businesses, and people across Lake Washington. During the peak period, East Link could carry a total of 18,000 to 24,000 people (9,000 to 12,000 per direction). This is equivalent of about 6 to 10 freeway lanes of traffic.

Without the project, congestion on I-90 would increase and I-90 would reach its vehicular capacity in the near future**.** Congestion would continue to worsen as travel times lengthen, in some cases to twice what they are today. More congestion and longer travel times would further disconnect key employment and population centers of Puget Sound: Seattle and the Eastside. Congestion would extend for longer periods as the peak period exceeds 3 hours. Without light rail's ability to move more people, the imbalance in vehicle capacity would not provide efficient and reliable transportation options to the growing residential and commercial areas on the Eastside. This is highlighted by travel in the reverse-peak direction on I-90, which is projected to have the longest travel time in the no-build condition.

The analysis presented in this section indicates that East Link would move more people and improve travel times compared to the no-build conditions, especially in the reverse-peak direction, which would provide a benefit not only to the overall performance and mobility of I-90 but also to the key urban centers—Seattle, Bellevue, Overlake, and Redmond—through which East Link would pass. Overall, by 2030, the number of people crossing the lake would increase with the East Link Project by 18 percent compared to the no-build condition that does not complete the I-90 Two Way Transit and HOV Operations Project and by slightly less than 10 percent compared to the no-build condition with the I-90 Two Way Transit and HOV Operations Project completed.

While transit total ridership across the lake (i.e., combined transit use on both SR 520 and I-90) would increase by up to 33 percent with the project, I-90 itself would experience a transit total ridership increase of more than 250 percent. This would provide a more balanced mode share across the lake, with up to 25 percent of the people traveling across the lake on I-90 using transit and up to 55 percent using either HOV or transit.

Because light rail would operate within an exclusive, fixed trackway separate from other vehicles traveling along I-90, the shift from people driving to using East Link would reduce the potential for accidents along I-90 and improve traveler safety.

5.2 Affected Environment

Segment A is the only East Link Project segment that would directly affect a regional highway (I-90) during project operations. Potential direct impacts on SR 520, I-5, and I-405 are not considered substantial (see Section 3.0); therefore, traffic operations on SR 520 (which crosses Screenline 2 [Lake Washington], I-5, and I-405 were not evaluated further during East Link operation. However, this section does address SR 520 and I-405 when describing travel demand across the lake (Section 5.3.2) and potential construction impacts (Section 5.3.4). No other regional highways would be affected by this project.

5.2.1 Affected Regional Highway Facilities

Segment A spans approximately 7 miles, originating at the International District/Chinatown Station in Seattle and terminating near the east side of Lake Washington where I-90 reaches South Bellevue. Within the portion of Segment A that crosses Lake Washington, I-90 consists of two “outer” roadways that are the westbound and eastbound mainline lanes, as well as a reversible center roadway that has peak-directional reversible lanes for use by HOVs and Mercer Island drivers, between Seattle and Mercer Island. During the morning peak period, the reversible roadway operates in the westbound direction, and during the afternoon peak period the roadway operates in the eastbound direction. A 1.4-mile corridor for buses and HOVs, called the D2 Roadway, connects the reversible center roadway to the Downtown Seattle Transit Tunnel (DSTT) and the intersection of 5th Avenue S and Airport Way S. East Link would traverse Lake Washington within the I-90 reversible center roadway.

Consistent with long-standing regional objectives of connecting the urban communities in the Puget Sound region, the center roadway has always been intended to be an HCT connection between Bellevue and Seattle to support higher-density employment and residential land uses on both sides of Lake Washington. As documented in Appendix G, the 2004 Amendment to the 1976 I-90 Memorandum Agreement states that “the ultimate configuration for I-90 between Bellevue, Mercer Island, and Seattle should be defined as high-capacity transit in the center roadway and HOV lanes in the outer roadways; and further agree that high-capacity transit for this purpose is defined as a transit system operating in dedicated right-of-way such as light rail, monorail, or a substantially equivalent system” (WSDOT, 2004). In 1996, with voter approval of Sound Move and with the formation of Sound Transit, the Long Range Vision (1996) identified the development of HCT across I-90 with future rail. Implementation of this objective and the 2004 Amendment to the 1976 I-90 Memorandum Agreement has led to three operational analysis studies:

- I-90 Two Way Transit and HOV Operations EIS (WSDOT, Sound Transit, FHWA)
- I-90 Center Roadway Study (WSDOT)
- East Link Project EIS (Sound Transit)

Descriptions of these three studies, their assumptions, and performance measures are provided in Appendix G.

5.2.2 Highway Operations

Freeway traffic operational performance is described in terms of person and vehicle throughput, travel times by mode of transportation, and level-of-service (LOS) (refer to Appendix A for freeway LOS description). Traffic volumes during the AM and PM peak periods were analyzed on freeway lanes and ramps using VISSIM software, which is compatible with the methodologies of the Highway Capacity Manual (Transportation Research Board [TRB], 2000). Current freeway traffic volumes, geometry, vehicle occupancy, and base and ramp free flow speed (FFS) were obtained from existing traffic data and as-built drawings. These data were used to calibrate the simulation to represent current operating conditions on I-90. Appendix A provides greater detail on the assumptions and VISSIM results associated with the freeway analysis.

The three key operating measures that were used to evaluate operating conditions on I-90 are vehicle and person throughput, travel time, and LOS (with congestion maps). Vehicle and person throughput is an indicator of the number of vehicles and people in vehicles that cross a screenline. Compared to vehicle throughput, person throughput is a more appropriate assessment measure for analysis of a transit project because it illustrates the overall efficiency of the system through number of people moved instead of vehicles. Throughput information is presented at Screenlines 2 (Lake Washington) to explain changes in travel patterns across the lake, while the Mercer Slough screenline (Screenline 3) is intended to be used to understand I-90 conditions east of the study area. Travel times provide information on how long it would take to travel through the corridor or certain paths within the corridor. LOS descriptions (with congestion maps as a visual aid) indicate when, how long, and how severely congestion occurs. LOS is useful to understand where poorly operating (i.e., LOS E and F) sections are located. Although LOS is based on vehicle density and the congestion maps are based on speed, the two measurements are generally related to one another. The safety conditions on I-90 also were assessed to evaluate how the project influences the potential for accidents on I-90. For analysis of intersection operations at or near I-90 ramp terminals refer to Section 6, Arterials and Local Streets.

5.2.2.1 Vehicle and Person Throughput

In the existing conditions, from 56 to 57 percent of the total vehicles on I-90 travel in the peak direction (westbound in the AM peak period and eastbound in the PM peak period). In the AM peak hour, slightly fewer than 13,000 vehicles travel on I-90, while in the PM peak hour, slightly more than 13,500 vehicles travel on I-90. In both AM and PM peak hours, the center roadway accommodates less than 15 percent of the total vehicles on I-90, due to its limited access. Access is provided by slip ramps from the outer mainline roadways and the signalized intersection of 5th Avenue S and S Dearborn Street, neither of which provides enough capacity to effectively use the reversible center roadway (WSDOT and Sound Transit, 2004). Table 5-1 provides the I-90 vehicle throughput data for Screenlines 2 and 3 in the AM and PM peak hours.

TABLE 5-1
Existing (2007) I-90 AM and PM Peak-Hour Vehicles and Persons

	AM Peak Hour				PM Peak Hour			
Screenline/ Direction	**Vehicles**	**Persons**	**Vehicle % of Total**	**Person % of Total**	**Vehicles**	**Persons**	**Vehicle % of Total**	**Person % of Total**
Screenline 2 (Lake Washington – I-90 only)								
Westbound Outer Roadway	5,450	6,250	43%	39%	6,000	7,500	44%	43%
Reversible Center Roadway	1,750	3,350	14%	21%	1,850	3,450	14%	20%
Eastbound Outer Roadway	5,500	6,500	43%	40%	5,650	6,500	42%	37%
Screenline 2 Total (for I-90)	12,700	16,100	100%	100%	13,500	17,450	100%	100%
Screenline 3 (I-90 at Mercer Slough)								
Westbound Outer Roadway	7,200	9,550	58%	61%	6,000	6,500	45%	45%
Eastbound Outer Roadway	5,300	6,000	42%	39%	7,250	7,950	55%	55%
Screenline 3 Total	12,500	15,550	100%	100%	13,250	14,450	100%	100%

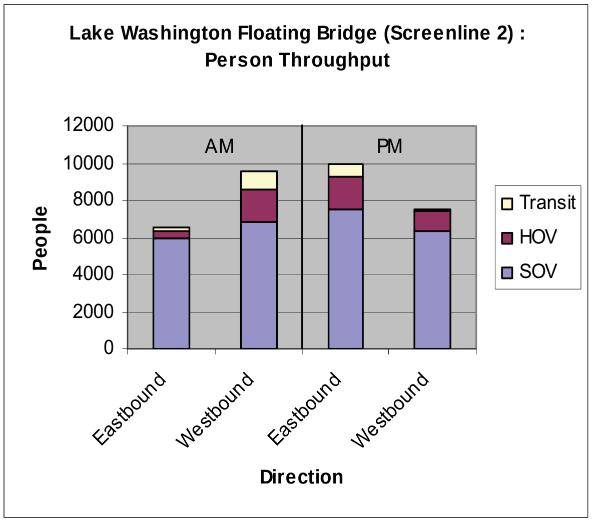
Source: from VISSIM software, CH2M HILL, 2007.

In terms of person throughput, in the AM peak hour on the I-90 floating bridge (Screenline 2), the westbound outer roadway throughput approaches 6,300 persons and the reversible center roadway (westbound direction in the AM peak period) person throughput is approximately 3,300 persons (of which about 25 percent are in buses). The eastbound outer roadway throughput is about 6,500 persons. Overall, about 16,100 people travel I-90 in both directions during the AM peak hour.

In the PM peak hour on the I-90 floating bridge, the westbound outer roadway throughput is about 7,500 persons. The eastbound outer roadway throughput approaches 6,500 persons, and the reversible center roadway (eastbound direction in the PM peak period) throughput is about 3,500 persons (of which about 20 percent are in buses). Overall, about 17,500 people travel I-90 in both directions during PM peak hour.

Similar person throughput trends occur at Screenline 3, except in the eastbound direction during the PM peak hour. Transit usage decreases at Screenline 3 compared to Screenline 2 because some passengers disembark at Mercer Island and some buses exit I-90 at Bellevue Way, so they do not cross Screenline 3.

The mode share at two screenline locations indicate that the proportion of HOV and transit users compared to single-occupant vehicles is generally between 25 and 35 percent in the peak direction and less than 20 percent in the off-peak direction. Exhibit 5-1 shows the existing AM and PM peak-hour person throughput by direction and mode at Screenlines 2 and 3. The person and vehicle throughput in the reversible center roadway is included in the direction in which it operates depending on the time period.



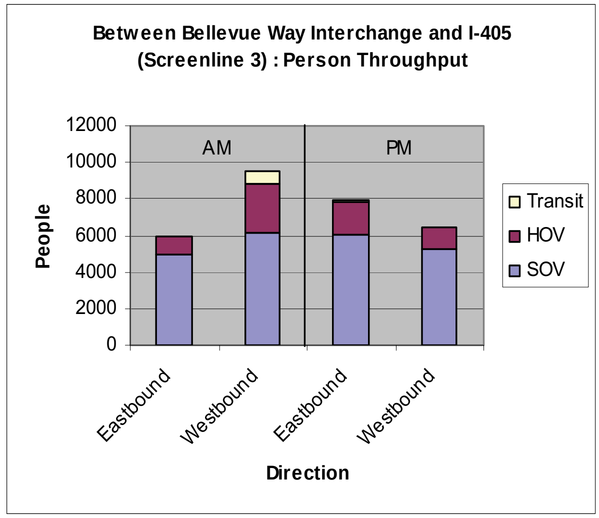


EXHIBIT 5-1
I-90 Existing AM and PM Peak-Hour Person Throughput at Screenlines 2 and 3

5.2.2.2 Travel Time

Existing travel time paths between Seattle and Mercer Island, Bellevue Way, and I-405 were established to understand regional and shorter-distance trips. Specifically, the I-90 travel times were computed to and from three locations in the study area:

- Island Crest Way to and from I-5 in Downtown Seattle
- Bellevue Way SE to and from I-5 in Downtown Seattle
- East of I-405 to and from I-5 in Downtown Seattle

Travel times were computed assuming that transit vehicles destined to or originating from Seattle do not use I-5, but rather the I-90 D2 Roadway, which is exclusive to transit and HOV vehicles. The I-90 D2 Roadway extends between the intersection of Airport Way S and S Dearborn Street and the Rainier Avenue S interchange. Depending on the direction of travel in the reversible center roadway, vehicles may connect between the D2 Roadway and the reversible center roadway or merge/diverge with the westbound and eastbound mainline roadways. Transit vehicles also use the reversible roadway westbound in the AM and eastbound in the PM. Table 5-2 lists the existing AM and PM travel times for single-occupant vehicle, HOV, and transit modes along the three beginning and ending points listed above.

As shown in the table, AM peak-period travel times for single-occupant vehicles traveling westbound to Seattle from I-405 and from Island Crest Way were calculated at 12.4 and 7.2 minutes, respectively. Travel times for transit vehicles traveling westbound to Seattle from I-405 and from Island Crest Way were 12.6 and 5.8 minutes, respectively. Travel times for single-occupant vehicles traveling eastbound from Seattle to I-405 and to Island Crest Way were 14.5 and 7.7 minutes, respectively. Travel times for buses (that stop on Mercer Island) traveling eastbound from Seattle to I-405 and to Island Crest Way were 24.9 and 9.2 minutes, respectively.

PM peak-period travel times for single-occupant vehicles traveling westbound to Seattle from I-405 and from Island Crest Way were 18.5 and 9.1 minutes, respectively. Travel times for transit vehicles traveling westbound to Seattle from I-405 and from Island Crest Way were 20.2 and 10.1 minutes, respectively. Travel times for single-occupant vehicles traveling eastbound from Seattle to I-405 and to Island Crest Way were 16.9 and 11.9 minutes, respectively. Travel times for buses (that stop on Mercer Island) traveling eastbound from Seattle to I-405 and to Island Crest Way were 12.8 and 5.8 minutes, respectively.

TABLE 5-2
I-90 Existing AM and PM Peak-Period Travel Times by Mode

Travel Time Path Endpoints		Travel Time (minutes)					
		AM			PM		
Beginning Point	Ending Point	SOV	HOV	Transit[a]	SOV	HOV	Transit[a]
Westbound Outer Roadway							
Mercer Island (Island Crest Way)	I-5 to Downtown Seattle[b]	7.2	7.2[c]	- / -	9.1	9.1	10.1 / 7.1
Bellevue Way[d]	I-5 to Downtown Seattle[b]	10.0	10.0[c]	- / -	16.7	16.8	18.1 / -
I-405	I-5 to Downtown Seattle[b]	12.4	12.4[c]	- / -	18.5	17.5	20.2 / 17.1
Reversible Center Roadway[e]							
Mercer Island (77th Avenue SE)	I-5 to Downtown Seattle[f]	6.8	N/A	- / -	8.0	N/A	- / -
Mercer Island (77th Avenue SE)	Seattle (5th Avenue S[g])	N/A	5.0	5.8 / 5.7	N/A	5.3	5.8 / 5.5
Bellevue Way	Seattle (5th Avenue S[g])	N/A	7.5	10.7 / -	N/A	8.0	10.8 / -
I-405	Seattle (5th Avenue S[g])	N/A	9.8	12.6 / 10.6	N/A	9.9	12.8 / 10.3
Eastbound Outer Roadway							
I-5 from Downtown Seattle[h]	Mercer Island (Island Crest Way)	7.7	7.5	9.2 / 8.4	11.9	11.9[c]	- / -
I-5 from Downtown Seattle[h]	Bellevue Way[d]	12.1	11.7	19.5 / -	15.0	15.0[c]	- / -
I-5 from Downtown Seattle[h]	I-405	14.5	14.2	24.9 /16.4	16.9	16.9[c]	- / -

[a] The two values in the transit column indicate transit routes with stops on Mercer Island / transit routes with no stops on Mercer Island.
[b] All vehicles end at I-5 northbound ramp, except transit vehicles, which use the I-90 D2 Roadway.
[c] Travel time for HOV is the same as for SOVs for comparable route.
[d] Buses and HOV use the reversible center roadway Bellevue Way ramp.
[e] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak.
[f] SOV vehicles are required to exit/enter reversible center roadway at Rainier Avenue S interchange.
[g] Travel time is to and from 5th Avenue S via the I-90 D2 Roadway.
[h] All vehicles start at I-5 southbound ramps to I-90.

N/A = Travel time for this path was not prepared because either there is no transit route on this path or the route's travel time by this mode is not applicable.

- = Buses that do not travel on this roadway during this period and/or do not travel between these points.

SOV = single-occupant vehicle

5.2.2.3 Level of Service

The LOS on I-90 varies throughout the study area. Substantial congestion/bottlenecks occur when vehicles travel at stop-and-go conditions (LOS F), and vehicle queues are observed throughout a majority of the peak periods, especially in the PM peak period. The congestion maps in Exhibit 5-2 illustrate the I-90 mainline LOS. These congestion maps indicate vehicle travel speeds over time (vertical axis) and distance (horizontal axis). The time indicated on these maps is a 2.5-hour duration in both the AM (6:30 to 9:00 a.m.) and PM (3:30 to 6:00 p.m.) peak periods. The distance covers I-90 from the western terminus at SR 519 to east of I-405 interchange. Although LOS is based on vehicle density and the congestion maps are based on speed, the two measurements are generally related to one another. In Exhibit 5-2, LOS E or F conditions (speeds at or below 55 mph) are indicated where areas of yellow, red, or black occur. LOS D (vehicle speeds over 55 mph) or better are portrayed where areas of green occur.

AM Peak Period

For travel in the westbound direction from east of I-405 during the AM peak period, all I-90 sections operate at LOS E or better until the area between the Rainier Avenue S southbound off-ramp and the I-5 interchange, which operates at LOS F.

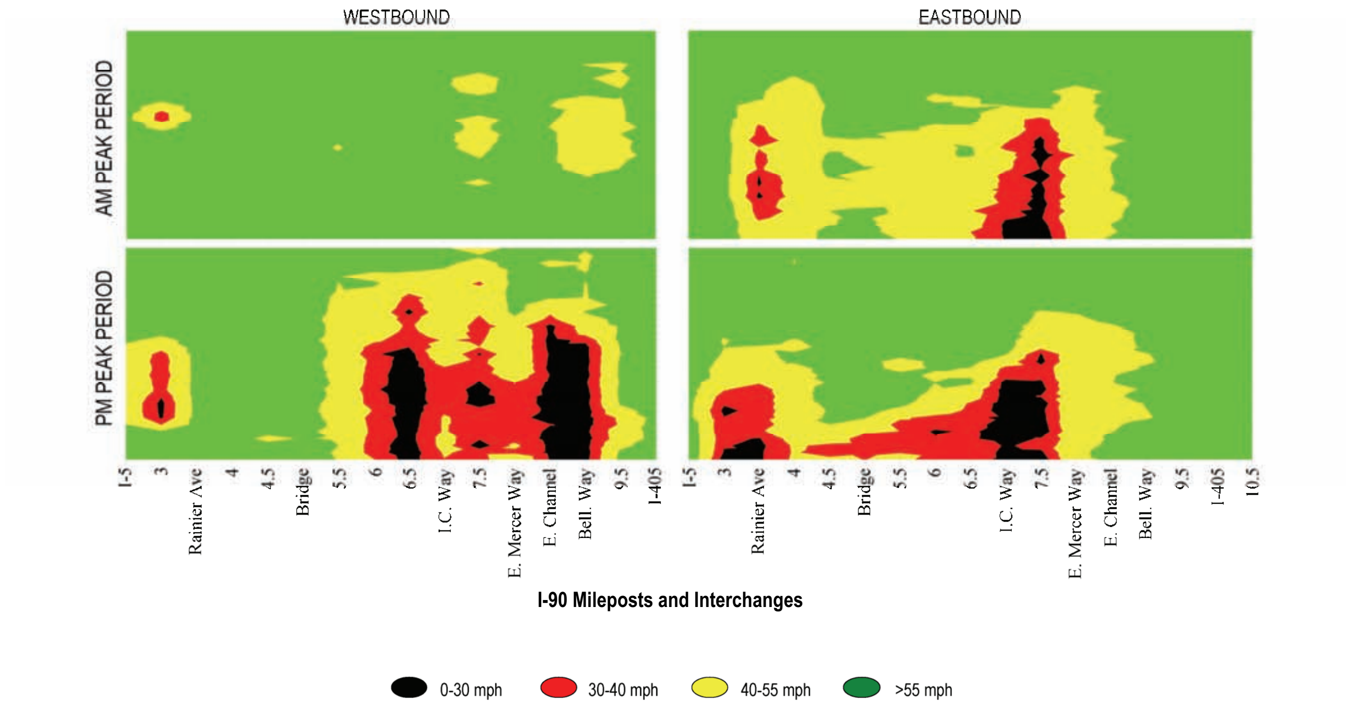


EXHIBIT 5-2
I-90 Existing Year AM and PM Peak-Period Vehicle Speeds in General-Purpose Lanes

For travel in the eastbound direction, I-90 west of I-5, during the AM peak period, all sections operate better than LOS E until the Rainier Avenue S interchange. East of the Rainier Avenue S interchange to the East Mercer interchange, I-90 operates at LOS E or worse. Within this section, LOS F conditions occur near the Rainier Avenue S interchange through the Mount Baker Tunnel and across Mercer Island. All other sections to the east of the East Mercer off-ramp operate at LOS D or better.

In the AM peak period, the reversible center roadway operates in the westbound direction and all sections operate at LOS B or better, with the worst operating conditions at the western terminus of the reversible roadway near the Rainier Avenue S interchange where vehicles in the center roadway merge with the traffic onto the I-90 mainline.

PM Peak Period

For travel in the westbound direction, I-90 operates at LOS D or better west of the I-405 on-ramp. I-90 west of the I-405 on-ramp until the First Hill Tunnel on Mercer Island operates at LOS E or worse. Across the I-90 floating bridge and into Seattle, I-90 operates at LOS D or better, except between Rainier Avenue S and the I-5 interchanges, where I-90 operates at LOS F.

For travel in the eastbound direction, I-90, from west of I-5, operates at LOS D or better until the I-5 interchange. East of the I-5 interchange, I-90 operates at LOS F until the section between the East Mercer and Bellevue Way interchanges. This section, across the East Channel Bridge, operates at LOS E. At the Bellevue Way interchange, I-90 conditions degrade and operate at LOS F. East of the Bellevue Way off-ramp, I-90 operates at LOS D or better.

In the PM peak period, the reversible center roadway operates in the eastbound direction and all sections operate at LOS B or better, with the worst operating conditions at the western origin of the reversible center roadway near the Rainier Avenue S interchange where vehicles from the D2 Roadway and from the I-90 mainline merge together into the center roadway.

5.2.2.4 Freeway Safety

Existing accident data along the study corridor were collected from WSDOT for the 3-year period from 2004 to 2006 (WSDOT, 2007a). The accident study corridors included the westbound, eastbound, and reversible center roadways. The extent of the analysis was between the I-90 western terminus with SR 519 to just east of I-405, slightly more than an 8-mile section.

In the westbound direction, the overall I-90 corridor accident rate for I-90 is 0.98 accident/million vehicle miles (acc./MVM). In the eastbound direction, the rate is 0.80 acc./MVM. The reversible center roadway accident rate is 0.45 acc./MVM. These accident rates are well below the average accident rate for urban interstate facilities (1.57 acc./MVM) in the Northwest Region of WSDOT.

Accident rates are also calculated by freeway sections. Two I-90 sections in the westbound direction, one I-90 section in the eastbound direction, and two I-90 sections in the reversible center roadway have accidents rates higher than the average accident rate for urban interstate facilities in the Northwest Region of WSDOT. These sections and their accident rates are discussed in the following paragraphs.

I-90 Westbound. The I-90 westbound section near the western terminus of the westbound mainline from the I-5 northbound off-ramp to SR 519 (0.85-mile length) has an accident rate of 1.59 acc./MVM. The second westbound mainline section is near the eastern end of the study area between the off-ramp to I-405 and the on-ramp from I-405 (1.08-mile length). It has an accident rate of 2.72 acc./MVM.

I-90 Eastbound. The I-90 eastbound section from Atlantic Street to the I-5 northbound and southbound on-ramp (0.64-mile length) has an accident rate of 1.71 acc./MVM.

I-90 Reversible Center Roadway. The first freeway section of the I-90 reversible center roadway that has an accident rate above the average for urban interstate facilities in the Northwest Region of WSDOT is just west of the Rainier Avenue transit flyer stop to the eastern edge of the Mount Baker Tunnel (0.78-mile length). It has the highest accident rate in the reversible center roadway, at 2.06 acc./MVM. The second section is located between the I-90 on/off-ramp at East Mercer Way and the beginning/ending point of the reversible center roadway at Bellevue Way SE (1.03-mile length). This section has an accident rate of 1.66 acc./MVM.

Comparing injury accident rates on each of the three roadway sections, the I-90 westbound roadway injury accident rate is 0.28 injury acc./MVM, the injury accident rate for the I-90 eastbound roadway is 0.26 injury acc./MVM, and the reversible center roadway injury accident rate is 0.18 injury acc/MVM. All roadways are below the urban interstate average for injury accident rate in the WSDOT Northwest Region, which is 0.53 injury acc./MVM. Two sections in the westbound roadway, one in the eastbound roadway, and one in the reversible center roadway exceed the statewide average for injury accident rate. All of the I-90 westbound and eastbound roadway sections mentioned previously regarding the total accident rate have an injury accident rate higher than the average injury rate. The one reversible roadway section that does have an injury accident rate higher than the statewide average is the section from the Rainier Avenue transit flyer stop to the eastern edge of the Mount Baker Tunnel.

The accident analysis also identified high-accident location (HAL) and high-accident corridor (HAC) locations, as defined by WSDOT. A HAL is defined as a spot location, less than 1 mile long, determined to have a higher than average rate of severe accidents during the previous 2 years. A HAC is defined as a segment of a state highway facility longer than 1 mile, having a higher than average rate of severe accidents during a continuous period. Three I-90 HAL locations and no HACs were identified in the study area, as follows:

- Westbound off-ramp to Rainier Avenue S northbound
- I-405 southbound HOV to I-90 westbound HOV ramp
- Westbound off-ramp to I-405

The two HACs associated with ramps to and from I-405 are at the eastern fringe of the study area and outside the influence of the project.

5.3 Environmental Impacts

This section describes the differences in I-90 operations between the no-build and build conditions for years 2020 and 2030. Consistent with the SR 520 Bridge Replacement and HOV Project Supplemental Draft EIS, which is slated to be published in late 2009 or early 2010, the year 2030 analysis assumed SR 520 improvements and tolling strategies for both no-build and build conditions. Year 2020 analysis does not assume any improvements or tolling implemented on SR 520.

Along I-90, the East Link Project was compared to two No Build Alternatives, even though the entire I-90 Two Way Transit and HOV Operations Project would need to be completed prior to the East Link Project so that HOV traffic can be moved from the center roadway to the outer roadways. Stage 1 of the I-90 Two Way Transit and HOV Operations Project was recently completed and Stage 2 is being designed, but Stage 3 may not be completed until just before East Link construction begins. If the I-90 Two Way Transit and HOV Operations Project is completed well before East Link construction begins, the reversible center HOV lanes would be available for bus transit, HOVs, and Mercer Island drivers in conjunction with the new HOV lanes. As the HOV lanes in the outer roadway might not be completed until just before construction of East Link, two No Build Alternatives were analyzed:

1. With the Stage 3 HOV lanes completed immediately before East Link, so that HOV and transit traffic shift from using the center roadway to the outer roadway HOV lanes but never use both at the same time. This is referred as the No Build Alternative with Stages 1 and 2 only. This no-build condition would continue to provide a total of eight lanes across the I-90 bridge (three general-purpose lanes in the westbound direction and three in eastbound direction, and two HOV lanes in the reversible center roadway). The floating bridge section of I-90 would remain unchanged.

2. With the Stage 3 HOV lanes completed and the center roadway available for transit, HOV users, and Mercer Island drivers. In this No Build Alternative, both the center roadway and outer HOV lanes are open the entire distance between Seattle and Bellevue. This is referred to as the No Build Alternative with Stages 1 through 3. This condition would provide a total of 10 lanes across the I-90 bridge (three general-purpose and one HOV lane in each of the westbound and eastbound directions and two HOV lanes in the reversible center roadway).

Both of these variations were evaluated for years 2020 and 2030. In all conditions (build and no-build), the I-90 HOV lanes would be designated for access by 2+ person vehicles.

Therefore the new HOV lanes in the outer roadway would never operate in conjunction with the center roadway before construction of East Link; allowing I-90 to continue providing eight total traffic lanes (three general-purpose lanes and one HOV lane in each of the westbound and eastbound directions). Exhibit 5-3 provides a schematic of the three stages of the I-90 Two Way Transit and HOV Operations Project. Additionally, in all future conditions (no-build and build) the SR 519 Intermodal Access Project is assumed to be completed; this project, on the western edge of I-90, will provide an additional ramp from I-90 to Seattle at S Atlantic Street.

The build condition would provide light rail along I-90 in the reversible center roadway and close all other vehicle access to the center roadway. Exhibit 5-4 provides the I-90 configuration between Seattle and Mercer Island for the No Build Alternative and with the East Link Project. These access changes are further discussed in Section 5.3.1.

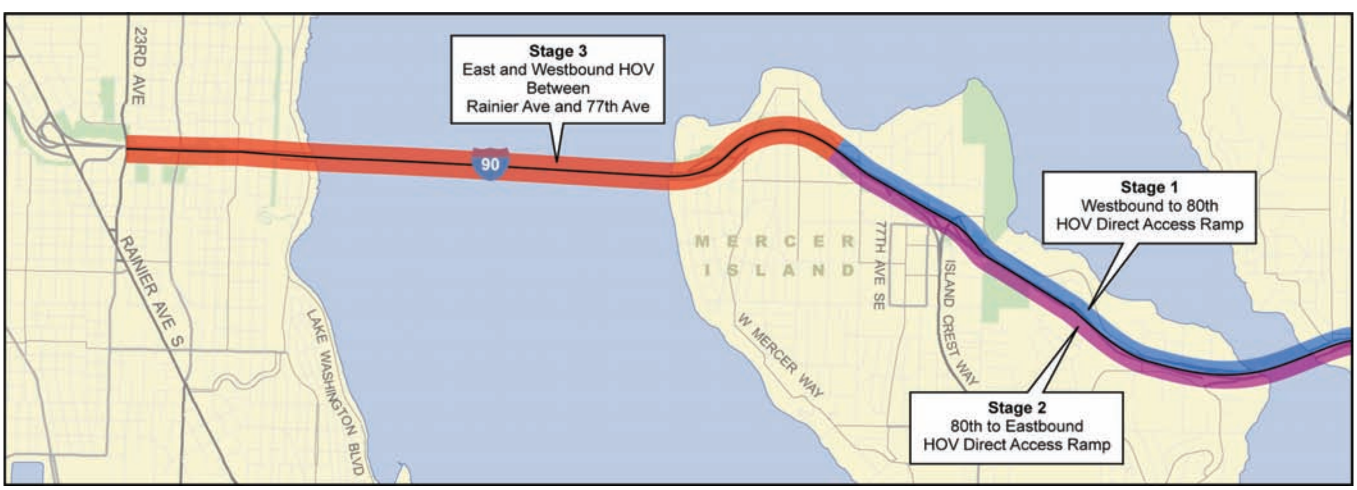


EXHIBIT 5-3
I-90 Two Way Transit and HOV Operations Project Stages

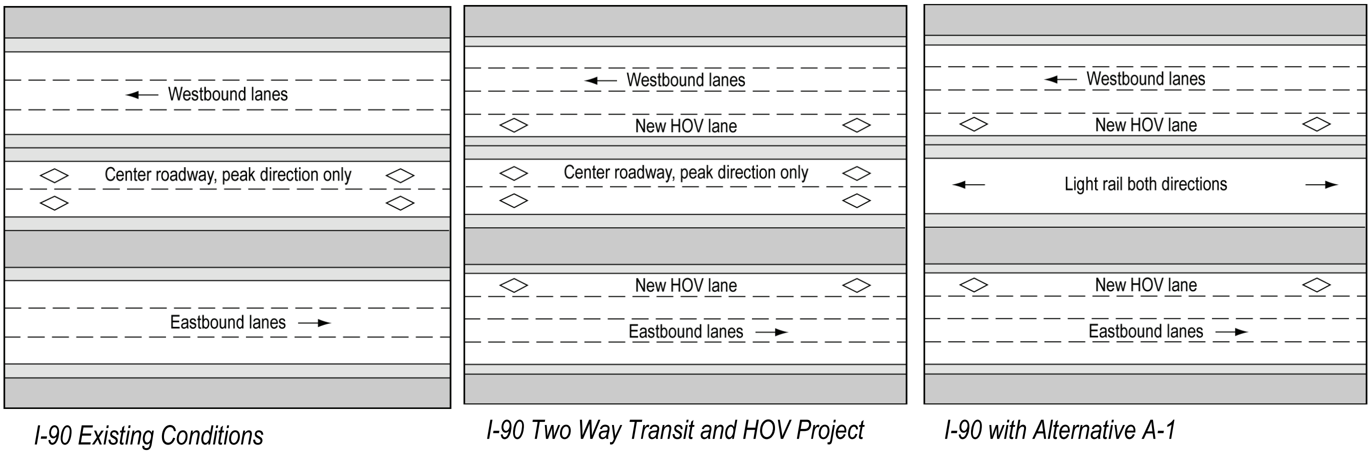


EXHIBIT 5-4
I-90 Configuration Before and After East Link

5.3.1 Access and Circulation Impacts

The I-90 Two Way Transit and HOV Operations Project and the SR 519 Intermodal Access Project, as discussed previously, will modify access and circulation along the I-90 corridor in the no-build condition. With East Link, access and circulation modifications would affect the D2 Roadway, access to the center reversible roadway, and the HOV ramps connecting to Bellevue Way SE. Exhibit 5-5 and Table 5-3 describe in detail the access modifications of the SR 519 Intermodal Access Project, I-90 Two Way Transit and HOV Operations Project, and the East Link project.

The project includes two options for use of the D2 Roadway that connects South Seattle with I-90: either the roadway would jointly operate with buses and light rail or it would operate with light rail exclusively. HOVs would not be allowed to use this roadway for either option with the East Link Project. For the option that has exclusive light rail use in the D2 Roadway, buses would be rerouted to other roadways to access I-90 from South Seattle (such as 4th Avenue S via SR 519).

With the East Link Project, during construction and operations, the reversible center roadway access would be removed to and from the I-90 westbound and eastbound mainline roadways as well as its ramps connecting to Mercer Island. These reversible center roadway ramps with Mercer Island are at 77th Avenue SE and Island Crest Way. Mercer Island drivers would have direct access to the mainline HOV ramps, which would be moved to the outer roadway. With the access modifications as part of the East Link Project and the I-90 Two Way Transit and HOV Operations Project, Mercer Island drivers would continue to have full access in all directions to I-90 in the Downtown Mercer Island area (between 76th Avenue SE and Island Crest Way/SE 26th Street). Additionally, in the build condition, it was assumed that Mercer Island drivers will be eligible to use the HOV lanes in both directions of I-90 between Seattle and Island Crest Way, as long as the lanes meet performance standards or until such time as they are managed differently based on the WSDOT and Mercer Island Access Plan. This agreement is discussed in Section 3.3.3.2 and documented in Appendix G.

If the center roadway is scheduled to be closed for light rail construction soon after the completion of the I-90 Two Way Transit and HOV Operations Project, the eastbound HOV off-ramp proposed at 77th Avenue SE, as part of the HOV Operations Project, could instead be built by Sound Transit and WSDOT to connect with the Island Crest Way eastbound off-ramp from the center roadway. This access modification is not expected to impact I-90 mainline operations and potentially could improve operations because this modification provides a connection to Mercer Island residents to the south. Bus use of 77th Avenue SE ramp would be partially or wholly replaced by light rail service.

In Segment B, the Bellevue Way Alternative (B1), would close the I-90 eastbound HOV off-ramp and the westbound HOV direct access on-ramp at the Bellevue Way SE interchange because the light rail track would use the ramps beneath the westbound mainline roadway to exit the center roadway. The other Segment B alternatives (B2A, B2E, B3, and B7) would preserve the westbound HOV direct access on-ramp by exiting the center roadway on a new elevated structure over the westbound mainline. These other alternatives also have the option to either close or keep open the eastbound HOV off-ramp from I-90 to Bellevue Way SE. Conceptual design indicates that keeping the eastbound HOV ramp open would require reconstructing this ramp, reconstructing the eastbound I-90 to I-405 transit/HOV braided ramp, and widening the I-90 mainline to the south (see drawings in Appendix G1). The modifications to keep the ramp open would require design deviations for reduced inside shoulder width and possibly for stopping sight distance in the HOV lane, and for traffic lane widths. Further design refinement and evaluation would be required for this scenario.

TABLE 5-3
I-90 Future Channelization and Access Modifications

Modification/Ramp	No Build[a]		Build
	No Build[b]	No Build[c]	
SR 519 Intermodal Access Project			
• Revise westbound access to Seattle via new ramp connection with S Atlantic Street. Maintain existing ramp to 4th Avenue S.	X	X	
I-90 Two Way Transit and HOV Operations Project			
• Construct I-90 westbound and eastbound HOV lane to outer roadway from East Mercer Way to 80th Avenue SE.	X	X	
• Construct an 80th Avenue SE westbound HOV direct-access off-ramp.	X	X	
• Modify Bellevue Way interchange for two-way continuous HOV operations to and from the west.	X	X	
• Modify the eastbound on-ramp at 80th Avenue SE to connect from the reversible center roadway to the new eastbound HOV lane in the outer roadway.	X	X	
• Add an eastbound I-90 general-purpose lane between East Mercer Way and I-405 interchanges.	X	X	
• Restripe the I-405 westbound on-ramp to provide an additional I-90 lane to the Bellevue Way westbound on-ramp. This modification extends the auxiliary lane across the East Channel Bridge to the I-405 westbound on-ramp.	X	X	
• Convert the HOV bypass lane on the Bellevue Way westbound on-ramp to a general-purpose lane.	X	X	
• Add a westbound and eastbound HOV lane to the outer roadways between 80th Avenue SE to Rainier Avenue S.		X	
• Construct an eastbound HOV direct-access off-ramp at 77th Avenue SE.		X	
East Link Project			
• Restrict HOVs from using the I-90 D2 Roadway between Seattle and Rainier interchange.			X
• Close vehicle access to and from the reversible center roadway at Rainier Avenue S and E Mercer Way.			X
• Close the Island Crest Way access to and from the reversible center roadway.			X
• Close the 77th Avenue SE westbound on-ramp/eastbound off-ramp access to the reversible center roadway.			X
• Option to close or keep open the eastbound direct-access HOV off-ramp to Bellevue Way.			X
• Close the eastbound direct-access HOV off-ramp and westbound direct-access HOV on-ramp to and from Bellevue Way.[d]			X[d]

[a] Source: WSDOT web site: http://www.wsdot.wa.gov/Projects/I90/TwoWayTransit/ and http://www.wsdot.wa.gov/Projects/SR519.

[b] With SR 519 Project and Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[c] With SR 519 Project and Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

[d] Applies to Bellevue Way Alternative (B1) only.

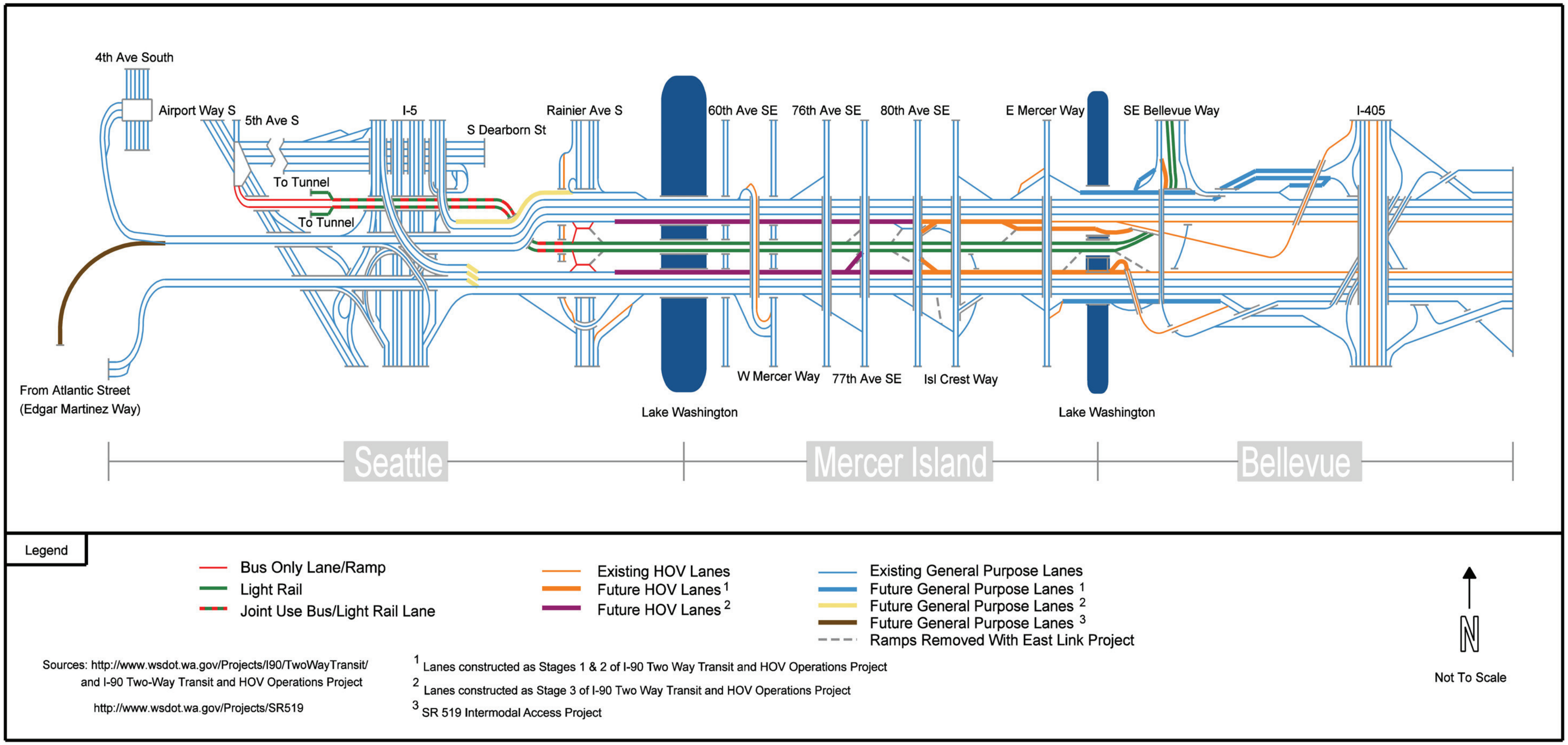


EXHIBIT 5-5
I-90 Future Channelization and Ramps with the East Link Project

Unless specifically mentioned in this section (Section 5.3), the build analysis and results are for the condition that would maintain the westbound Bellevue Way SE HOV direct-access on-ramp to the westbound I-90 HOV lane and would maintain current bus routes between Seattle and I-90. The analysis with the closure of the Bellevue Way SE westbound HOV direct-access on-ramp and exclusive light rail use in the D2 roadway is discussed in Section 5.3.3.

5.3.2 Travel Demand Forecasts

Vehicle and transit demand forecasts were prepared using the PSRC and Sound Transit travel demand models, as described in Section 3.3.1. Based on the forecasts for the 2020 and 2030 no-build conditions, a slightly higher growth rate was predicted on I-90 in the AM peak period than in the PM peak period. In the AM peak period, a growth rate of slightly over 2 percent per year was projected, and in the PM peak period, a growth rate of nearly 2 percent per year was projected. The overall vehicle growth rates are similar in both of the two future no-build conditions.

In the 2020 build condition, slightly less vehicle growth was predicted compared to the no-build condition, because more people would shift to use of transit and the center roadway would be closed. By 2030, this shift to light rail would be more evident, because East Link would provide a more reliable mode of travel with substantial travel-time savings. Table 5-4 provides the existing, 2020, and 2030 3-hour vehicle demand forecasts within the I-90 study area.

TABLE 5-4
3-Hour Vehicle Demand Forecasts Within I-90 Study Area

Direction	Vehicles						
		2020			2030		
	Existing	No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	29,600	41,100	41,500	40,500	47,900	48,000	46,100
Eastbound	22,300	29,700	29,300	28,500	35,500	35,300	33,800
PM Peak Period							
Westbound	32,800	43,400	44,100	43,400	52,500	53,300	52,300
Eastbound	36,200	45,200	45,700	44,400	54,700	55,100	52,100

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

Source: PSRC and Sound Transit travel demand models.

Although it is likely that roadway capacity on I-90 will be reached before 2030, there will be a continued increase in auto demand up to 2030. It was assumed the SR 520 bridge (assumed to be rebuilt by 2030) will include HOV lanes and tolling (consistent with the SR 520 Bridge Replacement and HOV Project Supplemental Draft EIS, which is slated to be published in late 2009 or early 2010) that would potentially change some people's travel patterns to use of I-90. Section 6.3 discusses the East Link Project's overall demand forecasting process.

As part of the travel demand forecasting, the demand mode share between single-occupant vehicle, HOV, and transit were calculated for both no-build and build conditions. Although this information is also presented in Section 3.3, more detailed information regarding the forecasted users of I-90 is provided in this section. As expected with more congestion, the forecasts suggest a slight shift towards people using HOV and transit in the future no-build condition, and between no-build and build conditions, the forecasts suggest a substantial shift to transit.

Analysis of Screenline 2 (Lake Washington), which includes both I-90 and SR 520 forecasts, indicates a noticeable shift to transit with the East Link Project. Between a 10 and 25 percent shift to transit is predicted in the AM peak period and between a 25 and 33 percent shift to transit in the PM peak period. Table 5-5 shows the mode share at Screenline 2 with both SR 520 and I-90.

TABLE 5-5
Screenline 2 (Lake Washington) Mode Share With I-90 and SR 520

Direction	Single-Occupant Vehicle/HOV/Transit Mode Share (percent)						
	Existing	2020			2030		
		No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	65/20/15	70/15/15	65/21/14	56/25/19	64/16/20	62/18/20	57/21/22
Eastbound	76/18/6	74/18/8	74/18/8	69/20/11	69/18/13	69/18/13	67/17/16
PM Peak Period							
Westbound	62/33/5	60/34/6	62/32/6	61/31/8	56/34/10	57/34/9	55/33/12
Eastbound	57/30/13	54/34/12	57/31/12	56/29/15	54/30/16	53/32/15	51/30/19

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

Source: PSRC and Sound Transit travel demand models.

Although Screenline 2 includes both I-90 and SR 520, analyzing only I-90 at Screenline 2 indicates a more substantial mode shift to transit in the build condition. The pie charts in Exhibit 5-6 provide a comparison between the no-build and build mode share on I-90 in year 2030. By 2030, the transit share would more than double from no-build conditions as people readjust their mode choice and choose to ride light rail because of faster travel times compared to bus or auto modes. The overall transit mode share (combined eastbound and westbound) in 2030 on I-90 would increase from about an 11 percent and 8 percent share (AM and PM peak, respectively) in the no-build condition to slightly over a 20 percent share in both AM and PM peak build conditions. In both 2020 and 2030, the single-occupant vehicle and HOV mode share would decrease in the build condition as people modify their driving choice and choose to use light rail.

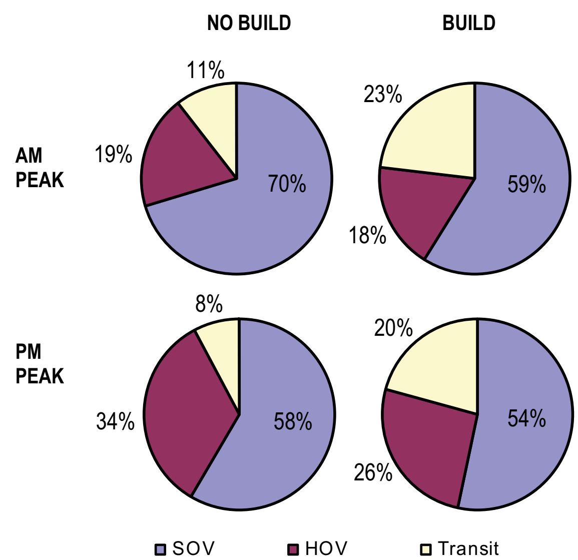


EXHIBIT 5-6
Screenline 2 (I-90 only) 2030 Mode Share
Source: PSRC and Sound Transit travel demand models

At Screenline 3 (I-90 at Mercer Slough) (Table 5-6), the transit mode share shifts would be less pronounced with the project as light rail would not cross the screenline. Slight changes to mode share are forecast at Screenline 3 in 2020 and 2030 with East Link.

For a further discussion of the mode share at all six screenlines in the study area, refer to Section 3.0, Regional Travel.

TABLE 5-6
Screenline 3 (I-90 at Mercer Slough) Mode Share

Direction	Single-Occupant Vehicle/HOV/Transit Mode Share (percent)						
		2020			2030		
	Existing	No Build[a]	No Build[b]	Build	No Build[a]	No Build[b]	Build
AM Peak Period							
Westbound	70/24/6	67/28/5	66/29/5	67/29/4	64/28/8	63/29/8	68/25/7
Eastbound	76/21/3	76/20/4	76/20/4	75/20/5	77/18/5	76/19/5	77/16/7
PM Peak Period							
Westbound	59/39/2	57/40/3	55/43/2	58/39/3	58/38/4	56/41/3	60/35/5
Eastbound	58/38/4	60/35/5	57/39/4	64/32/4	58/35/7	58/35/7	69/24/7

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

Source: PSRC and Sound Transit travel demand models.

5.3.3 Highway Operational and Safety Impacts

Based on the forecasts described in Section 5.3.2, freeway operations during the AM and PM peak periods were analyzed using the VISSIM simulation software package for years 2020 and 2030. Appendix A provides information on the assumptions for the future conditions analysis. Similar to existing conditions, the following four measures were used to assess I-90:

- Vehicle and person throughput and capacity
- Travel time
- Level of service (congestion maps)
- Safety

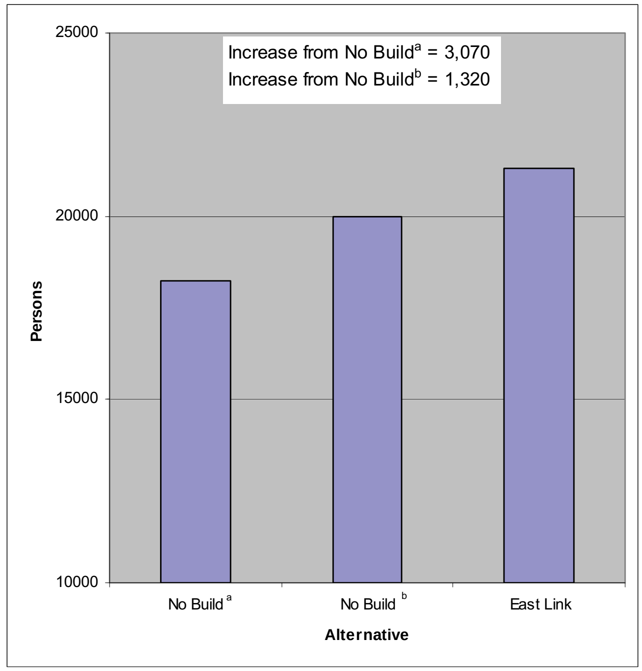
This section presents vehicle and person throughput results at Screenlines 2 and 3. Travel times are provided along the full length of the corridor and at specific locations within the corridor. Congestion maps are presented as a visual tool to help identify the I-90 LOS, including when, how long, and how severely congestion occurs. A safety comparison between the no-build and build conditions is provided to show how the project might affect the number of accidents on I-90.

5.3.3.1 Vehicle and Person Throughput and Capacity

Vehicle and person throughput were tabulated at the two screenlines that intersect with I-90, Screenlines 2 and 3. Throughput is summarized for the single-occupant vehicle, HOV, and transit modes. For the build condition, transit includes both bus and light rail passengers at Screenline 2 but only bus passengers at Screenline 3 as light rail does not cross Screenline 3.

With East Link, the overall person throughput across the lake (Screenline 2) in the AM and PM peak hours in 2030 would increase by about 3,070 people (about 18 percent) when compared to the No Build Alternative with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project and about 1,320 people (about 7 percent) when compared to the No Build Alternative with Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project (Exhibit 5-7). This increase would occur because bidirectional light rail is a more efficient use of space to move more people between Seattle and the Eastside than the one-direction center roadway with its restricted access and egress that limit vehicle capacity.

Although throughput describes the number of people forecasted to travel across Screenline 2 in 2020 and 2030, the total person capacity of I-90 across Lake Washington would substantially improve with East Link. Providing light rail in the center roadway would not only serve both directions at all times, but it would also provide a substantial capacity increase than the existing reversible center roadway. Compared to the No Build Alternative, East Link would increase the I-90 person capacity across Lake Washington. The project would use dedicated right-of-way, allowing East Link to operate reliably, independent of congested roadway conditions. The project is planned to operate during the peak periods with a train-arrival frequency (i.e. headway) of every 9 minutes by 2030. The project has the capacity to comfortably carry 600 persons per 4-car train and 800 persons with crowded conditions with 4 minute headways. During the peak period, East Link could carry a total of 18,000 to 24,000 people (9,000 to 12,000 per direction). This is the equivalent of about 6 to 10 freeway lanes of traffic, assuming that automobiles in the Puget Sound region average 1.17 persons per vehicle during commute hours, or about 2,300 persons per hour per freeway lane. The following subsections present the vehicle and person throughput results at Screenlines 2 and 3.



[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project

EXHIBIT 5-7
I-90 AM and PM Peak-Hour Person Throughput with Light Rail in 2030

Screenline 2 (Lake Washington for I-90 only)

At Screenline 2, the person throughput in the build condition would be higher in every direction in both years 2020 and 2030 when compared to the no-build condition with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. If Stage 3 of the I-90 Two Way Transit and HOV Operations Project is assumed to be complete in the no-build condition, the build condition person throughput would be higher in all directions in year 2020 and in all directions in year 2030 except for the eastbound direction in the PM peak hour, as indicated in Exhibit 5-8. This is because the project would provide another option for people to use when crossing the lake, which would improve the mobility on I-90. However, some users would be adversely affected, as described in the following paragraphs.

In the 2020 build condition during the AM peak hour, there would be close to a 20 percent increase in total person throughput compared to the no-build condition where only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project are completed. For the no-build condition, assuming Stage 3 of the I-90 Two Way Transit and HOV Operations Project is also completed, there would be about an 8 percent increase in person throughput in the AM peak hour. In the PM peak hour, there would again be close to a 20 percent increase in the total person throughput compared to the no-build condition that includes only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. Person throughput is expected to increase 4 percent when comparing the build condition to the no-build condition that assumes Stage 3 of the I-90 Two Way Transit and HOV Operations Project is completed.

In 2030, a similar trend is expected. There would be close to a 25 percent increase in total person throughput in the AM peak hour comparing the build condition to the no-build condition (with Stages 1 and 2 only) and a 12 percent increase when comparing the build condition to the no-build condition with Stage 3 completed. In the PM peak hour, total person throughput would substantially increase, by 11 percent compared to the no-build condition that includes only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. Person throughput is expected to increase by 3 percent when comparing the build condition to the no-build condition that assumes Stage 3 of the I-90 Two Way Transit and HOV Operations Project is completed. Compared to the no-build condition if Stage 3 is completed, a slight reduction (about 3 percent) in person throughput is predicted in the eastbound direction in the build condition due to a relatively low throughput in the HOV lane that crosses the screenline. Lane changing associated with the transition of the general-purpose lane to an HOV lane near the Rainier Avenue S interchange and the additional vehicles involved in the lane changing due to the center roadway closure would result in reduced throughput in the HOV lane. If the lane is managed in a way that accommodates more people, the throughput should be comparable in the no-build and build conditions.

The greatest increase in person throughput would occur in the reverse-peak direction on I-90 (eastbound in the AM peak hour and westbound in the PM peak hour) because light rail would provide a more reliable transportation option for people to use and would be opposite of the reversible center roadway direction. In year 2020 and 2030, East Link would provide from a 16 percent to a 26 percent increase in person throughput in the reverse-peak direction compared to the no-build condition where only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project are completed and from a 7 to a 16 percent increase in person throughput compared to the no-build condition when the I-90 Two Way Transit and HOV Operations Project is fully completed.

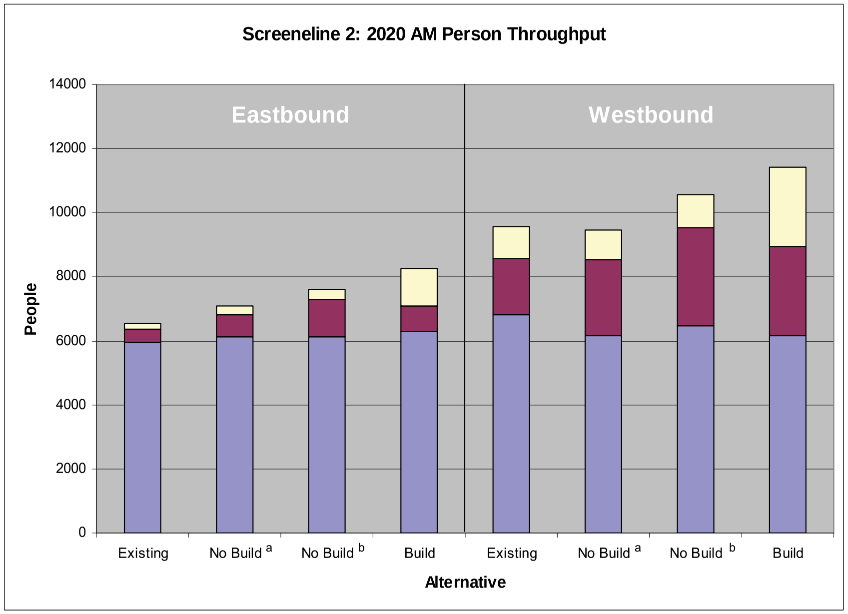
In terms of vehicle throughput, the build condition would have a similar to higher vehicle throughput in the reverse-peak direction during each peak hour (i.e., eastbound AM peak and westbound PM peak) than the no-build condition (with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3) because the vehicle capacity would not change in this direction and people would adjust their mode choice to use light rail. People shifting to light rail would cause a slight reduction in the level of congestion and therefore an increase vehicle throughput. While in most cases the East Link Project would increase the person throughput in the peak direction, the vehicle throughput in the peak direction would be similar to slightly reduced compared to the No Build Alternative, as the center roadway would be closed for vehicle access. In both years 2020 and 2030, the vehicle throughput would be only slightly reduced in the westbound direction in the AM peak hour, because even though the reversible center roadway would be closed to vehicle access in the build condition, Mercer Island drivers would be able to use the HOV lanes in the outer roadways. In the eastbound direction for the PM peak hour, vehicle throughput would be similar in the no-build and build conditions in 2020, but in year 2030, there would be a decrease of about 1,000 vehicles in the build condition due to a relatively low throughput in the eastbound HOV lane that crosses the screenline, as previously discussed. Table 5-7 lists Screenline 2 vehicle and person throughput.

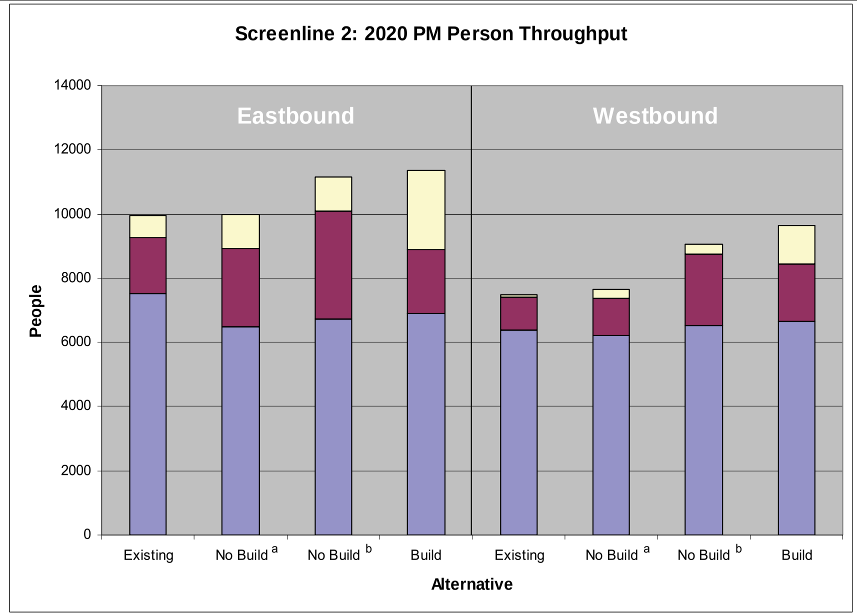
Screenline 3 (Mercer Slough)

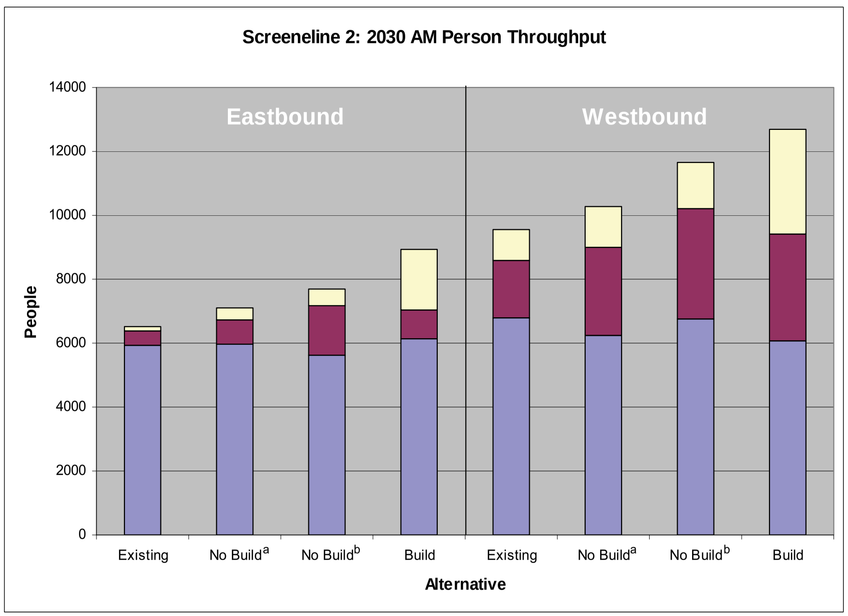
At Screenline 3 (Mercer Slough), person throughput would vary between no-build and build conditions depending on the direction and peak hour, as indicated in Exhibit 5-9, but overall the total throughput would remain similar because light rail would not cross this screenline. In years 2020 and 2030, the total person throughput in the build condition would be similar or increase by up to 8 percent (2030 AM peak hour) compared to the no-build condition with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project completed. Under the build condition, total person throughput would be similar to (from 3 percent less than to 1 percent more than) the no-build condition if Stage 3 of the I-90 Two Way Transit and HOV Operations Project is completed. Compared to Screenline 2, throughput changes at Screenline 3 are less between the no-build and build conditions, because light rail would not cross this screenline and HOV lanes are already provided at this location.

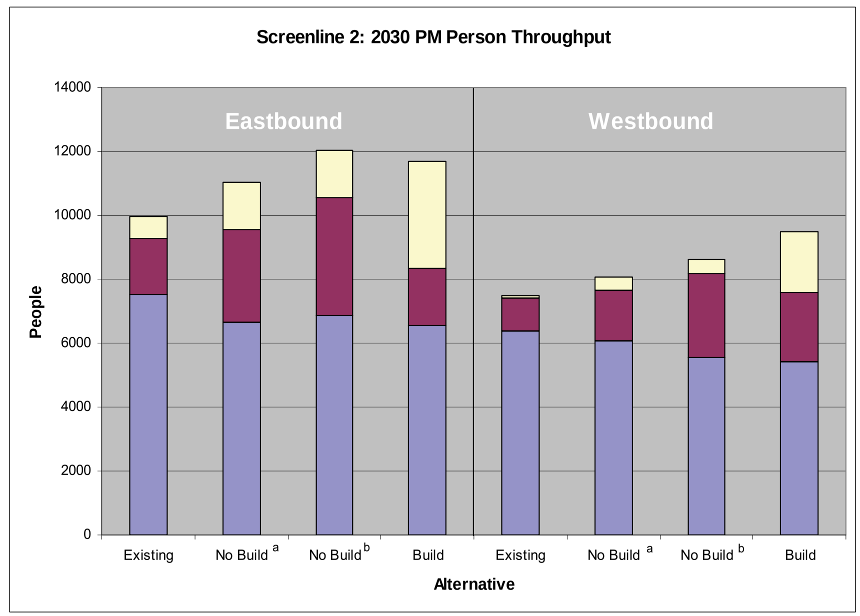
The greatest increase in person throughput (up to 13 percent compared to the no-build condition with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project) in year 2020 would be in the westbound direction during the PM peak hour. Because light rail would operate in this direction, a shift by people from driving to using light rail would create less congestion and therefore more vehicles would be able to travel the corridor. In all directions and peak hours, the build-condition person throughput in year 2020 would be similar to (between a 3 percent decrease and a 3 percent increase) no-build condition with Stage 3 of the I-90 Two Way Transit and HOV Operations Project.

In 2030, person throughput for the build condition would increase in the reverse-peak direction (i.e., eastbound direction in the AM peak hour and westbound in the PM peak hour) by approximately 7 percent in the AM peak hour and 11 percent in the PM peak hour, compared to the no-build condition when all three stages of the I-90 Two Way Transit and HOV Operations Project are completed. In the peak direction on I-90, person throughput for the build condition would be higher in the westbound direction in the AM peak hour compared to the no-build condition with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. Compared to the no-build condition when Stage 3 of the I-90 Two Way Transit and HOV Operations Project is completed, the person throughput in the build condition would be about 2 percent less. In the PM peak eastbound direction, build-condition person throughput would be reduced by approximately 9 percent because the HOV lane would be used ineffectively through the corridor, as discussed in Screenline 2 section and indicated in Table 5-8. Transit ridership would be similar or less than both no-build conditions because riders from transit facilities east of the study area, such as Eastgate Park-and-Ride Lot, would shift to the South Bellevue Park-and-Ride Lot and would not be considered transit riders at Screenline 3.









[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project

SOV HOV Transit

EXHIBIT 5-8
2020 and 2030 I-90 Peak-Hour Person Throughput at Lake Washington (Screenline 2)

TABLE 5-7
2020 and 2030 Vehicle and Person Peak-Hour Throughput for I-90 at Lake Washington (Screenline 2)

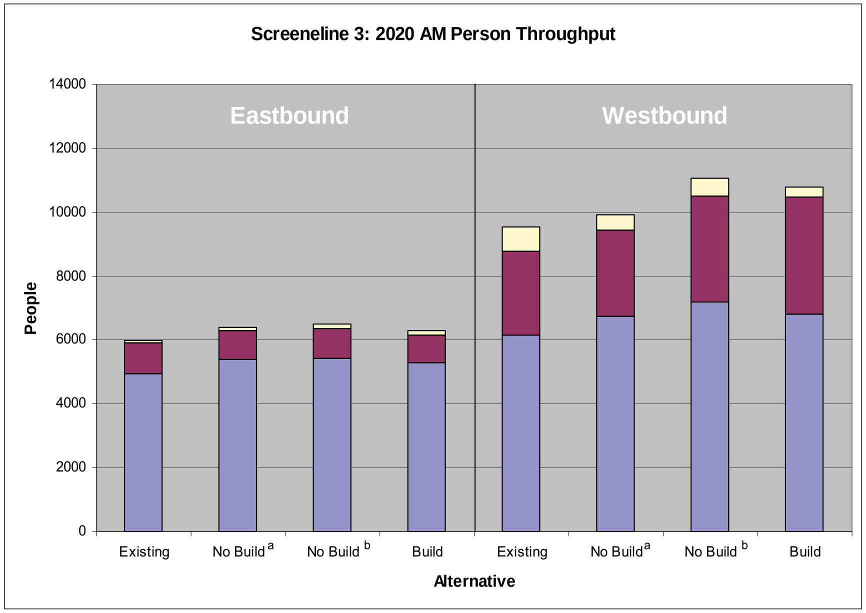
Direction	2020 Vehicle and Person Throughput						2030 Vehicle and Person Throughput					
	Vehicles					Persons	Vehicles					Persons
	SOV	HOV[a]	Transit	LRT	Total	Total	SOV	HOV[a]	Transit	LRT	Total	Total
AM Westbound												
No Build[b]	5,500	1,700	30	N/A	7,200	9,500	5,550	1,950	36	N/A	7,550	10,300
No Build[c]	5,700	1,900	33	N/A	7,600	10,550	5,950	2,150	36	N/A	8,100	11,650
Build	5,450	2,000	18	6	7,450	11,400	5,450	2,400	17	6	7,850	12,700
AM Eastbound												
No Build[b]	5,300	600	12	N/A	5,900	7,100	5,150	650	11	N/A	5,800	7,100
No Build[c]	5,550	650	14	N/A	6,200	7,600	5,050	850	14	N/A	5,900	7,700
Build	5,600	600	4	6	6,200	8,250	5,450	650	4	6	6,100	8,900
AM Total												
No Build[b]	10,800	2,300	42	N/A	13,100	16,600	10,700	2,600	47	N/A	13,350	17,400
No Build[c]	11,250	2,550	47	N/A	13,800	18,150	11,000	3,000	50	N/A	14,000	19,350
Build	11,050	2,600	22	12	13,650	19,650	10,900	3,050	21	12	13,950	21,600
PM Westbound												
No Build[b]	5,050	950	11	N/A	6,000	7,650	4,950	1,300	12	N/A	6,250	8,050
No Build[c]	5,600	1,150	12	N/A	6,750	9,050	4,750	1,350	12	N/A	6,050	8,600
Build	5,600	1,300	4	6	6,950	9,650	4,550	1,550	4	6	6,050	9,500
PM Eastbound												
No Build[b]	5,450	1,800	34	N/A	7,300	10,000	5,600	2,150	37	N/A	7,750	11,050
No Build[c]	5,500	2,000	34	N/A	7,550	11,150	5,550	2,300	37	N/A	7,950	12,050
Build	5,800	1,450	19	6	7,300	11,350	5,500	1,300	20	6	6,900	11,700
PM Total												
No Build[b]	10,500	2,750	45	N/A	13,300	17,650	10,550	3,450	49	N/A	14,000	19,100
No Build[c]	11,100	3,150	46	N/A	14,300	20,200	10,300	3,650	49	N/A	14,000	20,650
Build	11,400	2,750	23	12	14,250	21,000	10,050	2,850	24	12	12,950	21,200

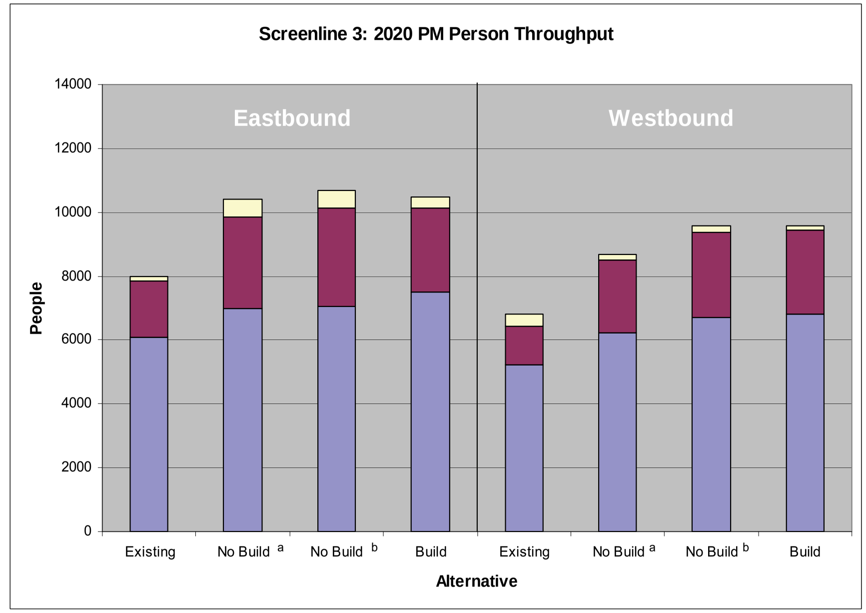
[a] HOV values are the total number of HOVs crossing the screenline, not the amount only in the HOV lanes. [b] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

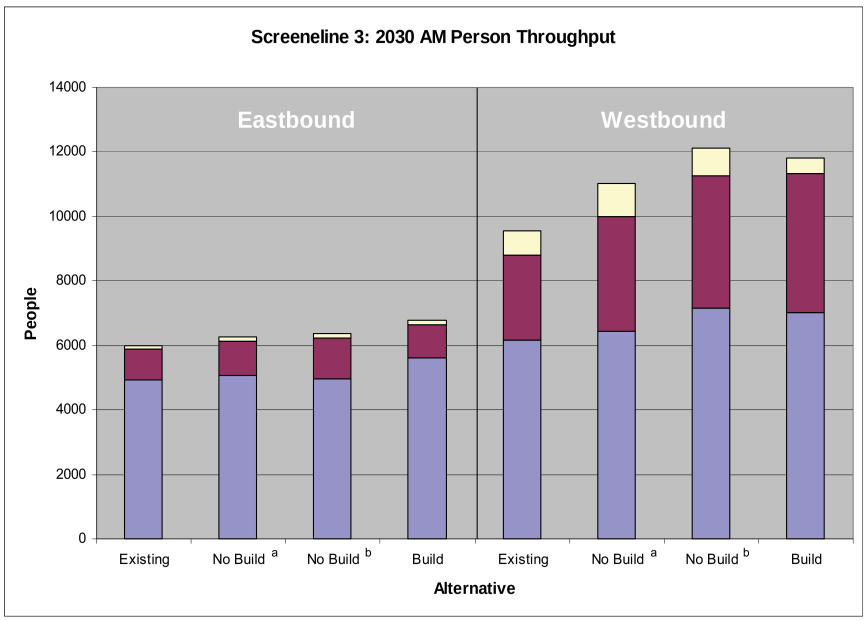
[c] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

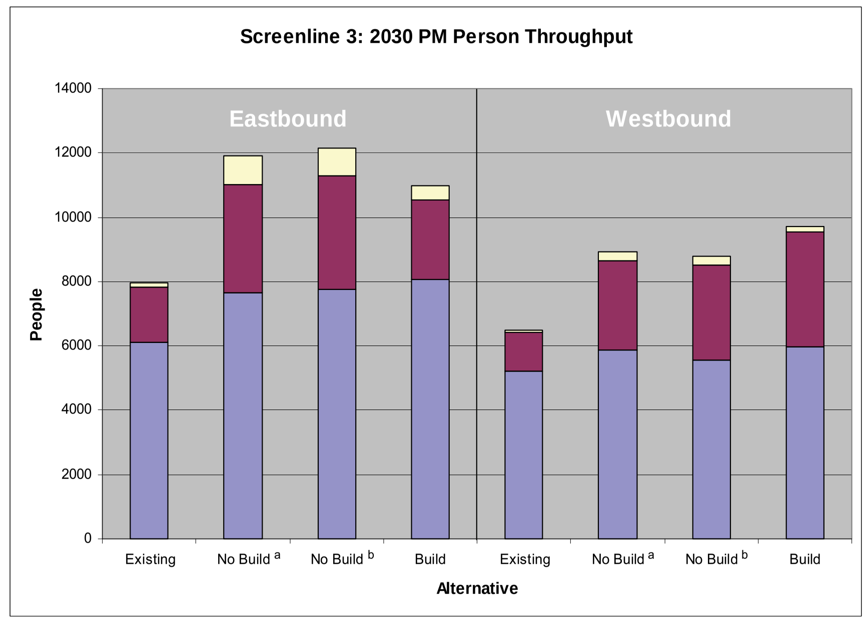
Note: Due to rounding, values may not sum correctly.

LRT = light rail transit
SOV = single-occupant vehicle
HOV = high-occupancy vehicle
N/A = not applicable









[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project

SOV HOV Transit

EXHIBIT 5-9
2020 and 2030 I-90 Peak-Hour Person Throughput at Mercer Slough (Screenline 3)

In terms of vehicle throughput, the build condition would accommodate a similar to higher vehicle throughput than the no-build condition in the reverse-peak directions (eastbound in the AM and westbound in the PM) in years 2020 and 2030. This is because the vehicle capacity would not change in this direction and people would adjust their mode choice to use light rail. As people shift to light rail congestion would decrease slightly; which would increase vehicle throughput.

In the 2020 peak directions, the vehicle throughput in the build condition would be similar to the no-build condition with Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project. Even though the reversible center roadway would be closed for vehicle access in the build condition, drivers would be able to adjust and use the HOV lane in the outer roadway. In 2030 the vehicle throughput in the peak directions in the build condition would be similar to the no-build condition with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project but slightly less than the no-build condition with Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project. As stated in the Screenline 2 (Lake Washington) discussion, the reduced eastbound (PM peak) HOV throughput would cause a reduction in the HOV throughput farther along at Screenline 3. In the AM peak westbound direction, the closure of the center roadway would cause slightly more congestion near the East Mercer Way ramps, which would affect throughput at Screenline 3. Table 5-8 provides a Screenline 3 vehicle and person throughput summary.

5.3.3.2 Travel Time

In the 2020 and 2030 no-build conditions, travel times would continue to get longer as congestion worsens. Tables 5-9 and 5-10 list the 2020 and 2030 I-90 travel times in the no-build and build conditions. It is expected that, by 2030, single-occupant vehicle travel from I-405 to Seattle (westbound) in the AM peak period (in the no-build condition) could more than double in duration, compared to existing conditions, and take up to 32 minutes on average. In the opposite (eastbound) direction, single-occupant vehicle travel times could increase by approximately 70 percent, so that a trip that now takes an average 14 minutes would be close to 25 minutes by 2030. In the PM peak period, a similar increase in single-occupant vehicle travel time is expected. In the westbound direction, to go from I-405 to Seattle, the trip may take more than 30 minutes, an increase of more than 60 percent from existing conditions. In the eastbound direction, to go from Seattle to I-405 could take 20 minutes.

The following subsections provide travel-time comparisons for each of the three modes (single-occupant vehicle, HOV, and transit) between the no-build conditions and the East Link Project. For trucks, a travel time comparison between the no-build conditions and the East Link Project is provided in Section 8.0.

Single-Occupant Vehicle

With light rail in 2020, single-occupant vehicle travel times are expected to stay relatively similar to the No Build Alternative (with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project) in the AM peak period. In the PM peak period, single-occupant vehicle travel times would improve compared to the No Build Alternative with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. Approximately a 25 percent improvement in single-occupant vehicle travel time is expected in the PM peak period. This is expected to result in approximately a 4- to 5-minute travel-time savings with the project. By 2030, larger travel time improvements are expected as congestion worsens in the no-build conditions. Single-occupant vehicles in the AM peak period are expected to have better travel times compared to the No Build Alternative with only Stages 1 and 2 of the I 90 Two Way Transit and HOV Operations Project. It is expected that up to 9 minutes of savings would be experienced in the westbound direction and about 3 minutes of savings in the eastbound direction. In the PM peak period, single-occupant vehicle travel times with East Link would improve by 1 minute in the westbound direction and 5 minutes in the eastbound direction compared to the No Build Alternative with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project. Improvements in travel time from the No Build Alternative (with Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project) compared to the East Link Project can be attributed to a shift from people driving their automobiles to use of light rail and the additional capacity provided with the outer roadway HOV lanes.

In year 2020, East Link single-occupant vehicle travel times compared to the No Build Alternative, assuming that I 90 Two Way Transit and HOV Operations Project Stages 1 through 3 are completed, would be similar to the previous paragraph's comparison as travel times in the AM peak period would remain similar and travel times in the PM peak period would improve. By 2030, single-occupant vehicle AM peak-period travel time with light rail would get slightly worse in the westbound direction (by 1 minute) and better in the eastbound direction (about

TABLE 5-8
2020 and 2030 Vehicle and Person Peak-Hour Throughput for I-90 at Mercer Slough (Screenline 3)

Direction	2020 Vehicle and Person Throughput					2030 Vehicle and Person Throughput				
	Vehicles				Persons	Vehicles				Persons
	SOV	HOV[d]	Transit	Total	Total	SOV	HOV[d]	Transit	Total	Total
AM Westbound										
No Build[a]	6,050	1,400	23	7,500	9,950	5,800	1,900	28	7,700	11,000
No Build[b]	6,500	1,700	25	8,200	11,050	6,450	2,150	28	8,600	12,100
Build[c]	6,150	1,850	26	8,000	10,800	6,350	2,250	26	8,600	11,800
AM Eastbound										
No Build[a]	4,850	550	4	5,450	6,400	4,600	700	4	5,300	6,250
No Build[b]	4,900	650	6	5,550	6,500	4,450	900	4	5,350	6,350
Build[c]	4,750	650	7	5,400	6,300	5,050	750	7	5,800	6,800
AM Total										
No Build[a]	10,900	1,950	27	12,950	16,350	10,400	2,600	32	13,000	17,250
No Build[b]	11,400	2,350	31	13,750	17,550	10,900	3,050	32	13,950	18,450
Build[c]	10,900	2,500	33	13,400	17,100	11,400	3,000	33	14,400	18,600
PM Westbound										
No Build[a]	5,300	1,300	7	6,600	8,650	5,000	1,550	7	6,550	8,900
No Build[b]	5,750	1,550	7	7,300	9,550	4,750	1,700	7	6,450	8,750
Build[c]	6,000	1,600	7	7,600	9,800	5,100	1,900	7	7,000	9,700
PM Eastbound										
No Build[a]	5,950	1,900	26	7,900	10,400	6,550	2,300	30	8,850	11,900
No Build[b]	6,000	2,100	26	8,100	10,700	6,600	2,400	29	9,050	12,150
Build[c]	6,400	1,800	26	8,200	10,500	6,900	1,600	26	8,550	11,000
PM Total										
No Build[a]	11,250	3,200	33	14,500	19,050	11,550	3,850	37	15,400	20,800
No Build[b]	11,750	3,650	33	15,400	20,250	11,350	4,100	36	15,500	20,900
Build[c]	12,400	3,400	33	15,800	20,300	12,000	3,500	33	15,550	20,700

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

[c] Light rail vehicle and its person throughput is not included in the build condition data because no light rail alternative crosses Screenline 3.

[d] HOV values are the total number of HOVs crossing the screenline, not the amount only in the HOV lanes.

Note: Due to rounding, values may not sum correctly.

SOV = single-occupant vehicle

HOV = high-occupancy vehicle

6 minutes of savings). The travel-time savings is expected in the eastbound direction because, with the No Build Alternative, only westbound travel in the reversible center roadway is allowed in the AM peak period, and a shift to light rail would reduces congestion, contributing to travel time savings.

In the PM peak period, westbound travel times with light rail are expected to improve by as much as 4 minutes, which is approximately a 15 percent travel-time savings. This is expected for reasons similar to those stated above in the AM peak period for the eastbound direction. In the eastbound direction, PM peak-period travel times are expected to be slightly better than with the No Build Alternative, although less vehicle throughput is expected, as described previously.

Single-occupant vehicle travel times between Seattle and Mercer Island would remain similar to or improve by as much as 3 minutes with East Link compared to the No Build Alternative, except in the PM eastbound direction. In this direction, travel from Seattle to Mercer Island could be as short as 7 minutes in the reversible roadway and up to 14 minutes in the eastbound mainline roadway with the No Build Alternative but would take 10 minutes with East Link. For trucks, a similar travel time comparison between the no-build conditions and the East Link Project would be expected because they also travel in the general-purpose lanes. Refer to Table 5-9 and 5-10 for further travel time information between Seattle and Mercer Island and the Bellevue Way interchange, and between Seattle and I-405.

HOV and Transit

HOV and bus travel times on I-90 in years 2020 and 2030 under the No Build Alternative (with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project) would remain similar to or get longer than existing conditions as congestion would increase in the future. HOV and bus travel times would be similar in the peak direction and improve in the reverse-peak directions for East Link and for the No Build Alternative that assumes the I-90 Two Way Transit and HOV Operations Project is completed (Stages 1 through 3) compared to the existing conditions. In the AM and PM peak periods, it could take between 14 and 20 minutes for an HOV to travel between Seattle and I-405 for the No Build Alternative (with only Stages 1 and 2). For the No Build Alternative (with Stages 1 through 3), HOV travel between Seattle and I-405 could take between 12 to 15 minutes. With East Link, it would take between 11 to 14 minutes. Buses traveling along I-90 in the reverse-peak direction are expected to have improved travel times because the outer roadway HOV lane would provide buses with a faster lane than the general-purpose lanes they are restricted to use when the reversible center roadway is operating in the opposite direction.

The I-90 eastbound direct-access HOV off-ramp to Bellevue Way would be closed for Alternative B1 and would have the option to either be closed or open for alternatives B2A, B2E, B3, and B7. HOVs using this ramp in the No Build Alternative would use the general-purpose Bellevue Way off-ramp with the project. Closing the eastbound HOV ramp would not impact HOV or single-occupant vehicle travel times to Bellevue Way. For instance, in the PM peak period, HOV and single-occupant vehicle travel times would remain slightly over 11 and 13 minutes to travel from Seattle to Bellevue Way, respectively. This is because of the low level of congestion between Mercer Island and the Bellevue Way interchange resulting from the I-90 Two Way Transit and HOV Operations Project improvements, which include an auxiliary lane between East Mercer Way and I-405 ramps. In both the AM and PM peak hours this modification would affect at most 100 HOVs.

Light rail travel between Seattle and Mercer Island and between Seattle and Bellevue Way would take 8 and 12 minutes, respectively. This would be a substantial improvement compared to a single-occupant vehicle trip that could take up to 16 minutes between Seattle and Mercer Island and up to 27 minutes between Seattle and Bellevue Way. For Alternative B1, which would also close the westbound direct-access HOV on-ramp from Bellevue Way, HOVs traveling between Bellevue and Seattle would use the general-purpose Bellevue Way on-ramp and weave across the general-purpose lanes to enter the HOV lane. This maneuver would increase the westbound HOV travel time from Bellevue Way to Seattle by approximately 10 to 12 minutes depending on the peak period, as indicated in Table 5-11. In the AM peak hour, about 200 HOVs are expected to use this ramp and fewer than 100 in the PM peak hour as indicated in Table 5-11.

For the option that has exclusive light rail use in the D2 roadway, buses would be rerouted to other roadways to access I-90 from South Seattle (such as 4th Avenue S via SR 519) and bus travel time would increase substantially. In the year 2030 PM peak period, up to 13 additional minutes could be experienced by buses in the eastbound direction and 7 minutes in the westbound direction if buses are required to alter their service to the I-90/SR 519 interchange along S Atlantic Street.

With Alternative B1 or the exclusive light rail use in the D2 roadway option, the travel times for the other vehicles on I-90 are not expected to change from the travel times already described.

5.3.3.3 Level of Service

Congestion on I-90 is expected to get worse in the future, as indicated by longer travel times described in the previous section. Therefore, the LOS of I-90 will continue to degrade and generally operate at LOS E or F conditions throughout the peak periods. The congestion maps in Exhibit 5-10 indicate year 2030 vehicle speeds over time (vertical axis) and distance (horizontal axis) for the year 2030. The time indicated on these maps is for a

TABLE 5-9

I-90 2020 No Build Alternative and Build Alternative Travel Times by Mode (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[d]			SOV			HOV			Transit[d]		
Beginning Point	Ending Point	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]
Westbound Outer Roadway																			
Mercer Is. (Island Crest Way)	I-5 to Dwntn. Seattle[i]	7.7	7.9	7.2	7.5	6.3	5.5	- / -	- / -	8.2 / 6.1	6.6	7.1	6.5	6.6	6.1	5.9	9.2 / 7.1	7.7 / 5.8	- / 5.7
Bellevue Way[k]	I-5 to Dwntn. Seattle[i]	19.5	19.6	19.5	9.5	10.6	8.3	- / -	- / -	- / -	24.0	20.5	16.9	12.2	8.9	8.6	16.3 / -	12.8 / -	- / -
I-405	I-5 to Dwntn. Seattle[i]	22.3	21.0	22.2	11.8	12.5	10.6	- / -	- / -	15.0/11.2	21.9	19.7	16.7	14.4	11.1	10.8	18.2 / 15.6	14.7/11.2	- / 10.6
Reversible Center Roadway[e]																			
Mercer Is. (77th Avenue SE)	I-5 to Dwntn. Seattle[f]	5.7	9.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.3	6.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercer Is. (77th Avenue SE)	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	5.0	6.5	N/A	5.9 / 5.7	7.6 / 7.4	8.0	N/A	N/A	N/A	5.5	5.5	N/A	5.7 / 5.7	5.6 / 5.6	8.0
Bellevue Way[k]	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	7.8	9.2	N/A	10.2 / -	11.8 / -	12.0	N/A	N/A	N/A	8.0	8.0	N/A	10.6 / -	10.6 / -	12.0
I-405	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	9.8	11.2	N/A	11.9 / 10.6	13.9 / 12.4	- / -	N/A	N/A	N/A	9.8	9.8	N/A	13.0 / 10.5	13.0/10.6	- / -
Eastbound Outer Roadway																			
I-5 from Dwntn. Seattle[j]	Mercer Is. (Is. Crest Way)	10.8	7.6	8.4	11.4	6.2	5.4	9.1 / 10.7	6.2 / 7.3	- / 5.6	10.8	12.2	7.6	10.9	6.8	6.5	- / -	- / -	6.6 / 5.8
I-5 from Dwntn. Seattle[j]	Bellevue Way[h]	13.2	10.1	11.4	14.2	8.4	7.7	13.4 / -	10.5 / -	- / -	14.5	16.0	10.7	13.8	8.9	8.6	- / -	- / -	- / -
I-5 from Dwntn. Seattle[j]	I-405	15.2	12.3	13.4	15.5	10.5	9.8	15.6 / 15.0	12.7 / 12.1	- / 10.3	16.6	18.1	12.8	13.8	10.7	10.8	- / -	- / -	12.2 / 10.4

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.
[c] "Bld" represents the build condition with westbound Bellevue Way HOV on-ramp. Light rail travels in both directions on the center roadway.
[d] Transit routes with stops on Mercer Island / Transit routes with no stops on Mercer Island.
[e] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak. It would be used by light rail in the build condition.
[f] Single-occupant vehicles are required to exit/enter reversible center roadway at Rainier Avenue S interchange.
[g] Travel time is to/from 5th Avenue via the D2 Roadway.
[h] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps. In build, all vehicles use the Bellevue Way outer roadway ramps.
[i] In no-build condition, all vehicles end at I-5 NB Ramp except transit, which utilizes D2.
[j] In no-build condition, all single-occupant vehicles and HOVs start at I-5 southbound ramps to I-90 except PM HOV vehicles, which use the D2 Roadway. In the build condition, all single-occupant vehicles and HOV vehicles would start at I-5 southbound ramps. Transit would use the D2 Roadway in both the no-build and build conditions.
[k] In no-build and build conditions, HOVs and transit would use the westbound Bellevue Way HOV on-ramp.
- = Buses that do not travel on this roadway during this period and/or do not travel between these points.
N/A = not applicable because the mode is not eligible to travel this path or the path is restricted
SOV = single-occupant vehicle; NB = no-build condition; bld = build condition
Note: Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; Bellevue Way means at the South Bellevue Park-and-Ride Lot.

TABLE 5-10

I-90 2030 No Build Alternative and Build Alternative Travel Times by Mode (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[d]			SOV			HOV			Transit[d]		
Beginning Point	Ending Point	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]	NB[a]	NB[b]	Bld[c]
Westbound Outer Roadway																			
Mercer Is. (Island Crest Way)	I-5 to Dwntn. Seattle[i]	8.2	8.2	7.7	8.1	6.9	5.9	- / -	- / -	8.1 / 6.0	7.1	9.4	10.1	7.0	7.0	7.8	10.2 / 7.5	10.5/ 6.6	- / 6.8
Bellevue Way[k]	I-5 to Dwntn. Seattle[i]	22.0	20.4	20.5	9.8	10.1	8.7	- / -	- / -	- / -	23.5	26.7	24.4	12.4	10.2	10.5	17.7 / -	16.2 / -	- / -
I-405	I-5 to Dwntn. Seattle[i]	31.8	21.9	22.8	14.1	12.2	11.0	- / -	- / -	14.8/11.2	27.9	30.5	26.7	14.5	12.4	12.9	19.7/ 15.8	17.6/ 12.5	- / 12.1
Reversible center Roadway[e]																			
Mercer Is. (77th Avenue SE)	I-5 to Dwntn. Seattle[f]	6.0	7.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.5	7.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mercer Is. (77th Avenue SE)	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	5.1	5.2	N/A	5.9 / 5.7	6.7 / 6.8	8.0	N/A	N/A	N/A	5.6	5.5	N/A	5.9 / 5.9	5.9 / 5.9	8.0
Bellevue Way[k]	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	7.8	8.7	N/A	10.2 / -	11.2 / -	12.0	N/A	N/A	N/A	8.2	8.2	N/A	10.8 / -	10.7 / -	12.0
I-405	Seattle (5th Avenue S)[g]	N/A	N/A	N/A	11.9	10.8	N/A	13.9 / 12.6	12.5 / 11.8	N/A	N/A	N/A	N/A	9.9	10.0	N/A	13.0/ 10.8	13.2 / 10.8	N/A
Eastbound Outer Roadway																			
I-5 from Dwntn. Seattle[j]	Mercer Is. (Is. Crest Way)	14.5	16.4	13.5	15.0	11.1	8.8	11.2 / 13.6	7.3 / 11.8	- / 6.0	14.0	13.7	10.1	14.0	7.7	8.9	- / -	- / -	6.6 / 6.1
I-5 from Dwntn. Seattle[j]	Bellevue Way[h]	18.9	21.7	16.6	17.5	10.9	11.2	15.6 / -	11.7 / -	- / -	17.5	17.4	12.9	16.8	10.2	11.1	- / -	- / -	- / -
I-5 from Dwntn. Seattle[j]	I-405	21.6	24.6	18.5	19.6	15.2	12.8	17.9 / 19.0	13.7 / 17.3	- / 11.2	19.7	20.0	15.1	16.6	11.7	13.2	- / -	- / -	12.2/ 10.7

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

[c] "Bld" represents the build condition with westbound Bellevue Way HOV on-ramp. Light rail travels in both directions on the center roadway.

[d] Transit routes with stops on Mercer Island / Transit routes with no stops on Mercer Island.

[e] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak. It would be used by light rail in the build condition.

[f] Single-occupant vehicles are required to exit/enter reversible center roadway at Rainier Avenue S interchange.

[g] Travel time is to/from 5th Avenue S via the D2 Roadway.

[h] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps. In the build condition, all vehicles would use the Bellevue way outer roadway ramps

[i] In no-build condition, all vehicles end at I-5 northbound ramp, except transit, which uses D2 Roadway.

[j] In no-build condition, all single-occupant vehicles and HOVs start at I-5 southbound ramps to I-90, except PM HOVs, which use the D2 Roadway. In the build condition, all single-occupant vehicles and HOVs would start at I-5 southbound ramps. Transit would use the D2 Roadway in both the no-build and build conditions.

[k] In no-build and build conditions, HOV vehicles and transit would use the westbound Bellevue Way HOV on-ramp.

- = Buses that do not travel on this roadway during this period and/or do not travel between these points.

N/A = not applicable because the mode is not eligible to travel this path or the path is restricted

SOV = single-occupant vehicle; NB = no-build condition; bld = build condition

Note: Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; Bellevue Way means at the South Bellevue Park-and-Ride Lot.

TABLE 5-11
AM and PM Travel Times With and Without Bellevue Way/I-90 HOV Ramps

From/To	2020				2030			
	2-hour HOV Volume	With EB & WB HOV Ramps[a]	Without EB & WB HOV Ramps[b]	Difference	2-hour HOV Volume	With EB & WB HOV Ramps[a]	Without EB & WB HOV Ramps[b]	Difference
AM Peak								
Westbound – Bellevue Way to I-5 Downtown Seattle[c]	350	8.3 min	16.7 min	8.4 min	400	8.7 min	21.0 min	12.3 min
Eastbound – I-5 from Downtown Seattle to Bellevue Way[d]	160	7.7 min	7.6 min	-0.1 min	160	11.2min	11.2 min	0.0 min
PM Peak								
Westbound – Bellevue Way to I-5 to Downtown Seattle[c]	130	8.6 min	16.0 min	7.4 min	160	10.5 min	21.1 min	10.6 min
Eastbound – I-5 from Downtown Seattle to Bellevue Way[d]	230	8.6 min	8.7 min	0.1 min	200	11.1 min	11.2 min	0.1 min

[a] No alternatives retain both ramps. The purpose of this information is only to indicate if any impacts are expected with the removal of the eastbound HOV direct-access ramp.
[b] With the Bellevue Way Alternative (B1) only.
[c] Travel path terminates at I-5 northbound ramp.
[d] Travel path begins at I-5 southbound ramp.
EB = eastbound
WB = westbound
min = minute

2.5-hour duration in both the AM (6:30 to 9:00 a.m.) and PM (3:30 to 6:00 p.m.) peak periods. The distance covers I-90 from the western terminus at SR 519 to east of the I-405 interchange. On the maps, areas with yellow, red, and black are generally considered LOS E or F conditions with vehicle speeds at or under 55 mph. Green areas are generally considered LOS A through D and indicate vehicle speeds over 55 mph. This section focuses on year 2030 conditions, as the comparison between no-build and build conditions in year 2020 is similar.

In addition to the general I-90 operating conditions, the performance of the HOV lanes was evaluated to identify where they would fail to meet WSDOT's HOV policy, which states that vehicles should be able to travel at least 45 mph during the peak commuting hour 90 percent of the time. It was assumed that in the No Build Alternative, Mercer Island single-occupant vehicles would not be allowed in the outer roadway HOV lanes but would have access to the center roadway. However, in the build condition, Mercer Island vehicles would be allowed in the outer roadway HOV lanes between Mercer Island and Seattle as long as the HOV lanes meet performance standards or until such time as they are managed differently based on the WSDOT and the Mercer Island Access Plan.

Without light rail, increased congestion on I-90 is expected, with congestion (red and black areas on Exhibit 5-10) occurring for longer distances and longer periods of each day in the no-build conditions. More congestion and longer travel times would make travel more difficult between two of the key employment and population centers of the Puget Sound region. Congestion and resulting vehicle hours of travel are expected to extend to longer periods, exceeding 3 hours for each peak period. Without light rail's ability to move more people, an imbalance in vehicle capacity across I-90 would reduce efficient and reliable transit service to the growing residential and commercial areas on the Eastside. The LOS of the freeway would continue to degrade and generally operate at LOS E or F conditions throughout the peak period. The center roadway would continue to be underutilized, as access to the center roadway is constrained by congested roadways and traffic signals. These constraints reduce the ability to move high volumes of people to and from key urban centers across the lake. This is highlighted in Exhibit 5-11, which indicates the operating conditions for the no-build condition in the 2030 PM peak hour for each lane type (i.e., general purpose, HOV, and center roadway). The imbalance in roadway capacity across Lake Washington (six eastbound lanes and four westbound lanes) helps create more congestion in the reverse-peak

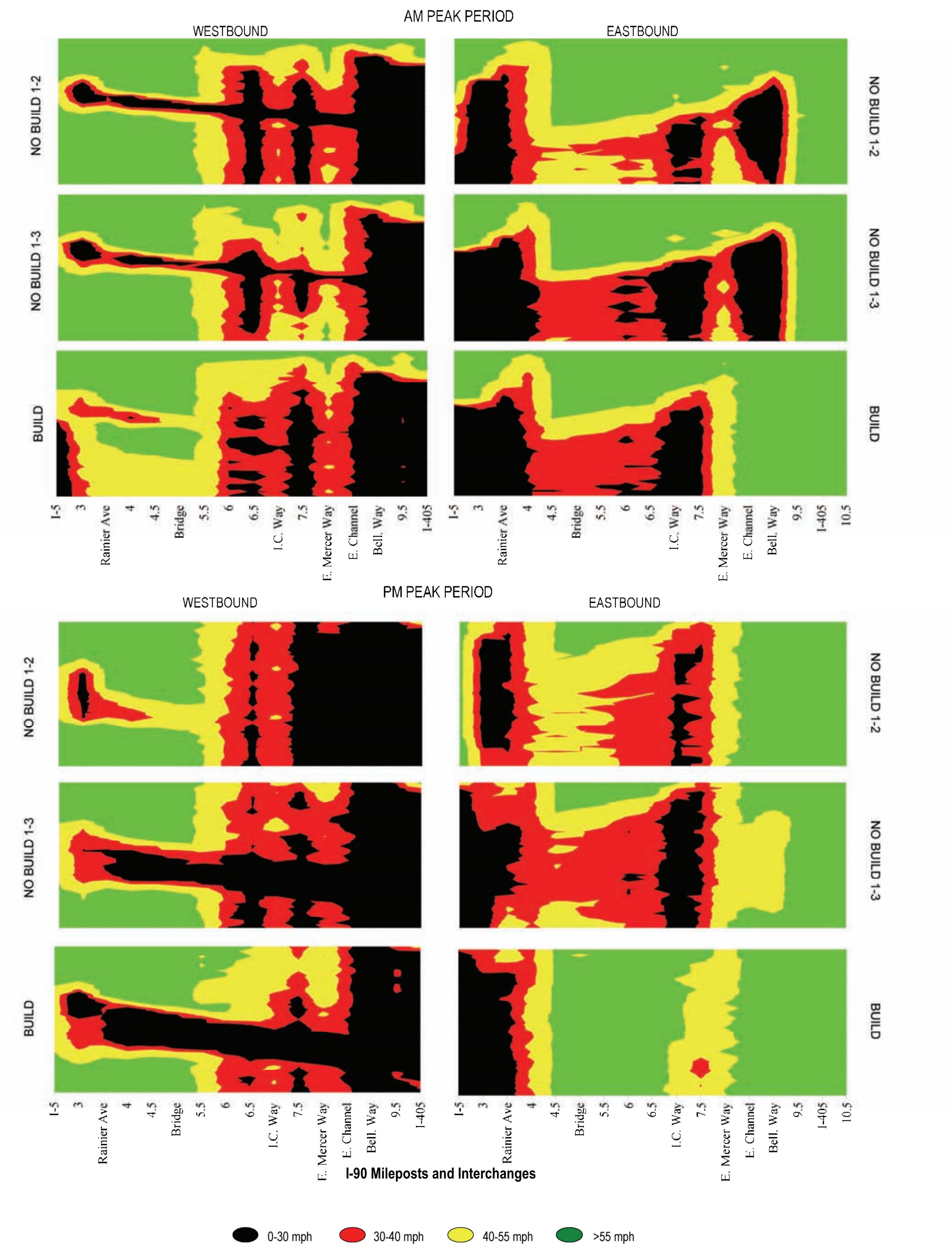


EXHIBIT 5-10
I-90 Year 2030 AM and PM Peak-Period Vehicle Speeds in General-Purpose Lanes

direction (westbound) than in the peak direction (eastbound). While the eastbound center roadway and HOV lanes operate mainly in free-flow conditions, the lanes in the opposite direction operate in slower conditions and have substantial congestion, especially in the general-purpose lanes.

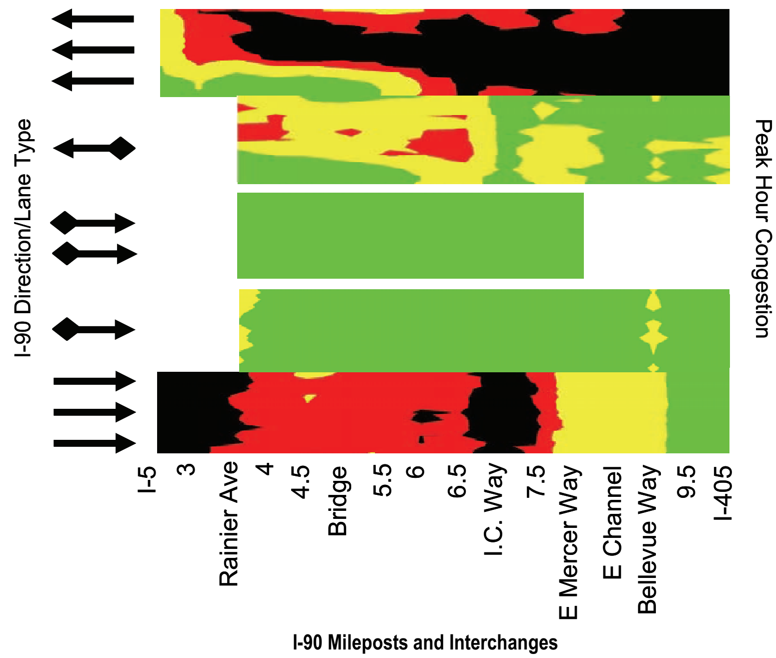


EXHIBIT 5-11
2030 PM Peak-Hour No-Build I-90 Congestion by Lane Type

AM Peak Period

In the AM peak period, congestion in the westbound direction would slightly improve in the no-build condition (I-90 Two Way Transit and HOV Operations Project Stages 1 through 3) once the HOV lanes are completed (left middle congestion map in Exhibit 5-10) compared to the no-build condition where the HOV lanes are not completed (left upper congestion map in Exhibit 5-10). In the build condition, congestion in the westbound direction (lower left map) shows traits similar to those of the no-build condition, with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 (upper left map), although less congestion would occur across the I-90 bridge in the peak hour compared to either of the two no-build conditions. In the eastbound direction, the build condition would have less congestion (lower right map) than the no-build condition with I-90 Two Way Transit and HOV Operations Project Stages 1 through 3 completed, especially near the eastern edge of Mercer Island, because there would be a shift from people driving to using light rail.

During the AM peak period, in the 2030 no-build condition, the westbound HOV lane would operate acceptably except near Rainier Avenue S as the lane transitions from an HOV lane to a general-purpose lane. In the 2030 build condition, the westbound HOV lane would operate acceptably at all locations in the westbound direction except near Rainier Avenue S and near the Island Crest Way ramps. The eastbound HOV lane in both 2030 no-build condition and the build condition would operate acceptably, except near Rainier Avenue S when the general-purpose lane transitions to an HOV lane. In the option where the westbound HOV direct-access on-ramp from Bellevue Way is closed (Alternative B1), HOVs would use the general-purpose ramp and weave across the general-purpose lanes to enter the HOV lane. This would likely occur near Island Crest Way and degrade the HOV lane performance at this location because vehicles would travel at slow speeds.

PM Peak Period

In the PM peak period, the westbound direction would have a noticeable reduction in congestion in the build condition (lower left map) compared to either of the two no-build condition maps (upper and middle left maps) as people shift to use light rail and congestion is reduced. In the eastbound direction, congestion would be heavier near the Rainier Avenue S interchange and Mount Baker Tunnel area because the reversible center roadway would be closed, but there would be less downstream congestion near Mercer Island because slightly less vehicle throughput would occur at the Rainier Avenue S/Mount Baker Tunnel section. This is further described in Section 5.3.3.1.

During the PM peak period, the westbound HOV lane in the 2030 no-build condition would not operate acceptably from Island Crest Way to Rainier Avenue S. In the 2030 build condition, the westbound HOV lane would operate acceptably, except near Rainier Avenue S as the lane transitions from an HOV lane to a general-purpose lane. In the 2030 no-build condition, the eastbound HOV lane would operate acceptably, except near Rainier Avenue S where the general-purpose lane transitions to an HOV lane. In the 2030 build condition, the HOV lane performs similar to the No Build Alternative except it would operate worse at the transition to an HOV lane near Rainier Avenue S.

In the Bellevue Way Alternative (B1), in which the westbound Bellevue Way HOV direct-access on-ramp is closed, the impact on the I-90 westbound mainline LOS would be nearly negligible. Minor variations in congestion levels would occur, but they would not be noticeable enough to impact travel times for HOV or single-occupant vehicles. If joint bus and light rail use is not permitted on the I-90 D2 Roadway, there would again be no change in the congestion levels in both the eastbound and westbound direction on I-90**.**

5.3.3.4 Highway Safety Conditions

Implementing the East Link Project would not increase the number of accidents in the corridor. Overall, with more people moving across Lake Washington with East Link and a similar number of accidents predicted between the no-build and East Link conditions, the overall safety on I-90 would improve with the project.

The impact analysis evaluated the expected safety conditions on I-90 in the westbound and eastbound mainline roadways. An analysis was done to predict the percent change in the number of accidents on I-90 for the no-build and build conditions.

The methodology used to predict future accident frequency for I-90 recognizes that accident rates for this high-volume freeway facility are not uniform throughout the day. It is known that, as volumes increase and congestion worsens, the accident frequency increases at a pace faster than the vehicle miles traveled (see Exhibits 5-12 and 5-13), resulting in higher peak-period accident rates. Where the percentage of the daily accidents exceeds the percentage of daily volumes in the peak periods, the accident rates are higher.

Based on the patterns observed on I-90, existing accident rates (using 2004-2006 accident data) were calculated for the following four time periods:

- AM peak period (7:00 a.m. to 9:59 a.m.)
- PM peak period (4:00 p.m. to 6:59 p.m.)
- Midday (10:00 a.m. to 3:59 p.m.)
- Evening and early morning (7:00 p.m. to 6:59 a.m.)

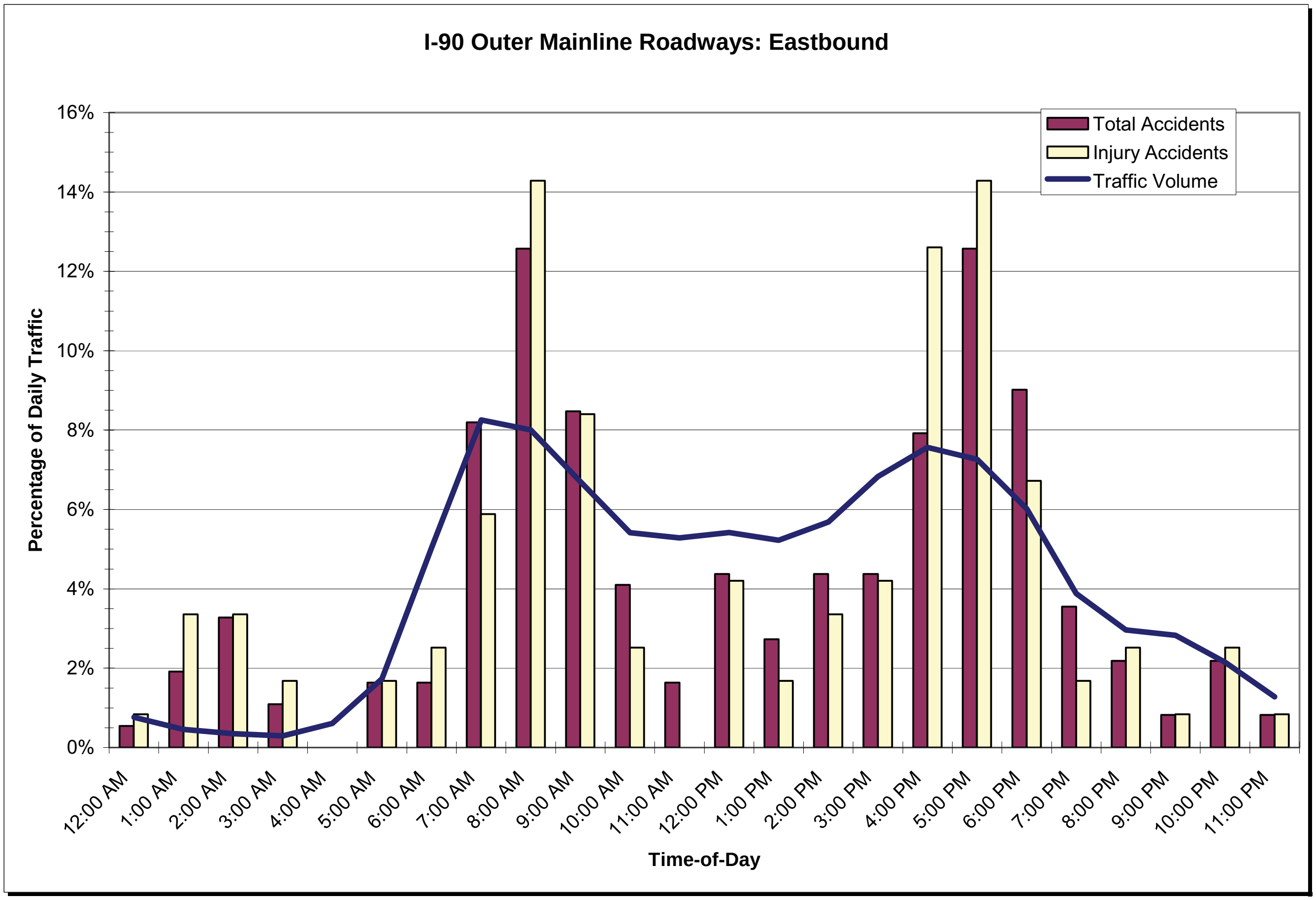
Table 5-12 summarizes the existing accident rates (accidents per million vehicle miles traveled [MVMT]) for the identified time periods.

Safety Prediction Methodology and Expected Percent Change in Accident Frequency

The accident rates calculated for the four time periods were applied to the estimated VMT in the future conditions, where it is expected that volumes will increase, lengthening the periods of congested travel. In order to estimate the amount of travel that occurred in the extended peak periods, a VISSIM model was used to estimate the number of vehicles that were able to cross Lake Washington on I-90 during the peak periods. The number of vehicles unable to cross Lake Washington due to congestion provides guidance on how many hours congestion would extend beyond the peak periods. The higher peak-period accident rates were applied to the travel that would occur during the peak period and also during the times of extended congestion.

This process resulted in estimating that, in 2030, the build condition would see a 1.9 percent increase in the accident frequency in the I-90 outer mainline roadways when compared to the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3. Although there would be a slight increase in the accident frequency in the eastbound and westbound mainline roadways, the vehicle accidents that occur in the reversible center roadway would be removed. In summary, the removal of accidents in the reversible center roadway with the project would offset the predicted accident-frequency increase in the eastbound and westbound mainline roadways.

The no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 would have 7 percent fewer accidents than the full the I-90 Two Way Transit and HOV Operations Project no-build condition, because the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3 is expected to have more vehicle miles traveled, and thus an increase in accidents, in the outer mainline roadways than the other no-build condition. Similarly, the build condition would have slightly more accidents in the outer mainline roadways than the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 because construction of light rail in place of the center reversible lanes would shift traffic to the outer mainline roadways.



Note: Traffic volume curve represents data from Screenline 2, while accident distribution represents all accidents within the corridor.

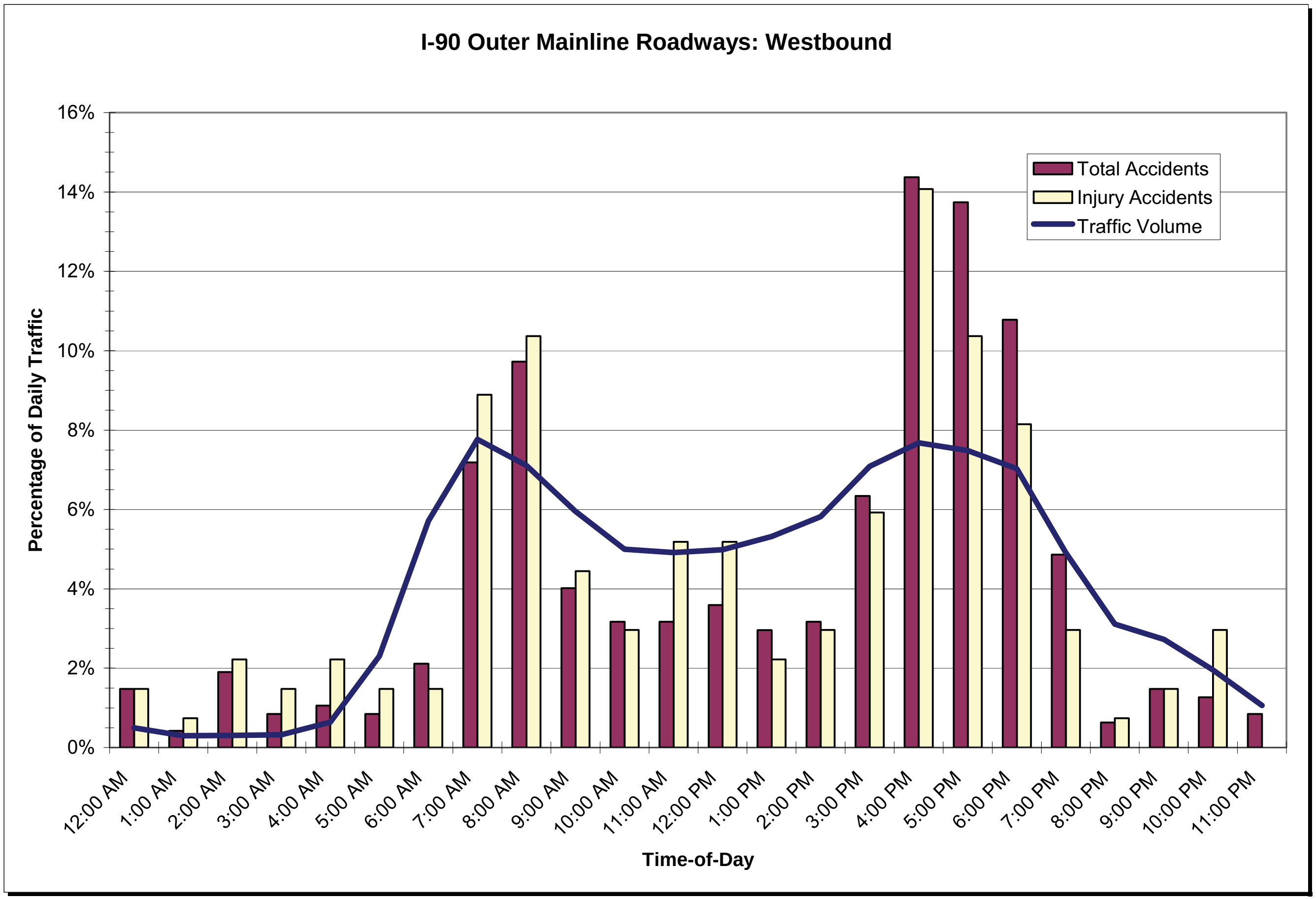
EXHIBIT 5-12
Time-of-Day Distribution for Existing Traffic Volume and Accidents on Eastbound I-90

Future Accident Prediction by Vehicle and Person Miles Traveled

The analysis from the I-90 Two Way Transit and HOV Operations Project EIS formed the basis for predicting accident frequency on the I-90 outer roadways. The limits of the future accident prediction for this project and those used in the I-90 Two Way Transit and HOV Operations Project do not match exactly, but they are similar; therefore, the percent change in the predicted accident frequency was applied to the results from the I-90 Two Way Transit and HOV Operations Project instead of the absolute changes in accident frequency. The methodology estimates the percent change in accidents expected in the westbound and eastbound mainline roadways that would occur when vehicle demand is shifted to the outer roadways with light rail operating in the reversible center roadway (no-build to build).

Previous analyses estimated that, by 2025, the I-90 outer mainline roadways would have 360 to 390 accidents per year with implementation of measures to mitigate accidents (shown in Table 6-129 of I-90 Two Way Transit and HOV Operations Project Transportation Discipline Report [HNTB Corporation and Mirai Associates, 2002]. These mitigation measures include the following:

- Speed management, such as posted or variable speed changes, west of Island Crest Way
- Shoulder rumble strips
- Enhanced delineation
- Static and variable signing
- Roadway and tunnel illumination
- Incident management



Note: Traffic volume curve represents data from Screenline 2, while accident distribution represents all accidents within the corridor.

EXHIBIT 5-13
Time-of-Day Distribution for Existing Traffic Volume and Accidents on Westbound I-90

TABLE 5-12
Existing Accident Rate Distribution on I-90

Time Period	Accident Rate (accidents per MVMT)[a]	
	Eastbound	Westbound
AM Peak Period	1.02 (0.32)	0.99 (0.32)
PM Peak Period	1.13 (0.42)	1.72 (0.41)
Midday	0.51 (0.12)	0.66 (0.21)
Evening and Early Morning	0.70 (0.25)	0.73 (0.23)

[a] Values in parentheses indicate the injury accident rate.

Accident rates determined using data from 2004-2006.

It is assumed congestion in year 2025 will resemble congestion in year 2030; therefore, the percentage changes computed for the 2030 conditions were used to estimate the expected change in accident frequency. Furthermore, the scenario analyzed in the Two Way Transit and HOV Operations Project matches the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3, which was therefore used as the baseline in comparing changes in accident frequency.

Considering the results of this analysis with the mitigation measures incorporated in the I-90 Two Way Transit and HOV Operations Project (Table 5-13), the accident frequency of the I-90 westbound and eastbound mainline roadways in the build condition could increase by up to seven accidents per year (390 accidents per year x 1.9 percent) more than the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3. Furthermore, the no-build condition with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 could have 27 fewer accidents per year (390 accidents per year x 7.0 percent) than the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3. This would be primarily due to lower vehicle miles traveled (i.e., vehicle throughput) in the no-build condition with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2.

TABLE 5-13
2030 Accident Frequency Predictions for I-90 Outer Mainline Roadways

	Eastbound and Westbound Outer Roadways		Total (includes reversible center roadway)	
	Percent Change	2030 Accident Frequency	Percent Change	2030 Accident Frequency
Base Condition: 2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project with Mitigation Measures (Stages 1 through 3)	N/A	360 – 390[a]	N/A	366 – 397[a]
2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2	- 7.0%	335 – 363	- 6.8%	341 – 370
2030 Build	+ 1.9%	367 – 347	+ 0.0%	367 – 397

[a] These values are from the 2025 analysis conducted as part of the I-90 Two Way Transit and HOV Operations Project (source: HNTB Corporation and Mirai Associates, 2002).

Even though East Link would shift more demand to the outer roadways and likely result in slightly greater accident frequency in these lanes (approximately seven accidents per year in 2030), several safety benefits linked to the light rail operations can be expected. For instance, vehicle accidents happening in the reversible center roadway would be eliminated once light rail replaces vehicle access in the reversible center roadway.

In the existing study period (2004-2006), the reversible center roadway averaged nine accidents per year, which are expected to be prevented when light rail replaces the vehicle usage. Furthermore, the Two Way Transit and HOV Operations Project Report predicted that the reversible facility would have six to seven accidents in 2025. This means that, overall, East Link, when combining all three roadway facilities (eastbound, westbound and reversible center), is expected to have no effect on I-90 safety conditions, and a nearly identical accident frequency between the no-build and build conditions is expected (see Table 5-13). It should be noted that accidents occurring on the ramps (including ramp terminal intersections) that connect the reversible lanes to local streets were assumed to redistribute to the ramps that connect to the outer mainline roadways.

Expressing the accident prediction in million person miles traveled (MPMT) instead of MVMT shows a safety benefit from development of the light rail system**.** The accident rates based on daily VMT are somewhat similar for all three conditions (Table 5-14). However, there would be a noticeable increase in PMT with the build condition, and, therefore, a safety benefit is expected because people using light rail would be passengers in a mode of travel substantially safer than an automobile. Because more people would be traveling through the corridor in the build condition and the expected accident frequency is expected to be similar between the no-build and build conditions, the accident frequency in terms of moving people would be lower.

TABLE 5-14
2030 Accident Rates as a Function of Vehicle and Person Miles Traveled (All I-90 Roadways)

	Annual Accident Frequency Prediction	Daily VMT (Estimated)	Accidents per MVMT	Daily PMT (Estimated)	Accidents per MPMT
Base Condition: 2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project with Mitigation Measures (Stages 1 through 3)	366 – 397	1,230,861	0.81 – 0.88	1,699,479	0.59 – 0.64
2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2	341 – 370	1,170,457	0.81 – 0.87	1,490,804	0.63 – 0.68
2030 Build	367 – 397	1,254,678	0.81 – 0.88	1,785,394	0.56 – 0.61

Note: Results include predictions for eastbound and westbound travel as well as outer roadways and reversible center roadways combined.

In Seattle, if the D2 Roadway is designated for joint-use with buses, there would be about 30 vehicles (including light rail) per hour during the peak periods, or a vehicle every 1.5 to 2 minutes using this roadway. This number of light rail and bus vehicles would be substantially less than the number of vehicles for safe operations that was determined for Central Link and the bus/light rail joint operations in the Downtown Seattle Transit Tunnel. The findings from the Central Link Initial Segment Environmental Assessment (Sound Transit, 2002) established that 60 buses and up to 10 trains would operate jointly. To further provide safe vehicle separation and management of bus and light rail vehicle movements on the D2 Roadway, a vehicle identification and signal system would be installed. In addition, bus on-ramps to the D2 Roadway would be equipped with gates to prevent auto/truck traffic from entering this roadway. These gates would be raised when buses entering the D2 Roadway are detected.

Injury Accident Analysis

The analytical process that was performed to predict the total number of accidents was repeated to asses the project's potential impact on injury-only accidents. In summary, by applying the existing injury accident rates to future conditions, it was estimated that by 2030, the build condition would have a 5.1 percent increase in the accident frequency in the I-90 outer mainline roadways when compared to the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 though 3. Comparing the two no-build conditions, the no-build condition with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 would have 6.2 percent fewer accidents than the full the I-90 Two Way Transit and HOV Operations Project no-build condition.

This previous analysis estimated that, by 2025, the I-90 outer mainline roadways would have from 130 to 180 injury accidents per year if accident-reduction measures were implemented, and from 205 to 275 with no mitigation measures. Considering the results of this analysis with the assumed mitigation measures (Table 5-15), the injury accident frequency of the I-90 westbound and eastbound mainline roadways in the build condition could have up to six injury accidents per year (180 injury accidents per year x 3.3 percent) more than the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3. Furthermore, the no-build condition with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2 could have 14 fewer injury accidents per year (180 injury accidents per year x 8.0 percent) than the no-build condition with the I-90 Two Way Transit and HOV Operations Project Stages 1 through 3. Similar to the analysis for total accidents, this decrease is primarily due to lower vehicle miles traveled (i.e., vehicle throughput) in the no-build condition with only the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2. As was done in the analysis that took into consideration the total number of accidents, a review was completed to determine the impact of the reversible facility and the impact of increased PMT associated with light rail on injury-only accidents. In the existing study period (2004-2006), the reversible center roadway averaged nearly four injury accidents per year, which are expected to be prevented when light rail replaces the vehicle usage in the reversible center roadway. Furthermore, the Two Way Transit and HOV Operations Project predicted that the reversible facility will have two to four injury accidents in 2025. This means that, overall, the East Link Project, when combining all three roadway facilities (eastbound, westbound and reversible center), is expected to have a marginal effect on the I-90 injury accidents, and likewise, a similar injury accident frequency between the no-build and build conditions is expected (see Table 5-15).

TABLE 5-15
2030 Injury Accident Frequency Predictions for I-90 Outer Mainline Roadways

	Eastbound and Westbound Outer Roadways		Total (includes reversible center roadway)	
	Percent Change	2030 Injury Accident Frequency	Percent Change	2030 Injury Accident Frequency
Base Condition: 2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project with Mitigation Measures (Stages 1 through 3)	N/A	130 – 180[a]	N/A	132 – 184[a]
2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2	- 8.0%	120 – 166	- 7.6%	122 – 170
2030 Build	+ 3.3%	134 – 186	+ 1.1%	134 – 186

[a] These values are from the 2025 analysis conducted as part of the Two Way Transit and HOV Operations Project (source: HNTB Corporation and Mirai Associates, 2002).

A review of the injury accident rates based on PMT for the three conditions considered shows that the build condition would have similar or slightly lower injury accident rates as a function of PMT when compared to the two no-build conditions (Table 5-16). The slightly higher expected frequency of injury accidents would be essentially cancelled by the additional PMT that accompanies light rail.

TABLE 5-16
2030 Injury Accident Rates as a Function of Vehicle and Person Miles Traveled (All I-90 Roadways)

	Annual Injury Accident Frequency Prediction	Daily VMT (Estimated)	Injury Accident per MVMT	Daily PMT (Estimated)	Injury Accident per MPMT
Base Condition: 2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project with mitigation measures (Stages 1-3)	132 – 184 [a]	1,230,861	0.29 - 0.41	1,699,479	0.21 - 0.30
2030 No Build Alternative with the I-90 Two Way Transit and HOV Operations Project Stages 1 and 2	122 – 170	1,170,457	0.29 - 0.40	1,490,804	0.22 - 0.31
2030 Build	134 – 186	1254,678	0.30 - 0.41	1,785,394	0.21 - 0.29

Note: Results include predictions for eastbound and westbound travel as well as outer roadways and reversible center roadways combined.

5.3.4 Construction Impacts

This section discusses potential impacts on I-90 and other regional freeways.

5.3.4.1 Interstate 90

The impacts due to construction of light rail infrastructure along I-90 were analyzed assuming a 2020 construction year. Prior to the construction of light rail on I-90, the I-90 Two Way Transit and HOV Operations Project would be completed (Stages 1 through 3) and the reversible center roadway would be closed for the construction of light rail. As a result, all bus routes, HOVs, and Mercer Island drivers would be rerouted to the outer roadway HOV lanes. Year 2020 person and vehicle throughput and travel-time information for the two no-build conditions and the East Link construction condition are presented in Tables 5-17 and 5-18.

The amount of automobile traffic on the outer roadways during the East Link construction period would be similar to East Link operations because the reversible center roadway would be removed in both of these conditions. Therefore, the vehicle travel times during the construction period would be similar to the travel times during East Link operations Although the number of autos that use I-90 would be similar in both of these conditions, the auto demand to use the outer roadway would be greater in the construction period because light rail would not be operating. Even though vehicle travel times would be similar for these two conditions, the

TABLE 5-17
2020 Construction and No Build Vehicle and Person Peak-Hour Throughput for I-90 at Lake Washington (Screenline 2)

Direction	AM Vehicle and Person Throughput					PM Vehicle and Person Throughput				
	Vehicles				Persons	Vehicles				Persons
	SOV	HOV[c]	Transit	Total	Total	SOV	HOV[c]	Transit	Total	Total
Westbound										
No Build[a]	5,500	1,650	30	7,200	9,450	5,050	950	11	6,000	7,650
No Build[b]	5,700	1,850	33	7,600	10,550	5,600	1,150	12	6,750	9,050
Construction	5,300	1,900	29	7,200	9,550	5,650	1,300	13	6,950	8,850
Eastbound										
No Build[a]	5,300	600	12	5,900	7,100	5,450	1,850	34	7,300	10,000
No Build[b]	5,500	650	14	6,150	7,600	5,500	2,000	34	7,550	11,150
Construction	5,850	650	14	6,500	7,850	5,900	1,500	32	7,450	10,050

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

[c] HOV values are the total number of HOVs crossing the screenline, not the amount only in the HOV lanes.

Note: Due to rounding, values may not sum correctly.

LRT = light rail transit

SOV = single-occupant vehicle

HOV = high-occupancy vehicle

person throughput would be less in the construction period because the reversible center roadway would not be operational for automobiles or light rail, and hence fewer people would cross Lake Washington.

Compared to the No Build Alternative with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project completed, the single-occupant travel times in the East Link construction period would generally be similar or better because the outer roadway HOV lanes would be completed prior to the construction period. Vehicle and person throughput during the construction period compared to the No Build Alternative with only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project would be similar in the peak directions and higher in the reverse-peak directions because of the completion of the outer roadway HOV lanes.

Compared to the No Build Alternative when all three stages of the I-90 Two Way Transit and HOV Operations Project are completed, the single-occupant travel times would be similar during the construction period in both the westbound and eastbound directions for the AM peak periods and in the westbound direction in the PM peak period. In the eastbound direction during the PM peak period, the travel times during the construction period would be shorter as less lane changing would occur between I-5 and the Mount Baker Tunnel with the closure of the center roadway ramp. While travel times would be improved in this direction, fewer vehicles would cross Lake Washington in the eastbound direction because the center roadway would be closed.

In the reverse-peak directions (eastbound in the AM hour and westbound in the PM hour), person throughput at Screenline 2 (I-90 bridge) would be similar to slightly higher during the East Link construction period than it would be for the No Build Alternative when all three stages of the I-90 Two Way Transit and HOV Operations Project are constructed, because Mercer Island drivers would be able to use the outer roadway HOV lanes. Permitting Mercer Island drivers into the outer roadway HOV lanes would allow more vehicles to use the general-purpose lanes.

In the peak directions (westbound in the AM peak hour and eastbound in the PM peak hour), person throughput is expected to be slightly higher under the No Build Alternative when all three stages of the I-90 Two Way Transit and HOV Operations Project are completed than it would be in the East Link construction period.

TABLE 5-18

I-90 2020 No-Build and Construction Peak-Period Travel Times (minutes)

Travel Time Path Endpoint		AM Peak Period									PM Peak Period								
		SOV			HOV			Transit[d]			SOV			HOV			Transit[d]		
Beginning Point	Ending Point	NB[a]	NB[b]	Con[c]	NB[a]	NB[b]	Con[c]	NB[a]	NB[b]	Con[c]	NB[a]	NB[b]	Con[c]	NB[a]	NB[b]	Con[c]	NB[a]	NB[b]	Con[c]
Westbound Outer Roadway																			
Mercer Is. (Island Crest Way)	I-5 to Downtown. Seattle[i]	7.7	7.9	6.9	7.5	6.3	5.6	- / -	- / -	13.8 / 10.9	6.6	7.1	6.9	6.6	6.1	6.1	9.2 / 7.1	7.7 / 5.8	8.8 / 6.7
Bellevue Way[k]	I-5 to Downtown Seattle[i]	19.5	19.6	12.8	9.5	10.6	11.8	- / -	- / -	25.7 / N/A	24.0	20.5	18.0	12.2	8.9	16.7	16.3 / -	12.8 / -	21.4 / -
I-405	I-5 to Downtown Seattle[i]	22.3	21.0	18.9	11.8	12.5	10.6	- / -	- / -	20.9 / 15.8	21.9	19.7	17.1	14.4	11.1	10.8	18.2 / 15.6	14.7 / 11.2	15.6 / 11.7
Reversible Center Roadway[e]																			
Mercer Is. (77th Avenue SE)	I-5 to Dwntn. Seattle[f]	5.7	9.0	N/A	N/A	N/A	N/A	N/A	N/A	-/-	6.3	6.0	N/A	N/A	N/A	N/A	-/-	-/-	-/-
Mercer Is. (77th Avenue SE)	Seattle (5th Avenue S[g])	N/A	N/A	N/A	5.0	6.5	N/A	5.9 / 5.7	7.6 / 7.4	-/-	N/A	N/A	N/A	5.5	5.5	N/A	5.7 / 5.7	5.6 / 5.6	-/-
Bellevue Way[k]	Seattle (5th Avenue S[g])	N/A	N/A	N/A	7.8	9.2	N/A	10.2 / -	11.8 / -	-/-	N/A	N/A	N/A	8.0	8.0	N/A	10.6 / -	10.6 / -	-/-
I-405	Seattle (5th Avenue S[g])	N/A	N/A	N/A	9.8	11.2	N/A	11.9 / 10.6	13.9 / 12.4	-/-	N/A	N/A	N/A	9.8	9.8	N/A	13.0 / 10.5	13.0 / 10.6	-/-
Eastbound Outer Roadway																			
I-5 from Downtown Seattle[j]	Mercer Is. (Is. Crest Way)	10.8	7.6	8.0	11.4	6.2	5.2	9.1 / 10.7	6.2 / 7.3	6.6 / 6.0	10.8	12.2	7.1	10.9	6.8	6.2	- / -	- / -	10.8 / 10.4
I-5 from Downtown Seattle[j]	Bellevue Way[h]	13.2	10.1	11.0	14.2	8.4	7.4	13.4 / -	10.5 / -	10.8 / -	14.5	16.0	10.0	13.8	8.9	8.4	- / -	- / -	14.6 / -
I-5 from Downtown Seattle[j]	I-405	15.2	12.3	13.1	15.5	10.5	9.5	15.6 / 15.0	12.7 / 12.1	13.5 / 10.6	16.6	18.1	12.2	13.8	10.7	10.5	- / -	- / -	17.4 / 14.7

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.
[c] "Con" = construction condition.
[d] Transit routes with stops on Mercer Island / Transit routes with no stops on Mercer Island.
[e] Reversible center roadway operates westbound in the AM peak and eastbound in the PM peak. The center roadway would be closed to traffic in the construction condition.
[f] Single-occupant vehicles are required to exit/enter center roadway at Rainier Avenue S interchange.
[g] Travel time is to/from 5th Avenue via the D2 Roadway.
[h] In no-build condition, buses and HOV use the reversible center roadway Bellevue Way ramps.
[i] In no-build condition, all vehicles end at I-5 northbound ramp, except transit, which uses D2 Roadway.
[j] In no-build condition, all single-occupant vehicles start at I-5 southbound ramps to I-90, except PM HOVs, which use the D2 Roadway. Transit would use the D2 Roadway in the no-build condition
[k] In no-build conditions, HOVs and transit use the westbound Bellevue Way HOV on-ramp.
[l] Seattle means at the International District/Chinatown Station; Mercer Island means at the Mercer Island Station; Bellevue Way means at the South Bellevue Park-and-Ride Lot.
- = Buses that do not travel on this roadway during this period and/or do not travel between these points.
N/A = not applicable because the mode is not eligible to travel this path or the path is restricted
SOV = single-occupant vehicle; NB = no-build condition

This is because the outer roadway HOV lanes have been operational in conjunction with the center roadway in this No Build Alternative and construction of the project would close the center roadway, thereby reducing roadway capacity. This is expected to increase vehicle congestion on the I-90 mainline roadways near the center roadway entry points from the I-90 mainline when they are closed during East Link construction. These locations would be near East Mercer Way in the westbound direction in the morning and near the Mount Baker Tunnel in the eastbound direction in the afternoon. Even though more people would cross Lake Washington in the No Build Alternative, during East Link construction the outer roadway HOV lanes would accommodate a substantial portion of the vehicles displaced from the center roadway, because the center roadway is underutilized due to poor connections that do not provide enough capacity to effectively use the two lanes in the center roadway.

Along I-90, the D2 Roadway would also be affected by construction. Construction of light rail tracks on the D2 Roadway would require full closure. Buses would be detoured to adjacent I-90 accesses, either the SR 519/S Atlantic Street or Rainier Avenue S interchanges.

The westbound mainline of I-90 would experience short-term partial nighttime closures near Bellevue Way for construction of the elevated structures for the 112th SE At-Grade (B2A), 112th SE Elevated (B2E), 112th SE Bypass (B3), and BNSF (B7) alternatives. B1 would not require these closures because it would be at-grade underneath the mainline roadway. Also, I-90 ramps to and from Bellevue Way would potentially experience short-term nighttime closures for the construction of the light rail elevated structures.

5.3.4.2 Other Regional Freeways

Short-term impacts on I-405 and SR 520 with the light rail construction are expected. All Segment C alternatives would close each direction (not concurrently) of I-405 at night during the construction of the elevated structure over I-405, causing drivers to detour and take alternative routes. I-405 impacts due to the Bellevue Way Tunnel (C1T) and 106th NE Tunnel (C2T) alternatives would occur adjacent to the NE 6th Street direct-access ramps, and impacts associated with the Couplet (C4A), 112th NE Elevated (C7E), and 110th NE Elevated (C8E) alternatives would occur just north of the NE 12th Street overpass across I-405.

Along the SR 520 mainline, impacts would be limited to short-term shoulder or lane closures. SR 520 eastbound on- and off-ramps from 148th Avenue NE to West Lake Sammamish Parkway would experience shoulder or lane closures and temporary lane shifts under all Segment D and E alternatives except when the elevated portions of the Redmond Way (E1) and Leary Way (E4) alternatives cross SR 520 near the Lake Sammamish Parkway interchange and when the elevated portion of E1 that crosses SR 520 near the SR 202 interchange. These elevated crossings would result in each direction of SR 520 being closed at night causing drivers to detour and take alternative routes. The westbound on-ramp and eastbound off-ramp at the SR 520 and SR 202 intersection would be reconstructed to provide clearance for the light rail structure that would be constructed for E2 and E4 alternatives.

5.4 Potential Mitigation

No mitigation would be necessary along the I-90 mainline with this project because the project would have either similar or improved vehicle travel times and increased person throughput across Lake Washington in both the AM and PM peak periods compared to the No Build Alternative and the overall safety on I-90 would improve with the project. In addition, prior to the I-90 construction of the East Link Project, the I-90 Two Way Transit and HOV Operations Project would be completed to provide HOV lanes on I-90 west to Seattle that replace the reversible center roadway used by East Link.

For potential mitigation regarding transit on I-90, including mitigation for transit when the D2 Roadway is closed, refer to Section 4.0. For potential mitigation regarding trucks on I-90, refer to Section 8.0. For potential intersection mitigation at or near I-90 ramp terminals, refer to Section 6.5.

6.0 Arterials and Local Streets

6.1 Section Overview

As described later in this report, the following analysis of arterials and local streets indicates that the East Link Project would positively affect and connect the growing Eastside neighborhoods, and impacts on roadway operations, safety, and parking on arterials and local streets would generally be minimal.

For the no-build condition, intersection operations would continue to degrade to congested levels (LOS E and F) throughout the study area, hindering vehicular mobility within the study area. This would occur especially in Downtown Bellevue where intersection performance is already operating at capacity. Light rail would not necessarily improve intersection operations, but it would make available a reliable and faster transportation mode for traveling through the study area.

Along streets where a light rail alternative travels at-grade, intersections would typically operate at an LOS similar to the no-build condition. This is because the East Link Project would provide, in most cases, roadway capacity similar to the no-build conditions and because the light rail train is usually able to safely travel through intersections without substantial signal timing adjustments. At-grade alternatives outside of Downtown Bellevue would receive priority at the traffic signals. However, changes to signal coordination are expected to be minimal because light rail detection could occur up to 1 minute prior to the train arriving at each intersection. In Downtown Bellevue, at-grade alternatives would receive some priority and east-west arterials are expected to maintain signal coordination during East Link Project operation. For alternatives with either elevated or tunneled sections, intersections are generally expected to operate similar to the no-build condition because the alternative would operate outside the roadway right-of-way. Near stations, local roadways and intersections are expected to operate in most cases at an LOS similar to the no-build conditions. Stations that include park-and-ride facilities are expected to generate more auto trips than other stations; therefore, a few intersections immediately adjacent to some of the stations may operate slightly worse in the build condition than in the no-build condition. Potential intersection mitigation improvements are also expected to be minimal and would be generally limited to turn pockets or installing traffic signals.

Interaction of the light rail alternatives with arterials and local streets are expected to be minimal because many of the alternatives are grade-separated outside roadways. For alternatives within a roadway, vehicle conflict points would be reduced because vehicle movements would generally be restricted across the tracks at unsignalized locations, and would be protected at intersections so that safety is not compromised. This would create some traffic recirculation for properties adjacent to alternatives because access would generally be restricted to right-in, right-out movements. East Link Project-generated trips are not expected to increase the vehicle accident rates, as the roadway conditions would remain similar to or would improve compared to the No Build Alternative.

With the East Link Project, parking capacity would increase at some existing park-and-ride lots in addition to the construction of new park-and-ride facilities. The potential for spillover parking may increase near stations and park-and-ride facilities due to available on-street parking and increased parking demand related to transit usage. However, the potential for "hide-and-ride" parking activity is expected to be minimal because most park–and-ride lots are expected to accommodate the transit parking demand, and available on-street parking is limited at many station locations.

The following section describe the existing conditions, impacts, and potential mitigation on arterial and local street transportation elements, including roadway characteristics, intersection levels of service, intersection safety, and parking.

6.2 Affected Environment

Existing PM peak-hour turning movement counts were collected from local and state agencies (WSDOT, City of Seattle, City of Mercer Island, City of Bellevue, and City of Redmond) for identified study intersections. AM and PM data period were collected within the City of Seattle and City of Mercer Island. For intersections with turning movement count data collected before 2005, new counts were taken over a 2-hour period. Turning movements were calibrated to a consistent existing conditions year of 2007. Additional information used in operational analysis includes functional use, lane geometry, traffic signal timing and phasing patterns, on-street parking, proximity to bus stops, and speed limits.

The quality of traffic operations is described in terms of LOS. Traffic volumes were analyzed using the Highway Capacity Manual methodology to calculate peak hour LOS at signalized and unsignalized intersections. Traffic volumes at signalized intersections were analyzed for average delays for all vehicles as they approach the intersection. Unsignalized intersection volumes were analyzed for the average delays for all vehicles at all way stop controlled (AWSC) intersections, and the leg that would experience the greatest delay for two way stop controlled (TWSC) intersections. For unsignalized intersections, LOS is reported based on the leg that would experience the greatest delay, or worst LOS, for motorists. LOS grades range from LOS A to LOS F; LOS A represents the best operation where most vehicles do not stop at all, and LOS F the poorest operation where most of the drivers stop and will wait more than a minute until proceeding through the intersection. For a more detailed discussion of intersection LOS, refer to Appendix B.

Parking surveys were conducted during spring 2007 to inventory the availability of on-street parking within one-quarter mile of the stations. The survey included a space occupancy count, taken once during the morning and afternoon on a weekday, to calculate the percent parking utilization. These calculations were used to identify where potential light rail impacts may require parking mitigation. On-street parking supply and demand were inventoried for two types: unrestricted and restricted. Restricted on-street parking includes all on-street parking that is restricted by meters, time limit signs, parking zones, or other restrictions. Off-street parking was not inventoried, but general observations are provided about the location and usage of these facilities.

Generally, parking supply and costs vary throughout the corridor, with higher parking demand and costs in the Downtown Seattle and Bellevue areas. On the Eastside, parking availability widely varies depending on the area. For instance, many private garages are located in the Downtown Bellevue area, while private garages are limited in other areas, such as South Bellevue. Demand for parking also varies, with relatively high demand in Downtown Bellevue, more moderate demand in the Bel-Red and Overlake areas, and relatively low demand in South Bellevue.

6.2.1 Segment A

Segment A spans approximately 7 miles, originating in Seattle at the International District/Chinatown Station and terminating near the Bellevue Way interchange with I-90 in Bellevue. This segment crosses Lake Washington and includes a section of reversible lane highway facilities on I-90.

6.2.1.1 Existing Operations and Level of Service

Major arterials or roadways in Segment A potentially affected by the project are described in Table 6-1. Generally, the identified roadways vary from two- to four-lane cross sections with posted speed limits of 25 or 30 mph. I-90 is an eight-lane freeway with three lanes in each direction and a two-lane reversible roadway. Currently, I-90 carries approximately 140,000 vehicles per day.

Intersection analysis in Segment A was prepared for 11 intersections in Seattle and 20 intersections on Mercer Island in the existing AM and PM peak-hour conditions. Five of the intersections in Seattle are within WSDOT's jurisdiction because the intersection is either a ramp terminal or is located near a ramp terminal. Similarly, on Mercer Island, 13 of the 20 intersections evaluated are within WSDOT's jurisdiction. The existing intersection analysis was completed, and then compared to the relevant jurisdiction's adopted minimum LOS standard to gauge whether the intersection operates at an acceptable LOS grade. The relevant agencies within Segment A and their LOS standards are:

- WSDOT: LOS E
- City of Seattle: LOS D
- City of Mercer Island: LOS C

TABLE 6-1
Segment A Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed limit	Average Daily Traffic (ADT) [a]
5th Avenue S	Principal Arterial	2	30	NA
4th Avenue S	Principal Arterial	6	30	15,890
Airport Way S	Principal Arterial	4	30	3,540
Rainier Avenue S	Principal Arterial	5	30	14,050
N Mercer Way	Minor Arterial	2	25	9,600
Island Crest Way	Principal Arterial	4	25	9,110
77th Avenue SE	Collector Arterial	3	25	5,900
76th Avenue SE	Collector Arterial	3	25	7,550
80th Avenue SE	Collector Arterial	3	25	5,250
E Mercer Way	Collector Arterial	2	25	9,600
W Mercer Way	Collector Arterial	2	25	4,900
I-90	Interstate Freeway	8	60	140,000

[a] ADT based on the latest available traffic count information

In Segment A, six intersections would not meet agency standards in the existing condition, the following five occurring in the PM peak hour:

- Rainier Avenue S and S Dearborn Street
- I-90 and 4th Avenue S
- S Royal Brougham Way and 4th Avenue S
- 77th Avenue SE and SE 27th Street
- E Mercer Way and I-90 westbound ramps

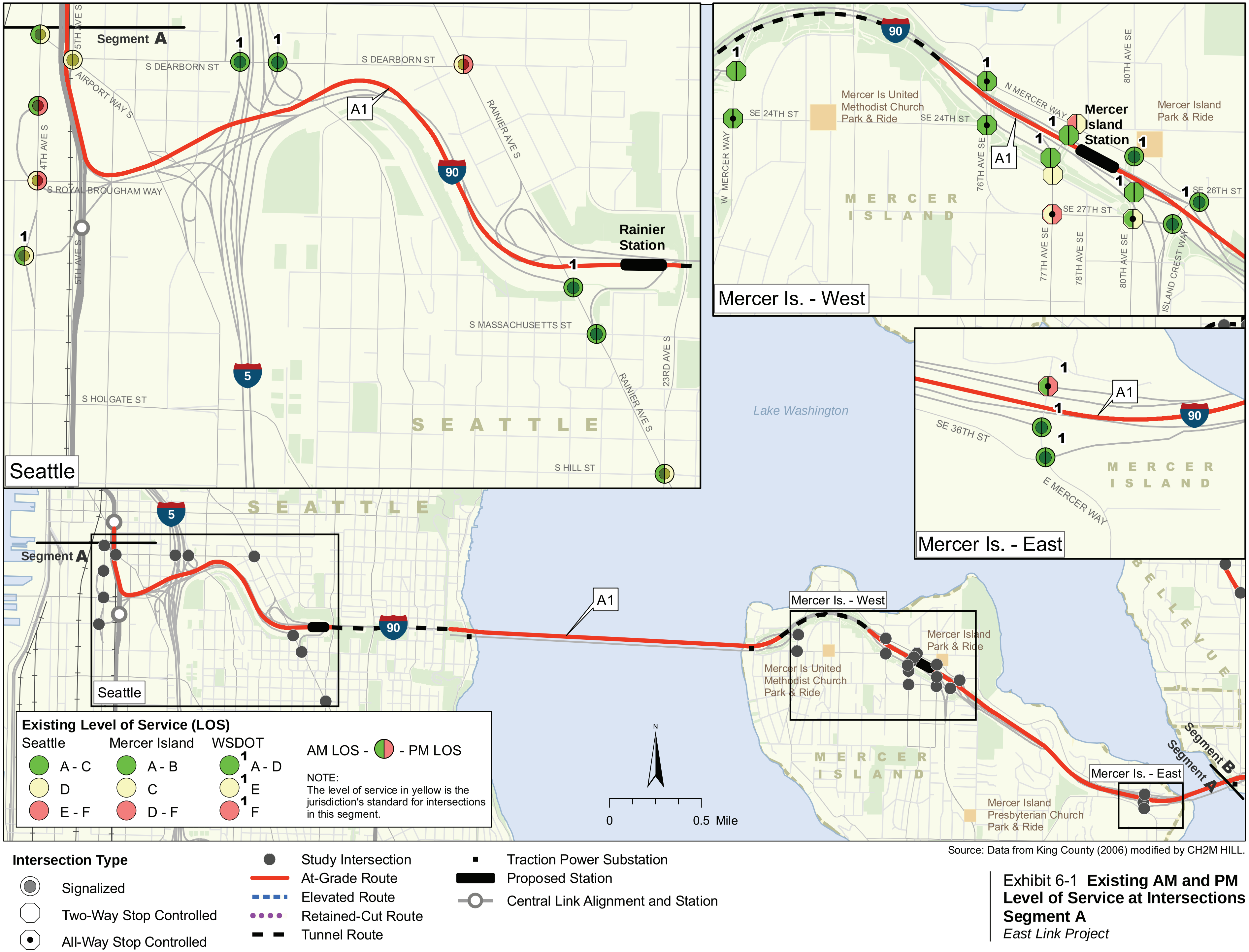
In the AM peak hour on Mercer Island, 77th Avenue SE and N Mercer Way also would not meet Mercer Island's LOS standards because it operates at LOS D. The rest of the intersections operate at either LOS E or F. High volumes in the westbound left-turning movement cause poor operations at the E Mercer Way and I-90 westbound ramps. AM and PM peak-hour intersection LOS results within Segment A are summarized in Exhibit 6-1 and presented in Table D-1 in Appendix D.

6.2.1.2 Traffic Safety

Accident data for arterial intersections were collected from each jurisdiction and reviewed within the study area. Appendix A lists all study intersections in Segment A. Accident rates were calculated as the number of accidents per million entering vehicles (MEV). The City of Seattle uses a system similar to WSDOT accident criteria, where HALs are identified for future safety improvements. A signalized intersection is considered to be an HAL if it experiences an average of more than 10 collisions per year. An unsignalized intersection is considered to be an HAL if it experiences an average of more than five collisions per year. Intersections within the City of Mercer Island with an accident rate near or above 1.0 are considered intersection with high accident rates. In the City of Seattle, there are no HALs. In the City of Mercer Island, there are no intersections with high accident rates. Rates were compared with the yearly average accident rate for the study intersection as shown in Table 6-2.

6.2.1.3 Parking

Parking supply and demand was inventoried for on-street restricted and unrestricted spaces; however, few on-street restricted areas exist within the cities of Seattle and Mercer Island in Segment A. Operation of existing on-street parking is governed by each jurisdiction. Table 6-3 provides parking utilization and supply information near Segment A stations. The only park-and-ride facility within Segment A is maintained by Sound Transit and



Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-1 **Existing AM and PM Level of Service at Intersections Segment A**
East Link Project

TABLE 6-2
Segment A Local Intersection Accident Rates

Jurisdiction/Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Seattle						
Rainier Avenue S & S Dearborn	40140	1.00	1.33	0	2.33	0.16
Rainier Avenue S & S Massachusetts Street	35980	3.67	3.33	0	7.00	0.53
Rainier Avenue S & 23rd Avenue S	39650	2.67	1.67	0	4.33	0.30
Rainier Avenue S & I-90 Eastbound Off-Ramp	33580	0.33	0	0	0.33	0.03
Dearborn Street & I-5 Southbound Ramp	16950	1.33	2.33	0	3.67	0.60
Dearborn Street & I-5 Northbound Ramp	19820	1.00	0.33	0	1.33	0.18
I-90 & 4th Avenue S	31270	1.00	0.33	0	1.33	0.12
S Royal Brougham Way & 4th Avenue S	37780	2.67	1.00	0	3.67	0.27
Airport Way S & 4th Avenue S	25940	1.33	0.33	0	1.67	0.18
Airport Way S & S Dearborn Street	17610	1.33	0.67	0	2.00	0.31
4th Ave Northbound off-ramp & Edgar Martinez Drive S	41290	2.33	3.00	0	5.33	0.35
City of Mercer Island						
W Mercer Way & I-90 Ramps	5620	0.33	0.33	0	0.67	0.32
W Mercer Way & 24th Avenue SE	6840	0.67	0.33	0	1.00	0.40
80th Avenue SE & SE 27th Street	12890	0.33	1.67	0	2.00	0.43
80th Avenue SE & I-90 Eastbound Express Lanes Ramp	6130	0	0.33	0	0.33	0.15
80th Avenue SE & N Mercer Way	10680	0.33	0.33	0	0.67	0.17
77th Avenue SE & Sunset Highway	7490	0.33	0.33	0	0.67	0.24
77th Avenue SE & I-90 Westbound Express Lanes Ramp	7370	0	0	0	0	N/A
77th Avenue SE & I-90 Eastbound Off-Ramp	660	0.67	0.3	0	1.00	0.42
77th Avenue SE & N Mercer Way	11320	1.00	0.67	0	1.67	0.40
77th Avenue SE & SE 27th Street	16100	1.33	1.33	0	2.67	0.45
76th Avenue SE/N Mercer Way & I-90 Westbound On-Ramp	9920	1.33	0.3	0	1.67	0.46
76th Avenue SE & 24th Avenue SE	9920	0.67	0	0	0.67	0.18
Island Crest Way & I-90 Eastbound On-Ramp	18320	2.67	2.33	0	5.00	0.75
Island Crest Way & I-90 Westbound Off-Ramp	13030	1.33	1.33	0	2.67	0.56
E Mercer Way & I-90 Eastbound Off-Ramp	10270	0.30	0	0	0.33	0.09
E Mercer Way & I-90 Eastbound On-Ramp	17500	0	0	0	0	N/A
E Mercer Way & I-90 Westbound Ramps	10290	0.30	0	0	0.33	0.09

ADT = average daily traffic (entering only), PDO = property damage only, INJ = injury, FAT = fatality, acc./MEV = accidents per million entering vehicles, N/A = not applicable; no recorded accidents during study period

TABLE 6-3
Segment A Existing Parking Supply and Utilization

	AM Period			PM Period		
Parking Type/Station	**Supply**	**Demand**	**% Utilization**	**Supply**	**Demand**	**% Utilization**
Rainier						
On-Street Unrestricted	879	363	41%	879	335	38%
On-Street Restricted	–	–	–	–	–	–
Subtotal	879	363	41%	879	335	38%
Mercer Island						
On-Street Unrestricted	108	73	88%	108	67	81%
On-Street Restricted	26	23	68%	26	21	62%
Subtotal	134	96	72%	134	88	66

Parking near the Rainier Station was collected in spring 2007 on all roads within a 0.25-mile radius of the stations.

Parking near the Mercer Island Station was collected in Spring 2008 on all roads within a 0.25-mile radius of the stations because the park-and-ride lot was closed during spring 2007.

located on N Mercer Way in the City of Mercer Island. This facility has recently been expanded and was temporarily closed due to construction and expansion activity on the site. Interim park-and-ride facilities were coordinated with private lots in the surrounding area.

The Rainier Station parking survey area is centered on the median of I-90 at the eastern opening of the Mount Baker Tunnel. In general, the area is bounded by S Charles Street to the north and S Grand Street to the south. Martin Luther King Junior Way S and Rainier Avenue S form the approximate eastern and western boundaries, respectively. Land use in the area is primarily residential. On-street parking in this area is entirely unrestricted by meters, loading zones, or other restrictive use. Of 879 available on-street parking spaces, 363 spaces, or 41 percent, were occupied during the AM peak period. Slightly fewer spaces, 335 spaces or 38 percent, were occupied during the PM peak period. Much of the private parking surrounding the Rainier Station is located on commercial and light industrial properties along Rainier Avenue S; parking regulations are enforced by private property owners at their discretion.

The Mercer Island Station parking area is centered on the median of I-90 and is generally bound by SE 22nd Street to the north, SE 29th Street to the south, 76th Avenue SE to the west, and 84th Avenue SE to the east. Land use is primarily residential north of I-90 and primarily commercial south of I-90. During the AM and PM peak periods, 108 unrestricted on-street parking spaces are available. Demand reached 73 spaces, or a utilization of 88 percent, during the AM peak period and 67 spaces, or a utilization of 81 percent, during the PM peak period. An additional 26 restricted on-street parking spaces are available only. Demand reached 23 spaces, or a utilization of 68 percent, during the AM peak period and 21 spaces, or 62 percent, during the PM peak period. Private off-street parking garages are located throughout the Mercer Island Town Center, and cost and validation policies vary among property owners. Private off-street parking garages are located throughout the Mercer Island Town Center, and private off-street is within a moderate walking distance of the Mercer Island Station. Regulations for private parking are enforced by property owners at their discretion. Parking located in the residential neighborhoods north of I-90, surrounding the Mercer Island Park-and-Ride Lot, is restricted parking designated as residential parking zones (RPZ). It was implemented to reduce impacts of park-and-ride spillover parking into residential neighborhoods and the Town Center.

The Mercer Island Park-and-Ride Lot has 447 parking spaces, of which 435 are currently used, for a utilization rate of 97 percent each weekday (King County Metro, 2008).

6.2.2 Segment B

Segment B spans approximately 1.8 miles from the I-90 on- and off-ramps at Bellevue Way SE to SE 6th Street. The segment is oriented primarily north and south, south of the Bellevue Central Business District. Appendix A lists the study area intersections in Segment B.

6.2.2.1 Existing Operations and Level of Service

The project corridor within Segment B consists of arterial roadway facilities listed in Table 6-4. These arterials vary from two to four lanes with a posted speeds between 30 and 40 mph. Current daily volumes on Bellevue Way are near 39,000, while all other roadways in Segment B have daily volumes between 7,000 and 15,000.

TABLE 6-4
Segment B Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed limit	Average Daily Traffic (ADT)[a]
Bellevue Way SE	Principal Arterial	4	30-40	38,800
112th Avenue SE	Principal Arterial	4	35	15,200
SE 8th Street	Principal Arterial	4	35	10,560
118th Avenue SE	Collector Arterial	2	35	7,125
I-90	Interstate Freeway	8	60	140,000
BNSF RR	Railroad	NA	55	NA

[a] ADT based on the latest available traffic count information.

Intersection analysis was prepared for 14 intersections in Segment B; 11 intersections are within the City of Bellevue's jurisdiction, and 3 are in WSDOT's jurisdiction. Intersection analysis was prepared for existing conditions and compared to the relevant jurisdiction's adopted minimum LOS standard to gauge whether the intersection operates at an acceptable LOS grade. The relevant agencies within Segment B and their LOS standards are as follows:

- City of Bellevue: LOS D (Mobility Management Area 7)
- WSDOT: LOS E

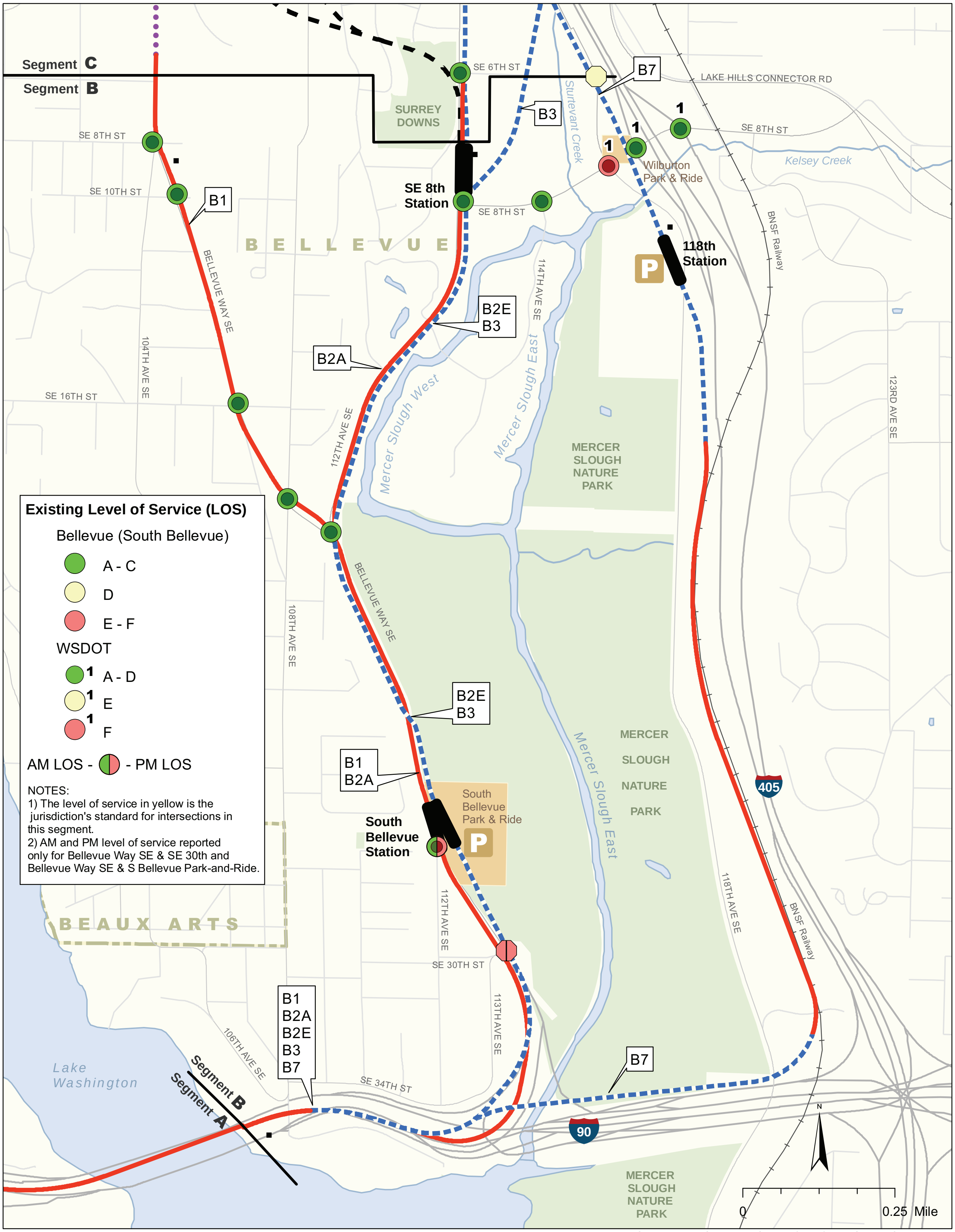
Within Segment B, three intersections (118th Avenue SE and SE 8th Street, Bellevue Way SE and SE 30th Street, and Bellevue Way SE and South Bellevue Park-and-Ride Lot) operate at LOS F in the PM peak hour. All three intersections are close to interstate facilities, and movements toward or away from the interstate operate poorly. During the AM peak hour, only two intersections were analyzed because they are located close to I-90: the South Bellevue Park-and-Ride Lot entrance, and Bellevue Way SE and SE 30th Street. Of these two intersections, the Bellevue Way SE and SE 30th Street intersection operates at LOS F. All other intersections within Segment B operate at LOS D or better. AM and PM peak-hour intersection LOS results for Segment B are summarized in Exhibit 6-2 and presented in Table D-2 in Appendix D.

6.2.2.2 Traffic Safety

Accident data for arterial intersections were collected from each jurisdiction and reviewed within the study area. Accident rates were calculated as the number of accidents per MEV. Intersection within the City of Bellevue with an accident rate near or above 1.0 are considered intersections with high accident rates. In Segment B, there are no intersections with high accident rates. Rates were compared with the yearly average accident rate for the study intersections as shown in Table 6-5.

6.2.2.3 Parking

Parking surveys were conducted to inventory the available on-street parking within one-quarter mile of the South Bellevue, SE 8th, and 118th stations located in Segment B. No restricted on-street parking exists in any of the areas surrounding the stations in Segment B. Table 6-6 summarizes the results of the surveys.



Source: Data from King County (2006) modified by CH2M HILL.

Intersection Type

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

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route

- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-2 **Existing AM and PM Level of Service at Intersections Segment B**
East Link Project

TABLE 6-5
Segment B Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
112th Avenue SE & Bellevue Way SE (MMA 7)	30440	1.67	1.33	0	3.00	0.27
112th Avenue SE & SE 8th Street (MMA 7)	18020	1.00	0.33	0	1.33	0.20
118th Avenue SE & SE 8th Street (MMA 7)	19380	1.33	1.00	0	2.33	0.33
1-405 Northbound Ramps & SE 8th Street (MMA 7)	18170	0.67	0	0	0.67	0.10
I-405 SB Ramps & SE 8th Street (MMA 7)	20510	0.33	1.33	0	1.67	0.22
Bellevue Way SE & SE 30th Street	31430	0.67	0	0	0.67	0.06
Bellevue Way SE & South Bellevue P&R	32590	1.00	0	0	1.00	0.08
112th Avenue SE & SE 6th Street	20770	1.00	1.00	0	2.00	0.26
114th Avenue SE & SE 6th Street	9420	0.33	0	0	0.33	0.10
SE 8th Street & 114th Avenue SE (Bellefield Business Park)	13220	0.33	0	0	0.33	0.07
Bellevue Way SE & 108th Avenue SE	23540	1.67	0.33	0	2.00	0.23
Bellevue Way SE & SE 16th Street	20830	0.67	1.00	0	1.67	0.22
Bellevue Way SE & 104th Avenue SE	19390	0.33	0.67	0	1.00	0.14
Bellevue Way SE & SE 10th Street	21620	1.33	0.67	0	2.00	0.25

ADT = average daily traffic (entering only), PDO = property damage only, INJ = injury, FAT = fatality, acc./MEV = accidents per million entering vehicles, N/A = not applicable; no recorded accidents during study period

TABLE 6-6
Segment B Existing Parking Supply and Utilization by Station

Parking Type/Station	AM Period			PM Period		
	Supply	Demand	% Utilization	Supply	Demand	% Utilization
South Bellevue						
On-Street Unrestricted	438	51	12%	438	31	7%
On-Street Restricted	–	–	–	–	–	–
Subtotal	438	51	12%	438	31	7%
SE 8th						
On-Street Unrestricted	301	24	8%	301	27	9%
On-Street Restricted	–	–	–	–	–	–
Subtotal	301	24	8%	301	27	9%
118th						
On-Street Unrestricted	127	5	4%	127	5	4%
On-Street Restricted	–	–	–	–	–	–
Subtotal	127	5	4%	127	5	4%

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

The parking survey area surrounding the South Bellevue Station is approximately bounded by 108th Avenue SE on the western side, SE 23rd Street on the northern side, and SE 31st Street on the southern side. The station is adjacent to the Mercer Slough Nature Park, which forms the parking survey area's eastern side. Land use is primarily residential. Parking utilization rates surrounding the South Bellevue Station are relatively low compared with the utilization rates in other segments. Of an available 438 unrestricted on-street parking spaces, only 51 spaces, or 12 percent, were occupied during the AM peak period; and 31 spaces, or 7 percent, were occupied during the PM peak period.

The two park-and-ride lots in the South Bellevue segment, South Bellevue Park-and-Ride Lot and the Wilburton Park-and-Ride Lot, are both currently used at or near capacity on weekdays. South Bellevue has 519 parking spaces, and the Wilburton has 186 parking spaces. The majority of private parking within Segment B surrounds the office and commercial areas adjacent to SE 8th Street.

The SE 8th Street Station is located near the intersection of SE 8th Street and 112th Avenue SE. The parking survey area is approximately bounded by SE 4th Street, 109th Avenue SE, SE 15th Street, and 118th Avenue SE. Land use is split between commercial office buildings and residential. Out of 301 available unrestricted on-street parking spaces, only 24 spaces, or 8 percent, are occupied during the AM peak period; and only 27 spaces, or 9 percent, are occupied during the PM peak period.

The parking survey area surrounding the proposed location of the 118th Station is approximately bounded by SE 6th Street to the north, 112th Avenue SE to the west, and SE 12th Street to the east. Land use in this area is split between commercial office buildings and residential. Existing on-street parking utilization in this survey area is also low compared with the utilization in other study segments. Out of 127 available unrestricted on-street parking spaces, only 5 spaces, or 4 percent, are occupied during both the AM and PM peak period.

6.2.3 Segment C

Segment C is the area bounded by SE 6th Street to the south, Bellevue Way SE to the west, NE 12th Street to the north, and 116th Avenue NE to the east. The area includes the central business district of Bellevue. Appendix A lists the study area intersections in this segment.

6.2.3.1 Existing Operations and Level of Service

The project corridor within Segment C consists of arterial roadway facilities that are listed in Table 6-7. Roadways within Segment C vary between three and seven lanes, with the majority of the roadways providing at least four lanes. All arterials identified as key roadways in this segment are posted for 30 mph.

An existing PM peak-hour intersection analysis was prepared for 37 intersections in Segment C, 7 intersections being in WSDOT jurisdiction and the remaining intersections in City of Bellevue jurisdiction. Intersection analysis was prepared for the existing conditions, and was compared to the relevant jurisdiction's adopted minimum LOS standard to gauge whether the intersections operate at an acceptable LOS grade. The relevant agencies within Segment C and their LOS standards are:

- City of Bellevue: LOS E (Mobility Management Area 3)
- WSDOT: LOS E

Of the 37 study intersections in Segment C, only the intersection of NE 8th Street and 112th Avenue NE operates at LOS F. LOS D and E meet the LOS standards in this segment; ten intersections operate at these conditions, indicating that, while intersections generally operate at acceptable LOS grades, the operations are near capacity.

PM peak-hour intersection LOS results for Segment C are summarized in Exhibit 6-3 and presented in Table D-3 in Appendix D.

TABLE 6-7
Segment C Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed Limit	Average Daily Traffic (ADT) [a]
Bellevue Way SE	Principal Arterial	4	30	27,000
106th Avenue NE	Local Arterial	3	30	19,080
108th Avenue NE	Minor Arterial	2	30	4,300
110th Avenue NE	Minor Arterial	2	30	7,700
112th Avenue NE	Principal Arterial	4	30	20,600
116th Avenue NE	Principal Arterial	4	30	18,845
Main Street	Minor Arterial	4	30	8,400
NE 2nd Street	Minor Arterial	3	30	6,900
NE 4th Street	Principal Arterial	5	30	11,730
NE 6th Street	Local Arterial	4	30	2,650
NE 8th Street	Principal Arterial	7	30	42,780
NE 10th Street	Minor Arterial	5	30	9,100
NE 12th Street	Principal Arterial	5	30	19,490

[a] ADT based on the latest available traffic count information

6.2.3.2 Traffic Safety

Accident data for arterial intersections were collected from each jurisdiction and reviewed within the project corridor. Accident rates were calculated as the number of accidents per MEV. Two intersections within Segment C have accident rates near or above 1.0 accident per MEV: 112th Avenue NE at NE 8th Street/I-405, and 110th Avenue NE at NE 10th Street. While the exact reason these intersections exhibit a higher accident rate is unknown, the 112th Avenue NE and NE 8th Street intersection is a high-volume intersection with an additional fifth approach. At 110th Avenue NE and NE 10th Street intersection, the traffic signal operates in two phases with all left-turn movements permitted. The rates were compared with the yearly average accident rate for the study intersections, as shown in Table 6-8.

6.2.3.3 Parking

Parking surveys were conducted to inventory the availability of on-street parking within one-quarter mile of the Old Bellevue, East Main, Bellevue Transit Center, Ashwood/Hospital, and Hospital stations located in Segment C. Table 6-9 summarizes the results of the surveys.

The Old Bellevue Station would be located near the intersection of Bellevue Way NE and Main Street. The parking survey area is bounded by NE 4th Street, 108th Avenue NE, SE 4th Street, and 100th Avenue NE. Land use is split between multifamily residential to the south of Main Street and commercial north of Main Street. During the AM and PM peak periods, 116 of the 198—a utilization of 59 percent—of the available on-street parking spaces are occupied.

The proposed East Main Station is located on the southeast corner of 112th Avenue SE and Main Street. The parking survey area is bounded by 108th Avenue NE on the western side, SE 4th Street on the southern side, NE 4th Street on the northern side, and 116th Avenue NE on the eastern side. Land use is primarily commercial, with residential use to the southwest. Of an available 50 unrestricted on-street parking spaces, only five spaces, or 10 percent, are occupied during the AM survey period; and four spaces, or 8 percent, are occupied during the PM survey period.

For the 110th NE Elevated Alternative (C8E), the Bellevue Transit Center Station is located at the intersection of NE 6th Street and 110th Avenue NE. The area that was surveyed for parking availability is approximately

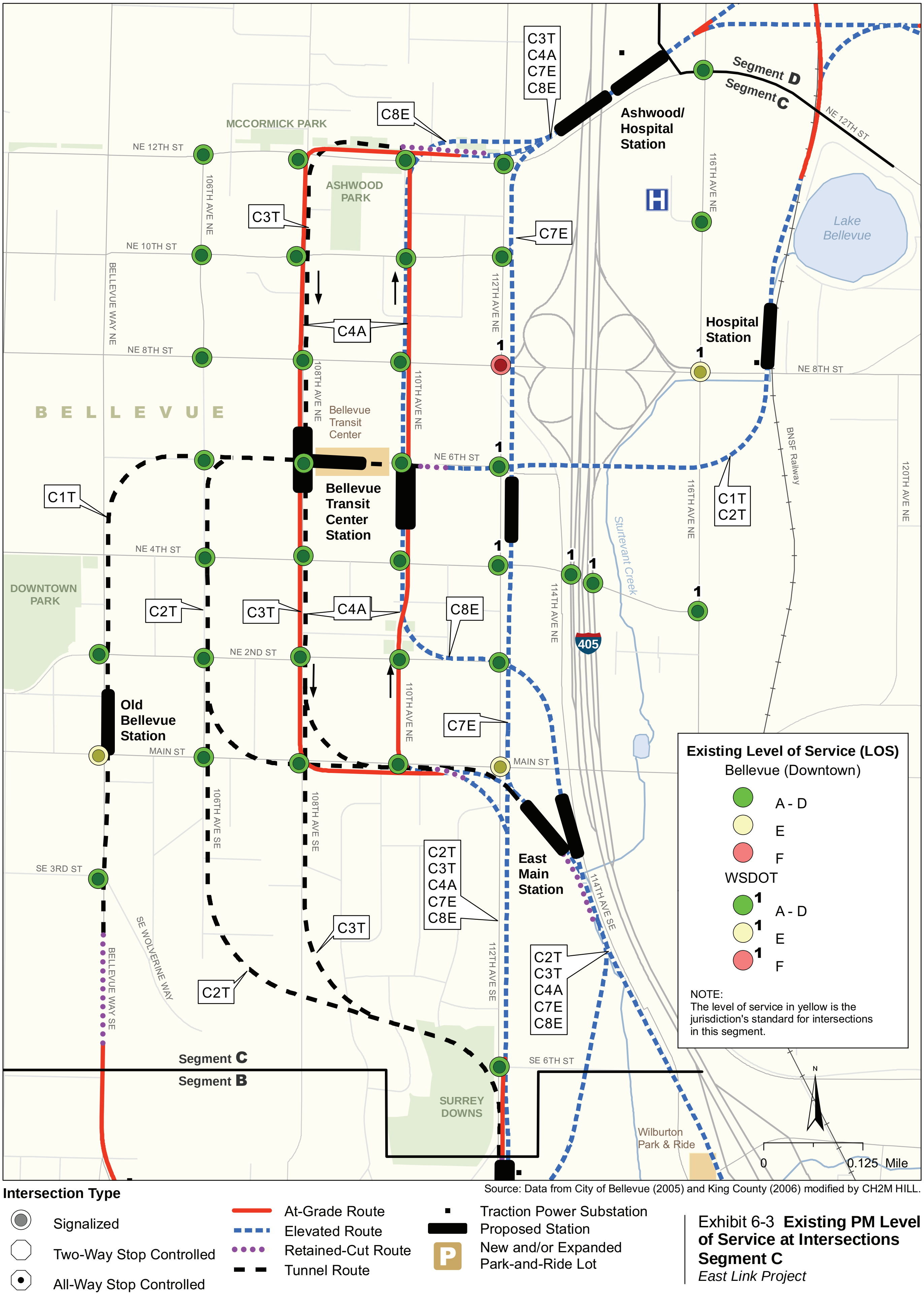


Exhibit 6-3 **Existing PM Level of Service at Intersections Segment C**
East Link Project

TABLE 6-8
Segment C Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (Acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
Bellevue Way SE & SE Kilmarnock Street	23950	1.33	1.00	0	2.33	0.27
Bellevue Way & Main Street (MMA 3)	35850	4.67	1.67	0	6.33	0.48
Bellevue Way NE & NE 2nd Street	25430	3.00	0.33	0	3.33	0.36
112th Avenue NE & NE 12th Street (MMA 3)	35260	1.67	1.00	0	2.67	0.21
112th Avenue NE & NE 10th Street	20590	1.33	0.33	0	1.67	0.22
112th Avenue NE & NE 8th Street/I-405 SB Ramp (MMA 3)	**52330**	**14.00**	**5.00**	**0**	**19.00**	**0.99**
112th Avenue NE & NE 6th Street	21740	0.67	0	0	0.67	0.08
112th Avenue NE & NE 4th Street (MMA 3)	37210	4.67	2.33	0	7.00	0.52
112th Avenue NE & NE 2nd Street	20510	0.67	0.33	0	1.00	0.13
112th Avenue & Main Street (MMA 3)	34700	2.33	0.33	0	2.67	0.21
110th Avenue NE & NE 12th Street	21250	0.67	0.33	0	1.00	0.13
110th Avenue NE & NE 10th Street	**7060**	**1.00**	**1.67**	**0**	**2.67**	**1.04**
110th Avenue NE & NE 8th Street	33390	4.33	2.33	0	6.67	0.55
110th Avenue NE & NE 6th Street	8510	0	0	0	0	N/A
110th Avenue NE & NE 4th Street	22860	1.00	1.00	0	2.00	0.24
110th Avenue NE & NE 2nd Street	10750	1.33	0.33	0	1.67	0.42
110th Avenue & Main Street	19960	1.33	0	0	1.33	0.18
108th Avenue NE & NE 12th Street (MMA 3)	21570	1.67	0.67	0	2.33	0.30
108th Avenue NE & NE 10th Street	13150	0.33	1.67	0	2.00	0.42
108th Avenue NE & NE 8th Street (MMA 3)	33910	5.67	1.33	0	7.00	0.57
108th Avenue NE & NE 6th Street	9180	0.33	0.33	0	0.67	0.20
108th Avenue NE & NE 4th Street (MMA 3)	28390	1.67	0.67	0	2.33	0.23
108th Avenue NE & NE 2nd Street	15240	0.67	0.67	0	1.33	0.24
108th Avenue & Main Street (MMA 3)	22560	4.67	1.67	0	6.33	0.48
106th Avenue NE & NE 12th Street	17740	0.67	0.67	0	1.33	0.21
106th Avenue NE & NE 10th Street	16210	0.67	0.67	0	1.33	0.23
106th Avenue NE & NE 8th Street	31580	5.33	2.00	0	7.33	0.64
106th Avenue NE & NE 6th Street	9150	0	0	0	0	N/A
106th Avenue NE & NE 4th Street	21270	0.33	0.67	0	1.00	0.13
106th Avenue NE & NE 2nd Street	11830	0.67	1.00	0	1.67	0.39
106th Avenue NE & Main Street	20310	1.00	0	0	1.00	0.13
NE 4th Street & I-405 SB Ramp	25470	3.33	1.67	0	5.00	0.54

TABLE 6-8
Segment C Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (Acc./MEV)
		PDO	INJ	FAT		
NE 4th Street & I-405 NB Ramp	15490	2.33	0.67	0	3.00	0.53
116th Avenue NE & NE 12th Street (MMA 4)	35130	4.00	2.33	0	6.33	0.49
116th Avenue NE & NE 10th Street	21550	1.00	0	0	1.00	0.13
116th Avenue NE & NE 8th Street (MMA 4)	56130	9.33	3.33	0	12.67	0.62
116th Avenue NE & NE 4th Street (MMA 4)	26350	3.67	0.33	0	4.00	0.42

ADT = average daily traffic (entering only), PDO = property damage only, INJ = injury, FAT = fatality, acc./MEV = accidents per million entering vehicles, N/A = not applicable; no recorded accidents during study period

Note: Intersections with an accident rate at or over 1.0 are highlighted in bold text.

TABLE 6-9
Segment C Existing Parking Supply and Utilization by Station

Parking Type/Station	AM Period			PM Period		
	Supply	Demand	% Utilization	Supply	Demand	% Utilization
Old Bellevue						
On-Street Unrestricted	38	22	58%	38	20	53%
On-Street Restricted	160	94	59%	160	96	60%
Subtotal	198	116	59%	198	116	59%
East Main						
On-Street Unrestricted	50	5	10%	50	4	8%
On-Street Restricted	–	–	–	–	–	–
Subtotal	50	5	10%	50	4	8%
Bellevue Transit Center						
On-Street Unrestricted	–	–	–	–	–	–
On-Street Restricted	141	88	62%	141	61	43%
Subtotal	141	88	62%	141	61	43%
Ashwood/Hospital						
On-Street Unrestricted	–	–	–	–	–	–
On-Street Restricted	138	38	28%	138	44	32%
Subtotal	138	38	28%	138	44	32%
Hospital						
On-Street Unrestricted	26	8	31%	26	8	31%
On-Street Restricted	12	1	8%	12	8	67%
Subtotal	38	9	24%	38	16	42%

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

bounded by NE 10th Street, 106th Avenue NE, NE 2nd Street, and I-405. The station is located in Downtown Bellevue, and land use is dominated by the high-rise commercial offices and retail outlets that are typical of central business districts. All of the available 141 on-street parking spaces in this area are restricted. During the AM peak period, 88 spaces, or 62 percent, are occupied. During the PM peak period, 61 spaces, or 43 percent are occupied.

Off-street private parking is largely provided by commercial and employment centers in Downtown Bellevue. Hourly parking rates, monthly permit policies, and validation policies are typically enforced at private garages and vary among properties. Demand for private parking is highest during the day consistent with traditional business hours. In the downtown area bound by Main Street, 100th Avenue NE, NE 12th Street, and 116th Avenue NE, there are close to 28,700 parking stalls (private and public) with an afternoon peak-period utilization rate of about 63 percent (City of Bellevue, 2003).

The Ashwood/Hospital Station would be constructed over I-405 on NE 12th Street. The parking surveys collected data within one-quarter-mile radius of the proposed station. Data collection was bounded by 110th Avenue NE, NE 8th Street, and 116th Avenue NE. Within this area, 138restricted on-street parking spaces were identified. Only 38 or—a utilization of 28 percent—of these spaces were occupied during the AM peak period; and 44—a utilization of 32 percent—were occupied during the PM peak period.

For the Bellevue Way Tunnel (C1T) and 10th NE Tunnel (C2T) alternatives, the Hospital Station is located just east of the intersection of NE 8th Street and 116th Avenue NE. The area studied by the parking survey is bounded approximately by I-405, NE 8th Street, and 124th Avenue NE. A total of 26 unrestricted on-street spaces and 12 restricted on-street spaces were identified. During the AM peak period, eight, or 31 percent, of the unrestricted spaces were occupied; and one, or 8 percent, of the restricted on-street spaces were occupied. During the PM peak period, eight, or 31 percent, of the unrestricted spaces were occupied; and eight, or 67 percent, of the restricted on-street spaces were occupied.

Substantial private off-street parking within Segment C is located at major commercial and employment centers in Downtown Bellevue and the Ashwood/Hospital area. A majority of these private off-street parking facilities are monitored by the property owners. Demand for private parking is highest during the day consistent with traditional business hours.

6.2.4 Segment D

Segment D is the Bel-Red corridor and is generally bounded by SR 520 to the north and NE Bel-Red Road to the south. Appendix A lists study area intersections in Segment D.

6.2.4.1 Existing Operations and Level of Service

The project corridor within Segment D consists of arterial roadway facilities that are included in Table 6-10. Roadways within Segment D vary from two to five lanes. The collector arterial classified roadways are either two or three lanes, while minor arterials are between three and five lanes. All arterials identified in the table are posted for 25 to 35 mph.

Intersection analysis was prepared for 28 intersections in Segment D. Twelve of these intersections are in the City of Bellevue, and 16 are in the City of Redmond. Of the 28 intersections studied in Segment D, five are in WSDOT's jurisdiction. Intersection analysis was prepared for the existing conditions and compared to the relevant jurisdiction's adopted minimum LOS standard to gauge whether the intersection operates at an acceptable LOS grade. The relevant agencies within Segment D and their LOS standards are as follows:

- City of Bellevue: LOS E (Mobility Management Areas 4 and 14)
- City of Redmond: LOS E
- WSDOT: LOS E

None of the intersections in Segment D operate at LOS F, which is less than the agency LOS standards. Three intersections on 148th Avenue NE operate at LOS E: SR 520 westbound ramp, NE 24th Street, and 20th Avenue NE. All other intersections operate at LOS D or better. Generally, the worst operating intersections are located along the highest volume and most congested arterials: 140th Avenue NE, 148th Avenue NE, 20th Avenue, and 156th Avenue NE. PM peak-hour intersection LOS results are summarized in Exhibit 6-4 and presented in Table D-4 in Appendix D.

TABLE 6-10
Segment D Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed limit	Average Daily Traffic (ADT) [a]
124th Avenue NE	Minor Arterial	3	30	24,310
130th Avenue NE	Collector Arterial	2	30	24,310
132nd Avenue NE	Collector Arterial	3	30	3,940
136th PL NE	Collector Arterial	2	25	8,780
140th Avenue NE	Minor Arterial	5	30	23,820
148th Avenue NE	Principal Arterial	6	35	33,140
152nd Avenue NE	Local Arterial	4	30	22,490
NE 16th Street	Local Arterial	2	25	2,350
NE 20th Street	Minor Arterial	4	35	5,820
NE 24th Street	Minor Arterial	4	30	13,450

[a] ADT based on the latest available traffic count information.

6.2.4.2 Traffic Safety

Accident data for arterial intersections were collected from each jurisdiction and reviewed within the project corridor. Accident rates were calculated as the number of accidents per MEV. Intersections within **S**egment D with an accident rate near or above 1.0 are considered intersections with high accident rates. Within **S**egment D there are no intersections with high accident rates. Rates were compared with the yearly average accident rate for the study intersection as shown in Table 6-11.

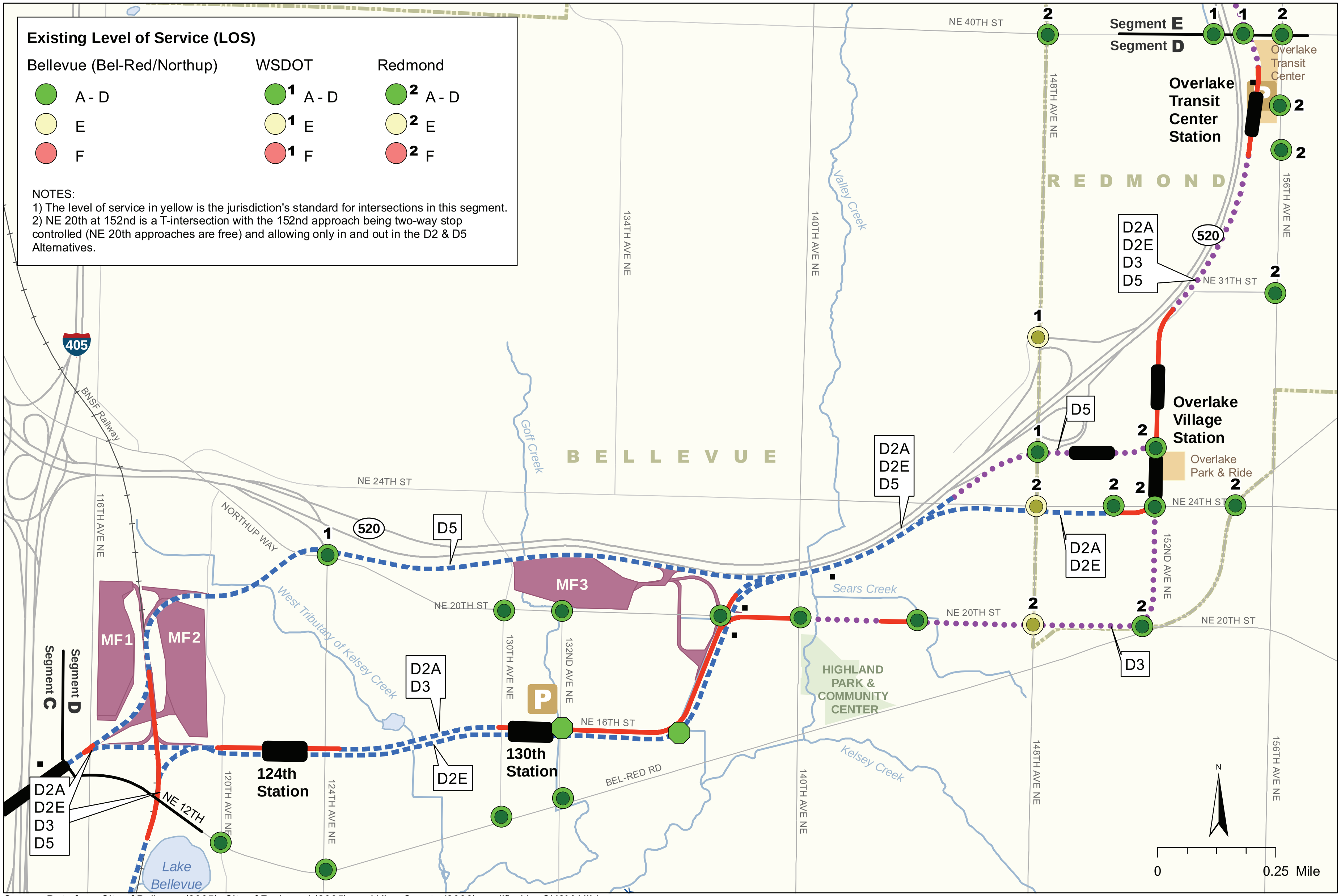
Because many of the arterials include either median two-way left-turn lanes or curbed medians restricting turns to signalized intersections, none of the Segment D intersections have an accident rate higher than 0.72 accident per MEV. This provides an indication that the accident conditions within Segment D are relatively acceptable.

6.2.4.3 Parking

Parking surveys were conducted to inventory the availability of on-street parking within one-quarter mile of the 124th, 130th, Overlake Village, and Overlake Transit Center stations located in Segment D. Table 6-12 summarizes the results of the surveys.

The proposed location for the 124th Avenue NE Station is between 120th Avenue NE and 124th Avenue NE, near NE 14th Street. The dominant current land use in this area is light to heavy industrial. The area studied by the parking surveys is approximately bounded by 120th Avenue NE, NE 12th Street, 124th Avenue NE, and NE 18th Street. A total of 177 unrestricted on-street parking spaces were identified in this area. Around 30 percent of these spaces are occupied during the AM and PM peak periods, or 44 spaces during the AM peak period and 55 spaces during the PM peak period.

The parking survey area surrounding the proposed location of the 130th NE Station at the intersection of NE 16th Street and 132nd Avenue NE is approximately bounded by 130th Avenue NE, Bel-Red Road, 136th Avenue NE, and NE 20th Street. A total of 152 unrestricted on-street parking spaces and one restricted on-street parking space were identified in this area. The restricted space was not used during the AM or PM peak periods. Around 40 percent of the unrestricted spaces are occupied during the AM and PM peak periods, or 63 spaces during the AM peak period and 59 spaces during the PM peak period.



Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

Intersection Type

- Signalized
- Two-Way Stop Controlled
- All-Way Stop Controlled
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Traction Power Substation
- Proposed Station
- Maintenance Facility and Access Track
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-4 **Existing PM Level of Service at Intersections Segment D**
East Link Project

TABLE 6-11
Segment D Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (Acc./MEV)
		PDO	INJ	FAT		
City of Bellevue						
120th Avenue NE & NE 12th Street (MMA 4)	24085	1.33	0.33	0	1.67	0.19
124th Avenue NE & Northup Way (MMA 4)	30244	4.33	0.67	0	5.00	0.45
124th Avenue NE & Bel-Red Road (MMA 4)	33450	2.33	0.33	0	2.67	0.22
130th Avenue NE & Bel-Red Road (MMA 4)	29841	2.00	1.33	0	3.33	0.31
130th Avenue NE & NE 16th Street	7097	0	0	0	0	N/A
130th Avenue NE & NE 20th Street (MMA 4)	31757	5.33	3.00	0	8.33	0.72
132nd Avenue NE & Bel-Red Road	25667	1.67	1.00	0	2.67	0.28
132nd Avenue NE & NE 16th Street	5152	0	0	0	0	N/A
132nd Avenue NE & NE 20th Street	24064	0.67	1.33	0	2.00	0.23
136th Avenue NE & NE 16th Street	5031	1.00	0	0	1.00	0.54
136th Avenue NE & NE 20th Street	24145	1.33	0.33	0	1.67	0.19
140th Avenue NE & 20th Avenue	45286	4.33	1.00	0	5.33	0.32
NE 20th Street & Mall Entrance	23167	1.67	0.67	0	2.33	0.32
City of Redmond						
148th Avenue NE & SR 520 Westbound Ramps	37833	2.00	0	0	2.00	0.15
148th Avenue NE & SR 520 Eastbound Ramps	56610	0.33	0.33	0	0.67	0.03
NE 24th Street & 148th Avenue NE	102912	8.00	2.33	0	10.33	0.28
NE 24th Street & 151st Avenue NE	34169	1.67	1.33	0	3.00	0.24
NE 20th Street & 152nd Avenue NE	22301	4.00	1.00	0	5.00	0.61
NE 24th Street & 152nd Avenue NE	37313	7.67	2.00	0	9.67	0.71
NE 26th Street & 152nd Avenue NE	14263	0.00	0.33	0	0.33	0.06
NE 24th Street & Bel-Red Road	35906	2.67	0.67	0	3.33	0.25
NE 40th Street & 148th Avenue NE	40115	3.67	0.67	0	4.33	0.30
NE 40th Street & SR 520 Westbound Ramps	36502	3.00	1.67	0	4.67	0.35
NE 40th Street & SR 520 Eastbound Ramps	42524	2.33	1.00	0	3.33	0.22
NE 40th Street & 156th Avenue NE	62911	6.67	1.67	0	8.33	0.36
Overlake P&R Entrance & 156th Avenue NE	31798	0	0	0	0	N/A
NE 36th Street & 156th Avenue NE	37262	4.67	1.33	0	6.00	0.44
NE 31st Street & 156th Avenue NE	30581	3.00	0.67	0	1.67	0.33
148th Avenue NE & 20th Avenue	61338	5.33	0.67	0	6.00	0.28

ADT = average daily traffic (entering only), PDO = property damage only, INJ = injury, FAT = fatality, acc./MEV = accidents per million entering vehicles, N/A = not applicable; no recorded accidents during study period

TABLE 6-12
Segment D Existing Parking Supply and Utilization by Station

Parking Type/Station	AM Period			PM Period		
	Supply	Demand	% Utilization	Supply	Demand	% Utilization
124th						
On-Street Unrestricted	177	44	25%	177	55	31%
On-Street Restricted	–	–	–	–	–	–
Subtotal	177	44	25%	177	55	31%
130th						
On-Street Unrestricted	152	63	41%	152	59	39%
On-Street Restricted	1	0	0%	1	0	0%
Subtotal	153	63	41%	153	59	39%
Overlake Village (Park-and-Ride Lot)						
On-Street Unrestricted	42	21	50%	42	18	43%
On-Street Restricted	–	–	–	–	–	–
Subtotal	42	21	50%	42	18	43%
Overlake Transit Center (Park-and-Ride Lot)						
On-Street Unrestricted	21	14	67%	21	14	67%
On-Street Restricted	–	–	–	–	–	–
Subtotal	21	14	67%	21	14	67%

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

The Overlake Village Station would be constructed near the intersection of NE 24th Street and 152nd Avenue NE. This area is dominated by commercial retail outlets and office buildings. The area that was inventoried is approximately bounded by 148th Avenue NE, NE 20th Street, 156th Avenue NE, and NE 28th Street. A total of 42 unrestricted on-street parking spaces were identified in this area. During the AM peak period, half of these spaces, or 21, were used. The utilization rate was slightly lower for the PM peak period, when 18 spaces or 43 percent were used.

The proposed location for the Overlake Transit Center Station is on the southwest corner of the intersection of NE 40th Street and 156th Avenue NE. The surrounding area is primarily used as commercial office space. The parking survey area for this station was bounded by 150th Avenue NE, NE 36th Street, 159th Avenue NE, and NE 45th Street. A total of 21 unrestricted on-street parking spaces were identified in this area. During the AM and PM peak periods, 14 of these spaces, or 67 percent, were used.

The Overlake Village Park-and-Ride Lot has 203 parking spaces, of which 33 percent are used each weekday. The Overlake Transit Center has 170 parking spaces, all of which are used each weekday (King County Metro, 2007).

Within Segment D, much of the off-street private parking is located at Overlake Hospital and at commercial businesses along the Bel-Red corridor. Private parking lots along Bel-Red Road typically do not enforce hourly parking policies; however, parking policies and enforcement vary among properties. Demand among private parking lots in Segment D is highest throughout the day during business hours; however, demand is generally consistent among major shopping centers located in Segment D.

6.2.5 Segment E

Segment E extends north of NE 40th Street along SR 520 to Downtown Redmond. Appendix A lists the study area intersections in Segment E.

6.2.5.1 Existing Operations and Level of Service

The project corridor within Segment E consists of arterial roadway facilities that are listed in Table 6-13. Local roadways within Segment E vary between two and six lanes. Excluding SR 202, the number of lanes on the identified roadways is between two and four lanes. Both local arterial roadways (NE 76th Street and NE 70th Street) and the collector arterial (161st Avenue NE) are two-lane roads that have posted speeds of 25 mph. All other arterials identified in this segment are posted for either 30 to 35 mph. Except on SR 202 (Redmond Way and Cleveland Street) and Union Hill Road and Avondale Road NE, daily traffic volumes range between 6,000 and 16,000 ADT. Daily traffic volumes on Redmond Way and Cleveland Street are between 27,000 and 29,000, and Union Hill Road and Avondale Road NE have about 26,000 and 33,000 ADT, respectively.

TABLE 6-13
Segment E Existing Roadway Facilities

Roadway	Arterial Classification	Number of Lanes	Speed limit	Average Daily Traffic (ADT)[a]
NE 40th Street	Collector Arterial	4	35	10,740
NE 51st Street	Minor Arterial	4	30	14,120
NE 76th Street	Local Arterial	2	25	2,350
NE 70th Street	Local Arterial	2	25	5,920
Leary Way NE	Principal Arterial	4	30	15,850
West Lake Sammamish Parkway	Principal Arterial	4	30	7,985
Redmond Way (couplet)	Principal Arterial	3	30	27,010
Cleveland Street (couplet)	Principal Arterial	2	30	29,460
Avondale Road NE	Principal Arterial	5	35	33,000
NE Union Hill Road	Minor Arterial	4	30	26,000
180th Avenue NE/178th Place NE	Collector Arterial	3	30	12,400
161st Avenue NE	Collector Arterial	2	25	8,550
SR 202	Principal Arterial	6	30	13,000

[a] ADT based on the latest available traffic count information from City of Redmond (http://www.redmond.gov/connectingredmond/resources/pdfs/redmondmachinecounts.pdf)

Intersection analysis was prepared for 25 intersections in Segment E. Twenty-two of these intersections are in the City of Redmond jurisdiction, and the other three are in WSDOT's jurisdiction. Intersection analysis was prepared for the existing conditions and compared to the relevant jurisdiction's adopted minimum LOS standard to gauge whether the intersections operate at an acceptable LOS grade. The relevant agencies within Segment E and their LOS standards are as follows:

- City of Redmond: LOS E
- WSDOT: LOS E

The intersections of NE Leary Way and West Lake Sammamish Parkway, Avondale Road NE and NE Union Hill Road, and SR 202 and East Lake Sammamish Parkway operate at LOS F, which is lower than the standard LOS. The intersection of SR 202 and SR 520 westbound ramps operates at LOS E, while all other intersections operate at or better than LOS D. PM peak-hour intersection LOS results are summarized in Exhibit 6-5 and presented in Table D-5 in Appendix D.

6.2.5.2 Traffic Safety

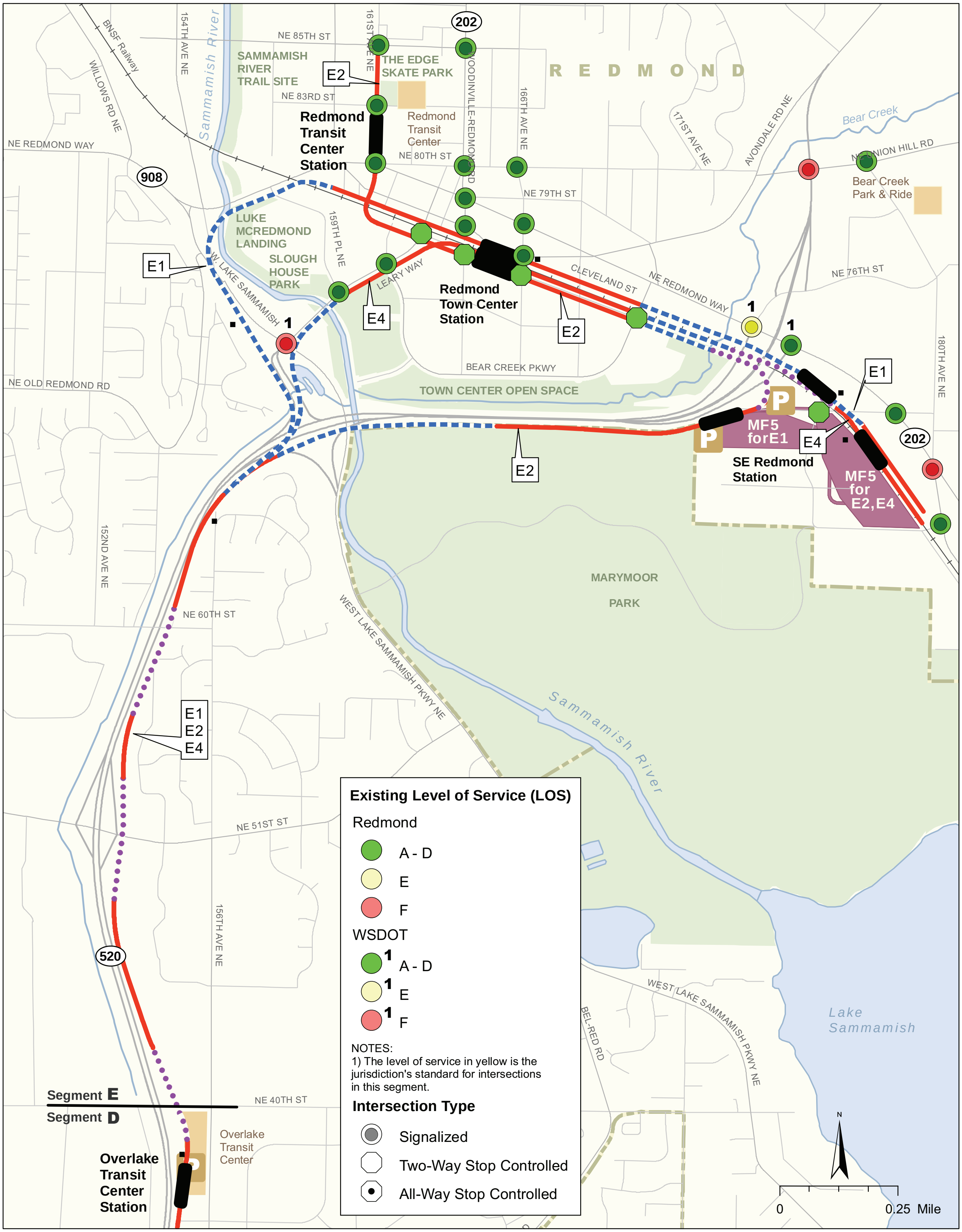
Accident data for arterial intersections were collected from each jurisdiction and reviewed within the project corridor. Accident rates were calculated as the number of accidents per MEV. Four intersections within Segment E have accident rates near or above 1.0 accident per MEV: 164th Avenue NE and NE 76th Street, 166th Avenue NE and SR 202, SR 202 and SR 520 westbound ramps, and 164th Avenue NE and NE 85th Street. Intersection accident rates were compared with the average number of yearly accidents as shown in Table 6-14.

TABLE 6-14
Segment E Local Intersection Accident Rates

Intersection	ADT	2004-2006 Accident Avg.			Yearly Acc. Avg.	Accident Rate (Acc./MEV)
		PDO	INJ	FAT		
City of Redmond						
NE Leary Way & West Lake Sammamish Parkway	61732	5.00	0.67	0	5.67	0.25
NE Leary Way & 159th Place NE	36895	1.33	0.67	0	2.00	0.14
NE Leary Way & Bear Creek Parkway	35944	1.67	0.33	0	2.00	0.15
NE Leary Way & NE 76th Street	15721	0	0	0	0	N/A
Redmond Way at 161st Avenue NE	22682	3.00	0.67	0	3.67	0.44
NE 83rd Street at 161st Avenue NE	12476	2.67	1.00	0	3.67	0.81
NE 85th Street & 161st Avenue NE	2112	3.00	0.67	0	3.67	0.47
164th Avenue NE & SR 202	21731	2.33	0.33	0	2.67	0.34
164th Avenue NE& NE 76th Street	**3017**	**0**	**1.67**	**0**	**1.67**	**1.51**
164th Avenue NE& Cleveland Street	18523	1.33	0.33	0	1.67	0.25
164th Avenue NE& NE 80th Street	20818	4.33	0.67	0	5.00	0.66
164th Avenue NE& NE 85th Street	**29109**	**8.00**	**2.33**	**0.33**	**10.67**	**1.00**
166th Avenue NE & SR 202	**24901**	**10.67**	**1.33**	**0**	**12.00**	**1.32**
166th Avenue NE & NE 76th Street	10980	0.67	0	0	0.67	0.17
166th Avenue NE & NE Cleveland Street	29388	2.33	0.67	0	3.00	0.28
166th Avenue NE & NE 80th Street	23620	2.33	1.00	0	3.33	0.39
NE 76th Street & Bear Creek Parkway	16507	1.00	1.00	0	2.00	0.33
SR 202 & SR 520 Westbound Ramps	**51564**	**15.33**	**3.00**	**0**	**18.33**	**0.97**
SR 202 & SR 520 Eastbound Ramps	51564	5.33	1.33	0	6.67	0.35
SR 202 & NE 70th Street	46163	4.67	0.67	0	5.33	0.32
NE 70th Street & 176th Avenue NE	5882	0	0	0	0	N/A
178th Place NE & Union Hill Road	35652	2.67	1.00	0	3.67	0.28
Avondale Road NE & NE Union Hill Road	53858	6.00	0	0	6.00	0.31
E Lake Sammamish Parkway & NE 65th Street	29160	1.33	0	0	1.33	0.13
SR 202 & E Lake Sammamish Parkway (180th Avenue NE)	49814	12.67	2.00	0	14.67	0.81

ADT = average daily traffic (entering only), PDO = property damage only, INJ = injury, FAT = fatality, acc./MEV = accidents per million entering vehicles, N/A = not applicable; no recorded accidents during study period.

Note: Intersections with an accident rate at or over 1.0 are highlighted in bold text.



Source: Data from City of Redmond (2005) and King County (2006) modified by CH2M HILL.

- ▪ Traction Power Substation
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Maintenance Facility and Access Track
- P New and/or Expanded Park-and-Ride Lot

NOTE:
Due to existing land use conditions the intersection at Cleveland St. and 161st Ave NE is absent under existing conditions.

Exhibit 6-5 **Existing PM Level of Service at Intersections Segment E**
East Link Project

6.2.5.3 Parking

Parking surveys were conducted to inventory the availability of on-street parking within a one-quarter mile of the Redmond Town Center, SE Redmond, and Redmond Transit Center stations located in Segment E. Table 6-15 summarizes the results of the surveys.

TABLE 6-15
Segment E Existing Parking Supply and Utilization by Station

Parking Type/Station	AM Period			PM Period		
	Supply	Demand	% Utilization	Supply	Demand	% Utilization
Redmond Town Center						
On-Street Unrestricted	393	162	41%	393	175	45%
On-Street Restricted	31	17	55%	31	12	39%
Subtotal	424	179	42%	424	187	44%
SE Redmond						
On-Street Unrestricted	41	29	71%	41	29	71%
On-Street Restricted	–	–	–	–	–	–
Subtotal	41	29	71%	41	29	71%
Redmond Transit Center (Park-and-Ride Lot)						
On-Street Unrestricted	485	303	62%	485	303	62%
On-Street Restricted	52	27	52%	52	21	40%
Subtotal	537	330	61%	537	324	60%

Note: Data were collected in spring 2007 on all roads within a 0.25-mile radius of each station.

The proposed location for the Redmond Town Center Station is along NE 76th Street between 164th Avenue NE and 166th Avenue NE. Commercial retail outlets surround this location. A total of 393 unrestricted and 31 restricted on-street parking spaces were identified within a one-quarter-mile radius of the proposed station. During the AM peak period, 179 of these spaces, or 42 percent, were occupied. During the PM peak period, 187 of these spaces, or 44 percent, were occupied.

The SE Redmond Station would be located near the intersection of SR 520 and SR 202. Light industry occupies the surrounding area. Within one-quarter mile of the station, a total of 41 unrestricted on-street parking spaces were identified. During the AM and PM peak periods, 29 of these spaces, or 71 percent, were occupied.

The Redmond Transit Center Station would be located along 161st Avenue NE between NE 80th Street and NE 83rd Street. Land use consists of multifamily residences and light commercial operations. A total of 485 unrestricted and 52 restricted on-street parking spaces were identified within a one-quarter-mile radius of this location. At least 60 percent of these spaces were occupied during the AM and PM peak periods. During both peak periods, 303 of the 485 unrestricted on-street parking spaces were occupied. Only 21 of the restricted on-street spaces, or 40 percent, were occupied during the PM peak period. The Redmond Transit Center Park-and-Ride Lot has 377 parking spaces, 80 percent of which are used each weekday. The Bear Creek Park–and-Ride Lot, located about 1 mile east of the Redmond Transit Center, has 273 parking spaces, more than 100 percent of which are used each weekday (King County Metro, 2007).

Private off-street parking is located at major employment and commercial centers within Segment E. A majority of the private parking is located at the Redmond Town Center, and demand varies through the day and evening hours.

6.3 Environmental Impacts

This section describes the no-build and build impacts of the proposed alternatives in two subsections. Section 6.3.1 presents regional and local travel demand forecasts and each station's vehicle trip generation, based on the light rail ridership estimates presented in Section 4.3.3. Section 6.4.2 describes the impacts on the local and arterial street system, the future 2020 and 2030 intersection LOS analysis, a safety assessment, parking impacts, and property access and circulation patterns. The focus of the analysis in this subsection is near the stations and along the alternative routes.

6.3.1 Travel Demand Forecasts

Future year analysis was performed for the years 2020 and 2030 based on the PSRC's current population and land uses forecasts and regional model (spring 2007). In the future (no-build and build conditions), numerous highway and arterial improvements were assumed by 2020 and 2030. Refer to Section 3.3 for a more detailed discussion of the travel demand forecasts and the list of programs and/or projects and the future year when they were assumed to occur. Appendix A provides a complete list of future projects assumed in years 2020 and 2030.

Overall, no-build traffic volumes in Segment A are predicted to grow at an average annual growth rate (up to year 2030) of 1.3 and 1.5 percent in the AM and PM, respectively. Segment A is expected to show lower growth when compared to other segments because of the roadway capacity constraints on I-90. The highest no-build vehicle growth would occur in Segments C and E, at more than 2.5 percent per year until 2020 and overall about 2.0 percent annually to 2030. Traffic volumes in Segments B and D are expected to grow at similar rates of about 1.7 percent per year up to 2020 and just more than 1.0 percent per year by 2030.

For the build condition, two methods were used to forecast the future vehicular demand. The first method focuses on the impacts of station demand in the South Bellevue (Segment B), Bel-Red (Segment D), and Redmond (Segment E) areas. The second method applies to the I-90 mainline and ramps (including Seattle and Mercer Island) and the Downtown Bellevue area (Segment C).

The first method relies on the 2020 and 2030 transit station trip generation information developed from the Sound Transit model and assigned to the modes of travel based on the Portland Banfield LRT Station Mode of Access Survey (Tri-Met, 1996). The Banfield methodology is a mode of access and egress survey of Portland light rail riders. This survey characterizes the different modes people choose to use to access and egress the stations, such as walk, drive alone, drive with others, drop off, transit transfer, or other.

The vehicle and pedestrian trips associated with the light rail station ridership forecasts for the highest ridership alternative were assigned to the pedestrian and vehicular networks around the stations. The auto traffic volumes were added to the future 2020 and 2030 no-build auto traffic volumes as the basis to analyze the project alternatives. This approach yields a conservative forecast for the project alternatives because it does not reflect the shift to transit as people replace their vehicle trips and use light rail.

The second method relies on auto forecasts from the PSRC model. This method was used to identify the shift in traffic demand and patterns within a congested transportation system. The transit ridership associated with the light rail alternatives and the transit service modifications (based on the 2020 and 2030 Transit Service Integration Plan, Sound Transit, 2007) were used to understand auto demand changes and patterns with the build forecasts. This model was used to estimate the regional and screenline changes in modal shares and estimate the vehicular demand for the I-90 and Downtown Bellevue areas. Along I-90, the PSRC model forecasts were used to develop changes in vehicular demand at the freeway mainline and ramps. These volume adjustments were post-processed to produce I-90 mainline, ramp, and ramp terminal build traffic volumes. Similarly, these PSRC build forecasts were post-processed in Downtown Bellevue to produce 2020 and 2030 build intersection turn movements.

The travel demand forecasts for I-90 (Segment A), a growth rate of slightly more than 2 percent per year in the AM peak period is projected. For the PM peak period, a growth rate near 2 percent per year is projected from existing conditions to year 2030. (See Section 5.3 for a detailed discussion of the travel demand forecasts for I-90.) In the build condition, there would be a slight reduction in auto use as people adjust their mode of transportation and use light rail. In year 2020, the forecasts for the build condition estimate a reduction of between 2 and 3 percent in demand compared to the no-build condition. By year 2030, the reduction in vehicle demand between the build and no-build conditions is estimated between 2 and 5 percent. A slightly larger reduction in 2030 would occur because the congestion would be higher and more people would choose to use light rail because it is a more reliable mode choice and provides substantial travel time savings.

With Downtown Bellevue (Segment C), the build condition forecasts estimate a vehicle demand similar to the no-build condition for both 2020 and 2030 conditions. This estimate is attributed to the increase in transit use because as congestion worsens in a roadway capacity constrained environment, people would adjust their mode of transportation and use light rail.

Vehicle trips generated by the proposed light rail stations were calculated separately for each station and added (Segments B, D, and E) to the projected 2020 and 2030 no-build PM peak-hour turning movement volumes. For stations in Segments A and C, vehicle information from the PSRC demand model at these stations was compared to the vehicle trip predictions for the light rail stations so that similar volumes would be projected by the PSRC demand model. Volume adjustments were made where necessary to provide a consistent analysis approach at the stations throughout the study area.

Trip generation was calculated based on the highest PM peak-period (3-hour) ridership forecasts for each station and PM peak bus service levels provided by the transit integration plan prepared for this project (Sound Transit, 2007). Net increases in bus volumes over existing and no-build conditions were added to the transportation network for each station. Year 2020 and 2030 daily and PM peak-period ridership for the highest ridership alternatives at each station are summarized by mode of travel in Tables 6-16 and 6-17.

Total ridership at each station was segregated into three categories: walk, bus transfer, and park-and-ride related person demand for stations with proposed park-and-ride lots. Walk and bus transfer trips were further divided into walk trips onto and off of light rail and transit access and egress from light rail. Vehicle trips were calculated by applying an average vehicle occupancy factor to the park-and-ride person demand and adding the passenger drop-off and pick-up volumes. The vehicle data in these tables do not include bus volumes. Furthermore, this PM peak-period park-and-ride auto demand is generally considered to be the daily demand to use the park-and-ride lot because the characteristics of a park-and-ride lot are vehicles arriving in the AM peak period and leaving in the PM peak period, with limited activity outside these periods. Passenger drop-off percentages used to calculate the passenger drop-off and pick-up volumes for the proposed stations are presented in Table 6-18.

In 2020, the highest nonmotorized accessed station would be the Bellevue Transit Center, with more than 4,500 people accessing (entering or leaving) this station in the PM peak period. This high number is expected because of the dense urban environment surrounding the station. In more suburban stations, the nonmotorized access trips would be substantially lower. The highest transit access/egress person forecasts are at the Rainier, Mercer Island, South Bellevue, Bellevue Transit Center, Overlake Transit Center, and Redmond Town Center stations. All of these stations are expected to have more than 400 transit person trips. The largest park-and-ride person demand forecast is at the South Bellevue, SE Redmond, and Overlake Transit Center stations.

In general, the characteristics of station modes of access in 2030 would be similar to the 2020 patterns. As shown in Table 6-17, the highest number of people accessing (entering or leaving) the Bellevue Transit Center Station is close to 7,500 people in the PM peak period. Many of these riders would originate from businesses in Downtown Bellevue and would be bound for cross-lake and surrounding destinations. Alternatively, in terms of bus transfer ridership, the highest number of trips originating from transferring transit modes (that is, bus to light rail and vice versa) would occur at the transit center or stations with park-and-ride facilities. During the PM peak period with the exception of the Bellevue Transit Center and the Overlake Transit Center, a higher number of transit riders would board bus or light rail transit than exit transit modes at the stations, consistent with evening commuting patterns, as shown in Table 6-17. The largest park-and-ride person demand forecast occurs at the South Bellevue, SE Redmond, and Overlake Transit Center stations.

At proposed park-and-ride stations, it was assumed that the number of new park-and-ride vehicle trips generated will be equal to the total number of park-and-ride stalls proposed. If the park-and-ride facility is an existing lot, the total number of new park-and-ride trips is the difference between the total number of stalls and the existing utilization of the park-and-ride lot. This assumption is applied to all park-and-rides in the project area regardless of the number of park-and-ride trips predicted in the forecasts from the ridership model and provides a conservative assessment of traffic impacts near the stations.

TABLE 6-16
2020 3-Hour PM Peak-Period and Daily Station Ridership

Station	Alternative	Daily Station Light Rail Boardings[a]	3–Hour PM Peak Light Rail Ridership[a,d]						
			Walk-on[c]	Walk-off[c]	Bus Access	Bus Egress	P&R Person Demand[b]	Person Total[e]	Vehicle Trips[f]
Rainier	A1	2,500	280	320	400	210	N/A	1,210	180
Mercer Island	A1	2,000	130	110	260	90	330	920	360
South Bellevue	B1, B2A, B2E, B3	3,000	10	60	370	180	1,290	1,930	1,440
SE 8th	B2A, B2E	500	170	70	20	0	N/A	250	40
118th	B7	1,000	130	50	20	0	430	630	480
Old Bellevue	C1	1,500	480	370	10	0	N/A	850	120
East Main	C Alternatives from B3, B7	2,000	410	320	330	40	N/A	1,100	160
Bellevue Transit Center	All C Alternatives	4,500	2,310	960	410	1,140	N/A	4,820	400
Ashwood/ Hospital	C3T, C4A, C7E, C8E	500	220	80	30	10	N/A	330	50
Hospital	C1T, C2T	500	210	60	50	10	N/A	320	50
124th	D2A, D2E, D3	<250	40	10	40	0	N/A	90	20
130th	D2A, D2E, D3	1,000	130	150	0	0	270	550	300
Overlake Village	All D Alternatives	1,000	180	90	90	0	310	670	340
Overlake Transit Center	All D Alternatives	3,000	480	220	310	510	470	1,990	520
SE Redmond	All E Alternatives	1,000	30	10	20	0	820	880	910
Redmond Town Center	All E Alternatives	1,500	290	160	320	220	N/A	980	140
Redmond Transit Center	E2	500	70	50	60	10	160	340	170

N/A =This station does not have a park-and-ride lot.

P&R = park-and-ride lot

[a] The highest alternative ridership data are shown for each station.

[b] The unconstrained demand forecasts for proposed park-and-ride facilities are shown and are not constrained by the available parking supply.

[c] Walk-on and walk-off station forecasts include bicyclist riders.

[d] 3-hour PM peak period is a close representation of daily park-and-ride demand.

[e] PM peak person trips include people boarding and alighting from bus and light rail.

[f] The forecasts for park-and-ride and drop-off/pick-up vehicle trips shown are not constrained by the available parking.

Note: Because of rounding, ridership may not sum exactly to totals.

Source: Sound Transit ridership model.

TABLE 6-17
2030 3-Hour PM Peak-Period and Daily Station Ridership

Station	Alternative	Daily Station Light Rail Boardings[a]	3–Hour PM Peak Light Rail Ridership[a,d]						
			Walk-on[c]	Walk-off[c]	Bus Access	Bus Egress	P&R Person Demand[b]	Person Total[e]	Vehicle Trips[f]
Rainier	A1	3,500	390	350	460	250	N/A	1,440	210
Mercer Island	A1	2,500	130	140	310	120	340	1,040	380
South Bellevue	B1, B2A, B2E, B3	4,000	20	80	550	320	1,730	2,700	1,910
SE 8th	B2A, B2E	500	240	80	20	0	N/A	350	50
118th	B7	1,000	180	50	40	0	510	780	560
Old Bellevue	C1	2,000	950	450	10	0	N/A	1,410	210
East Main	C Alternatives from B3, B7	3,500	870	380	480	120	N/A	1,860	270
Bellevue Transit Center	All C Alternatives	7,500	4,180	1,210	570	1,360	N/A	7,320	600
Ashwood/ Hospital	C3T, C4A, C7E, C8E	1,000	630	210	140	20	N/A	990	150
Hospital	C1T, C2T	500	290	100	80	10	N/A	480	70
124th	D2A, D2E, D3	500	70	10	60	0	N/A	140	20
130th	D2A, D2E, D3	1,000	180	210	0	0	320	710	350
Overlake Village	All D Alternatives	1,500	400	200	190	0	540	1,320	600
Overlake Transit Center	All D Alternatives	4,500	670	340	530	810	630	2,970	690
SE Redmond	All E Alternatives	1,500	40	20	30	0	1,090	1,170	1,210
Redmond Town Center	All E Alternatives	1,500	250	200	350	300	N/A	1,100	160
Redmond Transit Center	E2	500	60	80	70	10	220	430	240

N/A =This station does not have a park-and-ride lot.

P&R = park-and-ride lot

[a] The highest alternative ridership data are shown for each station.

[b] The unconstrained demand forecasts for proposed park-and-ride facilities are shown and are not constrained by the available parking supply.

[c] Walk-on and walk-off station forecasts include bicyclist riders.

[d] 3-hour PM peak period is a close representation of daily park-and-ride demand.

[e] PM peak person trips include people boarding and alighting from bus and light rail.

[f] The forecasts for park-and-ride and drop-off/pick-up vehicle trips shown are not constrained by the available parking.

Note: Because of rounding, ridership may not sum exactly to totals.

Source: Sound Transit ridership model.

TABLE 6-18
Light Rail Station Passenger Drop-Off and Pick-Up Assumptions

Station Type	Applicable Stations	Percent Passenger Drop-Off/Pick-Up (%)
Station with Park-and-Ride Facilities	Mercer Island, South Bellevue, 118th Avenue, 130th Avenue, Overlake Village, SE Redmond, Redmond Transit Center	22
Station Only	Rainier, SE 8th, Old Bellevue, East Main, Ashwood/Hospital, Hospital, 124th, Redmond Town Center	16
Major Transit Center with Park-and-Ride Facilities	Overlake Transit Center	22
Major Transit Center Only	Bellevue Transit Center	9

Within the study area, five of the proposed park-and-ride stations already exist as park-and-ride facilities. These are at Mercer Island, South Bellevue, Overlake Transit Center, Overlake Village, and Redmond Transit Center stations. With the project, the total number of parking stalls at the South Bellevue and Overlake Transit Center stations would increase. The 118th, 130th, and SE Redmond stations would include new park-and-ride facilities with this project. The number of parking stalls at the Mercer Island, Overlake Village, and Redmond Transit Center would not be increased with this project. For the traffic analysis, these park-and-ride lots were assumed to be at full capacity. In each of the following segment discussions, the Parking section identifies the existing and proposed parking stalls at park-and-ride stations and the number of vehicles expected to park there.

Bus vehicle trips were estimates from the transit integration plan (Sound Transit, 2007) that developed a no-build and build bus service plan. Passenger drop-off and pick-up trips were assumed to be a percentage of the unconstrained park-and-ride person demand trips. For non-park-and-ride stations, the passenger drop-off and pick-up trips were assumed to be a percentage of the total peak-hour ridership for that station type. The passenger drop-off and pick-up percentages (see Table 6-18) were developed based on information provided in Tri-Met (1996) for stations in the Portland area that have characteristics similar to the proposed East Link stations.

Using the 3-hour station ridership information and the passenger drop-off/pick-up assumptions, vehicle trip generation numbers were prepared for each station. To develop the station PM peak-hour vehicle trip generation, it was assumed that 43 percent of the PM peak-period (3-hour) trips obtained from the Sound Transit ridership demand model will occur during the PM peak hour. This 43 percent estimate was based on actual trip generation from light rail transit park-and-ride lots in other U.S. rail systems. Year 2020 and 2030 vehicle trip generation for each station in East Link is summarized in Table 6-19.

The highest trip-generating stations are those with expanded or new park-and-ride facilities: the South Bellevue, 118th, and SE Redmond stations. All of these locations are expected to generate between 400 and 700 new PM peak-hour vehicle trips. The Bellevue Transit Center, while generating the highest ridership, would produce a comparatively lower vehicle trip estimate because most of the rail patrons would be walking or bicycling to the surrounding office, commercial, retail, and residential areas of Downtown Bellevue.

TABLE 6-19
2020 and 2030 Station PM Peak-Hour Vehicle Trip Generation Summary

Station	Alternatives	Type of Trips	2020			2030		
			In	Out	Total	In	Out	Total
Rainier	A1	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	38	38	76	45	45	90
		buses	-19 (53)	-19 (53)	-38 (106)	-20 (54)	-20 (54)	-40 (108)
		total	19	19	38	25	25	50
Mercer Island	A1	park-and-ride	0	0 (450)	0 (450)	0	0 (450)	0 (450)
		drop-off/pick-up	14	14	28	15	15	30
		buses	-17 (17)	-17 (18)	-34 (35)	-18 (17)	-18 (18)	-36 (35)
		total	-3	-3	-6	-3	-3	-6
South Bellevue	B1, B2A, B2E, B3	park-and-ride	0	367 (1400)	367 (1400)	0	367 (1400)	367 (1400)
		drop-off/pick-up	56	56	112	74	74	148
		buses	-3 (30)	0 (33)	-3 (63)	-1 (33)	1 (35)	0 (68)
		total	53	423	476	73	442	515
SE 8th	B2A, B2E	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	8	8	16	11	11	22
		buses	4 (20)	4 (20)	8	5 (21)	5 (21)	10 (42)
		total	12	12	24	16	16	32
Old Bellevue	C1	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	26	26	52	44	44	88
		buses	2 (24)	2 (24)	4 (48)	2 (24)	2 (24)	4 (48)
		total	28	28	56	46	46	92
118th	B7	park-and-ride	0	353 (1000)	353 (1000)	0	353 (1000)	353 (1000)
		drop-off/pick-up	18	18	36	22	22	44
		buses	0 (11)	0 (11)	0 (22)	0 (11)	0 (11)	0 (22)
		total	18	371	389	22	375	397
East Main	C Alternatives with B3 and B7	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	34	34	68	58	58	116
		buses	0 (12)	0 (12)	0 (24)	0 (12)	0 (12)	0 (24)
		total	34	34	68	58	58	116
Bellevue Transit Center	All C Alternatives	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	85	85	170	129	129	258
		buses	-12 (72)	-12 (78)	-24 (150)	-12 (70)	-11 (77)	-23 (147)
		total	73	73	146	117	118	235
Ashwood/ Hospital	C3T, C4A, C7E, C8E	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	10	10	20	31	31	62
		buses	0 (8)	0 (8)	0 (16)	0 (8)	0 (8)	0 (16)
		total	10	10	20	31	31	62
Hospital	C1T, C2T	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	10	10	20	15	15	30
		buses	0	0	0	0	0	0
		total	10	10	20	15	15	30
124th	D2A, D2E, D3	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	3	3	6	4	4	8
		buses	4 (8)	4 (8)	8 (16)	4 (8)	4 (8)	8 (16)
		total	7	7	14	8	8	16

TABLE 6-19
2020 and 2030 Station PM Peak-Hour Vehicle Trip Generation Summary

Station	Alternatives	Type of Trips	2020			2030		
			In	Out	Total	In	Out	Total
130th	D2A, D2E, D3	park-and-ride	0	129 (300)	129 (300)	0	129 (300)	129 (300)
		drop-off/pick-up	11	11	22	14	14	28
		buses	0	0	0	0	0	0
		total	11	140	151	14	143	157
Overlake Village	All D Alternatives	park-and-ride	0	58 (203)	58 (203)	0	58 (203)	58 (203)
		drop-off/pick-up	13	13	26	23	23	46
		buses	-2 (12)	-2 (15)	-4 (27)	-2 (12)	-2 (15)	-4 (27)
		total	11	69	80	21	79	100
Overlake Transit Center	All D Alternatives	park-and-ride	0	60 (320)	60 (320)	0	60 (320)	60 (320)
		drop-off/pick-up	20	20	40	27	27	54
		buses	-20 (47)	-20 (49)	-40 (96)	-20 (47)	-20 (49)	-40 (96)
		total	0	60	60	7	67	74
Redmond Town Center	All E Alternatives	park-and-ride	0	0	0	0	0	0
		drop-off/pick-up	31	31	62	34	34	68
		buses	-14 (22)	-14 (22)	-28 (44)	-14 (22)	-14 (22)	-28 (44)
		total	17	17	34	20	20	40
SE Redmond[a]	All E Alternatives	park-and-ride	0	602 (1400)	602 (1400)	0	602 (1400)	602 (1400)
		drop-off/pick-up	35	35	70	47	47	94
		buses	6 (6)	6 (6)	12 (12)	6 (6)	6 (6)	12 (12)
		total	41	643	684	53	655	708
Redmond Transit Center	E2	park-and-ride	0	33 (377)	33 (377)	0	33 (377)	33 (377)
		drop-off/pick-up	7	7	14	9	9	18
		buses	-14 (39)	-14 (37)	-28(76)	-14 (39)	-14 (37)	-28(76)
		total	-7	26	19	-5	28	23

[a] At the SE Redmond station, approximately one-third of the park-and-ride trips were assumed to be relocated from the existing Bear Creek Park-and-Ride Lot.

Notes: The highest ridership alternative is shown for reach station.

For bus trips, the total build bus volumes are noted in parentheses. Outside the parentheses are the net changes to the bus volumes in the build compared to the no-build condition.

The PM peak-hour vehicle trips generated at each station were assigned to the study area roadways and intersections based on existing and future travel patterns, station access plans, and bus route assumptions as part of the transit integration plan (Sound Transit, 2007). Only net increases in bus volume over existing and no-build conditions were added to the transportation network for each station.

For the interim terminus ridership forecasts, the alternative generating the highest ridership at each interim terminus station was selected to examine the potential for an increase. Although the interim termini ridership forecasts at Overlake Village and Overlake Transit Center indicate a noticeable increase in daily boardings; the majority of these trips are walk or bus transfer trips. Interim terminus ridership at the Hospital Station was not forecasted because it is not located within the representative route. However, the Hospital Station is a candidate location for an interim terminus because of surrounding land uses, and its impacts would be similar to those forecasted for Ashwood/Hospital Station. Table 6-20 provides mode of access ridership information for each potential interim terminus station.

TABLE 6-20
2020 and 2030 3-Hour PM Peak-Period and Daily Interim Terminus Station Ridership

Interim Terminus Station	Daily Station Boardings[a]	Increase in Daily Boardings[e]	3–Hour PM Peak Light Rail Ridership[a]								
			Light Rail Walk-on[c]	Light Rail Walk-off[c]	Bus Access	Bus Egress	P&R Person Demand[b]	Person Total	Increase in Person Totals[e]	Vehicle Trips[d]	Increase in Vehicle Trips[e]
2020 Condition											
Ashwood/Hospital[c]	500	0	180	50	20	0	N/A	260	-70	40	0
124th	500	<250	110	260	30	30	N/A	430	340	60	50
130th	1,000	0	140	140	10	0	340	630	80	380	90
Overlake Village	3,000	2,000	180	70	430	790	260	1,740	1,070	290	0
Overlake Transit Center	4,000	1,000	430	200	610	1,100	370	2,710	710	410	0
SE Redmond	1,500	500	90	20	120	0	910	1,140	260	1,010	100
Redmond Town Center	1,500	0	210	490	210	160	N/A	1,060	80	150	10
2030 Condition											
Ashwood/Hospital[c]	1,000	0	320	140	80	10	N/A	540	-450	80	0
124th Avenue	1,000	500	170	330	50	40	N/A	600	460	90	70
130th Avenue	1,000	0	190	180	20	0	420	810	100	460	110
Overlake Village	4,000	2,500	270	110	630	1,160	320	2,490	1,170	360	0
Overlake Transit Center	6,000	1,500	550	280	880	1,600	500	3,810	840	550	0
SE Redmond	2,000	500	100	30	150	0	1,220	1,500	330	1,350	140
Redmond Town Center	2,000	500	210	650	260	250	N/A	1,370	270	200	40

[a] The highest ridership alternative is shown for each interim terminus station.

[b] The unconstrained demand forecasts for proposed park-and-ride facilities are shown and are not constrained by the available parking supply.

[c] Hospital interim terminus station ridership would be similar to the ridership for Ashwood/Hospital Station.

[d] The forecasts for park-and-ride and drop-off/pick-up vehicle trips shown are not constrained by the available parking.

[e] Ridership increases from Tables 6-16 and 6-17.

Source: Sound Transit ridership model.

The build ridership forecasts for the interim termini are provided in Table 6-20. Also provided in the interim termini ridership forecasting data are the increases in each station's daily boardings, peak-period vehicle trips and peak-period total person trips over the information provided in Tables 6-16 and 6-17 for the full-length East Link alternatives. Because the forecast data in Table 6-20 are from the peak period ridership model while the vehicle data in Table 6-21 were adjusted for the peak hour based on the conservative traffic analysis methodology, which assumes full park-and-ride usage in any build condition, there are differences between the increases in vehicle trips in Tables 6-20 and 6-21.

From Table 6-21, the Overlake Village Station, with an increase of nearly 50 trips in both 2020 and 2030, would generate the largest increase in vehicle activity as an interim terminus. This is because of the increase in bus service that would connect to this station if it were an interim terminus. Otherwise, no other station as an interim terminus would have a noticeable trip generation impact. Because the park-and-ride stations are conservatively estimated to be fully utilized in the peak periods under the full-length alternatives, there would be no change between the build station park-and-ride trip generation and the interim termini park-and-ride trip generation. Assumptions similar to those described in the full-length build ridership forecasts (earlier in this section) were applied to create the interim terminus trip generation.

TABLE 6-21
2020 and 2030 Interim Terminus Station PM Peak-Hour Vehicle Trip Generation Summary

Interim Terminus Station	Type of Trips	2020			2030		
		In	Out	Total	In	Out	Total
Ashwood/Hospital[a]	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	0	0	0	0	0	0
	buses	4 (12)	4 (12)	8 (24)	4 (12)	4 (12)	8 (24)
	total	4	4	8	4	4	8
124th	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	10	10	20	15	15	30
	buses	0	0	0	0	0	0
	total	10	10	20	15	15	30
130th	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	4	4	8	4	4	8
	buses	0	0	0	0	0	0
	total	4	4	8	4	4	8
Overlake Village	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	0	0	0	0	0	0
	buses	24 (36)	24 (39)	48 (75)	24 (36)	24 (39)	48 (75)
	total	24	24	48	24	24	48
Overlake Transit Center	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	0	0	0	0	0	0
	buses	6 (53)	6 (55)	12 (108)	6 (53)	6 (55)	12 (108)
	total	6	6	12	6	6	12
Redmond Town Center	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	2	2	4	9	9	18
	buses	0	0	0	0	0	0
	Total	2	2	4	9	9	18
SE Redmond	park-and-ride	0	0	0	0	0	0
	drop-off/pick-up	4	4	8	5	5	10
	buses	0	0	0	0	0	0
	Total	4	4	8	5	5	10

[a] Hospital interim terminus station vehicle trips are similar to the vehicle trips for Ashwood/Hospital Station

Notes: The highest ridership alternative is shown for reach interim terminus station.

The number of trips reported is the net increase over the build condition traffic estimate. For bus trips, the total anticipated volumes are noted in parentheses.

6.3.2 Arterials and Local Streets

The arterials and local streets impact analysis compares the future 2020 and 2030 no-build and build conditions for these facilities. Overall, close to 150 intersections were analyzed in the five segments. This section discusses the operations and intersection LOS, potential access and circulation impacts, parking, potential property access modifications, interim terminus stations, and maintenance facilities for each project alternative. The parking assessment is based on the current level of design completed for each alternative. In subsequent design refinements the on- and off-street parking impacts may be modified. Parking impacts identified due to the East Link Project are primarily unrestricted parking near light rail stations, as restricted parking is not as likely to be used by light rail riders. Included in this discussion is an evaluation of the safety impacts from each alternative. Construction activities and impacts are discussed, as is any mitigation required during construction or operation. For further discussion of the arterial and local street impact analysis assumptions, refer to Appendix A. For a discussion of the impacts on transit service and facilities and on pedestrian and bicycle access, refer to Sections 4.0 and 7.0, respectively.

As further detailed in the following sections, the intersection LOS results presented in this report for the build condition when at-grade profiles are proposed to operate through intersections were analyzed under two operating plans: when light rail is not present at the intersection, and when light rail is present. The two analyses were combined based on the signal cycle length and light rail headways. Additionally, intersections adjacent to light rail alternatives were included in this analysis because they may be affected by light rail operations.

Individual station impacts are described by segment in the following subsections. Overall, intersections near potential stations are expected to operate in most cases at an LOS similar to the no-build condition. Potential stations that include park-and-ride facilities are expected to generate more auto trips than other stations. Therefore, at a few of these locations, the intersections immediately adjacent to the stations may operate at a lower LOS in the build condition than in the no-build condition.

Where light rail is located within an existing street, intersection operations with at-grade light rail operations are predicted to operate with an intersection LOS similar to the no-build condition, although a few intersections in the study area may have a lower LOS depending on the alternative and intersection movements. The similarity occurs partly because a similar roadway capacity is provided in most cases in the build condition compared to the no-build condition. Additionally, the light rail trains, operating in at-grade profiles, would generally be able to safely travel through the intersection within the adjacent vehicle signal phasing without substantial signal timing adjustments. This is because the time required for a light rail vehicle to proceed through the intersection is sufficiently accommodated within the time needed for the vehicle or pedestrian crossing movement. It is expected that light rail vehicles will be able to proceed through intersections in approximately 20 to 25 seconds, depending on the speed of the train and size of the intersection. Intersections that require an all-red signal phase to allow the light rail train to proceed through would generally be on lower volume streets, so the intersection would continue to maintain acceptable operations. Finally, even though at-grade alternatives outside of Downtown Bellevue would receive traffic signal priority, disturbances of the signal coordination are expected to be minimized because light rail train detection would occur up to 1 minute prior to the train arriving at the intersection, thereby allowing non-light-rail signal phases to be served without dramatic adjustments to their signal timing. Within Downtown Bellevue, at-grade alternatives would receive some priority and traffic signal coordination would be maintained. At intersections where light rail would require advanced detection and traffic signal modifications, new signal equipment would likely be required. For alternatives with either elevated or tunneled profile, intersection operations are generally expected to operate similar to the no-build condition because the alternative would be outside the roadway right of way.

This section also discusses the types of traffic control devices and treatments (traffic signals, rail gates, access control) that are proposed for each alternative. These treatments would maintain traffic flow and provide protected vehicle crossings while ensuring safe traffic operations. Generally, for median at-grade or elevated profile, left turns would not be allowed between intersections because of safety concerns, reduced visibility/sight distance, and the exposure to increased accidents. The only locations where left turns would be allowed for these routes are at protected crossings (that is, gates or traffic signals). Traffic controls and protection required for safe operations will continue to be coordinated with WSDOT, local jurisdictions, and King County Metro throughout the design phase of the project.

The safety impact assessments are based on Integration of Light Rail Transit into City Streets (Korve et al., 1996) and Light Rail Service, Vehicular and Pedestrian Safety (TRB, 1999). The following sections present the safety assessment for each alternative. Overall, the project-generated trips created by the East Link alternatives are not expected to increase the accident rates for automobiles because roadway conditions would remain similar to or would improve compared to the No Build Alternative.

Driveways and other mid-block accesses that are currently open would be modified to allow only turns that do not conflict with the light rail trackway. At locations where traffic movements cross the light rail track, those movements would generally be eliminated or protected with either a light rail gate or traffic signal to coordinate safe traffic and light rail flows. Gates are generally provided at driveways or when light rail track crosses a roadway. Refer to each segment discussion for specific locations.

6.3.2.1 Segment A

I-90 is the only major facility within Segment A where the no-build and build conditions would alter the physical characteristics of the facility.

In the no-build condition, an additional HOV lane will be added to the eastbound and westbound mainline roadways as part of the I-90 Two Way Transit and HOV Operations Project. Section 5.3.1 provides a detailed description of that project and its effect on the freeway. Regarding local access modifications as part of the I-90 Two Way Transit and HOV Operations Project, improvements to the HOV direct access to and from the Bellevue Way SE interchange will be provided to allow direct access to and from eastbound and westbound HOV lanes throughout the day. Access to the reversible center roadway will continue to vary depending on time of day. At Mercer Island, the I-90 Two Way Transit and HOV Operations Project will provide additional access to and from the island via an 80th Avenue SE westbound HOV direct-access off-ramp and an eastbound HOV direct-access on-ramp. At 77th Avenue SE, an eastbound HOV direct access off-ramp will be built.

In the build condition, the I-90 reversible center roadway would be converted to the exclusive use of light rail vehicles as discussed in Section 5.0, Highway Operations and Safety. Local access changes related to the reversible center roadway closure would consist of removing the I-90 eastbound HOV direct-access off-ramp to Bellevue. If the at-grade profile is selected at this interchange, the eastbound and westbound HOV direct access ramps would be removed. This change would require all HOV vehicles heading off I-90 to Bellevue Way from the west and HOV vehicles accessing I-90 and heading west to weave across the general-purpose lanes if they are coming from or heading to the HOV mainline lanes. At Mercer Island, the 77th Avenue SE and Island Crest Way reversible center roadway accesses would be eliminated, thereby rerouting vehicles to other I-90 access points, specifically the West Mercer Way on- and off-ramps, 76th Avenue SE on-ramp, 77th Avenue SE off-ramps, and Island Crest Way on- and off-ramps.

Operations and Level of Service

Throughout Segment A, the light rail would operate in an exclusive right-of-way, except if joint bus/light rail operation is implemented in the I-90 D2 Roadway. Light rail operations in an exclusive right-of-way would result in minimal direct impact on the local streets.

During the AM and PM peak hours, intersection operations within the City of Seattle would vary slightly when comparing the no-build to the build condition. In the AM peak hour, intersection operations would generally improve along Rainier Avenue S because light rail would reduce the amount of autos in this corridor. Intersection operations also would improve near the I-90 D2 Roadway terminus at 5th Avenue S and Airport Way S/ S Dearborn Street because the D2 Roadway is at a minimum restricted to buses only and would not be accessible to vehicles. If the D2 Roadway is not operated under joint bus/light rail use, AM and PM peak-hour intersection operations would further improve at the D2 Roadway terminus and could slightly degrade at the I-90 terminus on 4th Avenue.

In Mercer Island, some intersections that provide access to or adjacent to I-90 in the build condition may experience some degradation in operations because of the changes in I-90 access between no-build and build conditions. At 77th Avenue SE and Island Crest Way, the reversible center roadway westbound access would be eliminated in the build condition, thereby rerouting vehicles to other I-90 access points. With these access changes and an LOS C standard for Mercer Island, five intersections would not meet agency standards in the 2020 AM peak hour. These intersections are West Mercer Way and 24th Avenue SE, 77th Avenue SE and Sunset Highway, 77th Avenue SE and North Mercer Way, 77th Avenue SE and 27th Street, and East Mercer Way and I-90 eastbound ramps. By 2030, the 76th Avenue SE at North Mercer Way/I-90 westbound on-ramp and SE 27th Street and 80th Avenue SE intersections would degrade to LOS F in the build condition.

Similar to the AM peak hour, intersections in Mercer Island that provide access to or are adjacent to I-90 in the build condition may experience some degradation in operations in the PM peak hour because of changes in access between the no-build and build conditions. Because access to Mercer Island from the reversible center roadway would be restricted, eastbound vehicles destined for Mercer Island would shift to the other access locations: the West Mercer Way and Island Crest Way eastbound off-ramps. With these access changes and an LOS C standard for Mercer Island, eight intersections in the 2020 PM peak hour would not meet agency standards. These intersections are West Mercer Way and I-90 ramps, West Mercer Way and SE 24th Street, 76th Avenue SE and North Mercer Way, 77th Avenue SE and Sunset Highway, 77th Avenue SE and the I-90 eastbound HOV off-ramp, 77th Avenue SE and North Mercer Way, SE 27th Street and 80th Avenue SE, and East Mercer Way and I-90 eastbound ramps. Most of these intersections are expected to operate at LOS E or F conditions, except for the 77th Avenue SE and Sunset Highway intersection, which is expected to operate at LOS D. By 2030, the Island Crest Way and I-90 eastbound off ramp intersection is expected to operate at LOS F in the build condition.

In terms of traffic controls within Segment A, there are no new traffic control measures that are proposed in Segment A because the I-90 Alternative (A1) would be exclusively in the center roadway of I-90 and does not cross or merge with general-purpose vehicles on the I-90 mainline. Additionally, (A1) would not interact with vehicles at arterial and local at-grade intersections.

Exhibits 6-6 through 6-9 and Tables D-6 and D-7 in Appendix D show 2020 and 2030 intersection LOS results in the no-build and build conditions for the AM and PM peak hours, respectively. The intersection LOS results are included in exhibits to provide a visual indication of the intersection operations between no-build and build conditions. This provides the intersection location relative to the other intersections and/or alternatives and illustrates why impacts may have occurred and whether the intersection LOS would be positively or negatively affected.

Traffic Safety

Impacts on light rail and traffic safety were identified based on the East Link track designs and national safety guidelines. National research and case study guidelines were obtained from TCRP reports to assess traffic safety issues associated with the project alternatives. The proposed alternative in Segment A consists of an at-grade profile located on I-90, so there would not be traffic safety impacts on arterials and local streets in Seattle or Mercer Island.

Parking

This section discusses the parking impacts associated with the light rail route and stations in Segment A. Table 6-22 summarizes the impacts by alternative, and Table 6-23 summarizes the impacts associated with the area covered by each station.

There are no anticipated direct permanent impacts on public on-street parking or private off-street parking associated with I-90 Alternative (A1).

TABLE 6-22
Segment A Parking Impacts Summary by Alternative

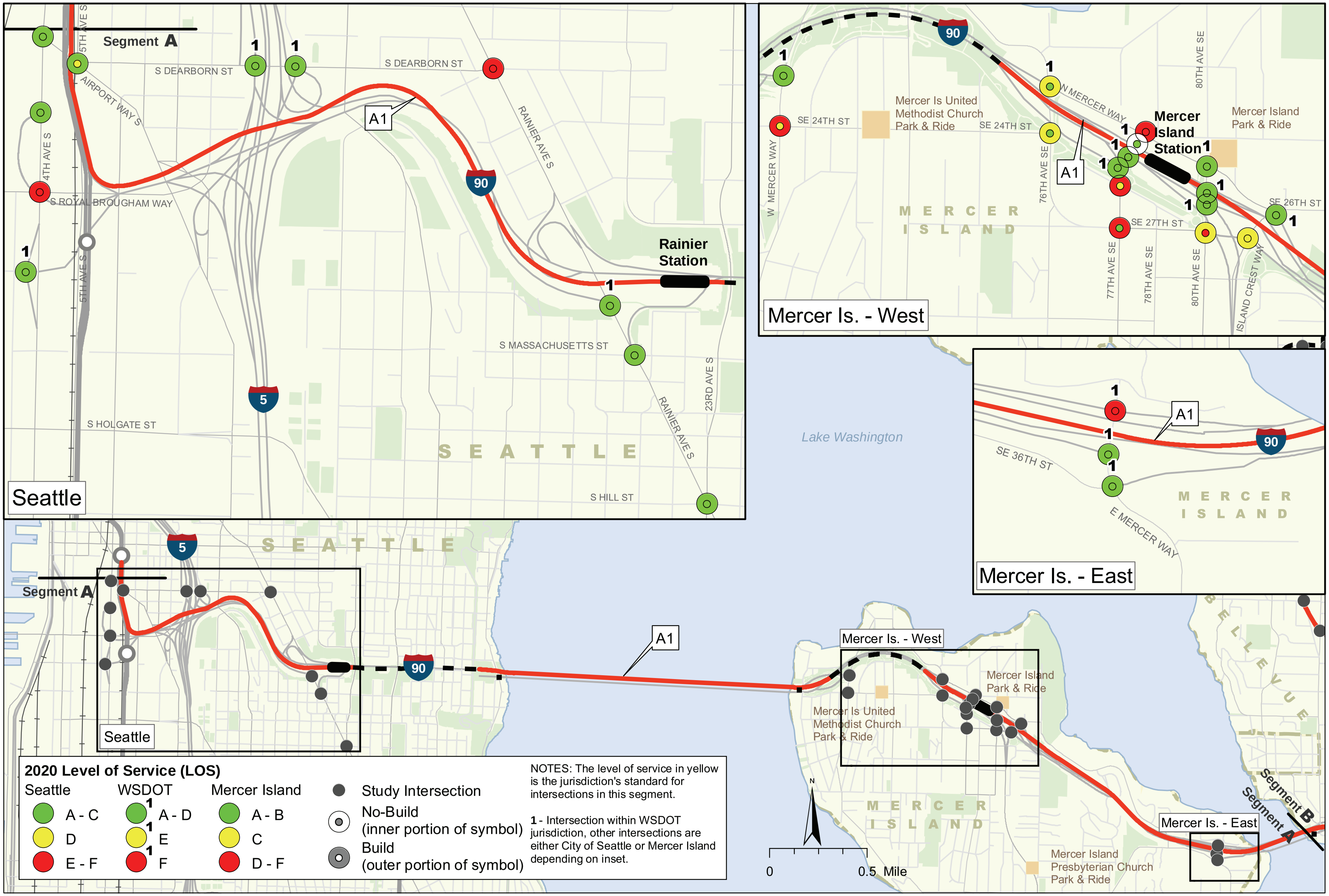
Alternative	Parking Spaces Removed	
	On-street	Off-street
A1, I-90	0	0

Note: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

TABLE 6-23
Segment A Parking Impacts Summary by Station

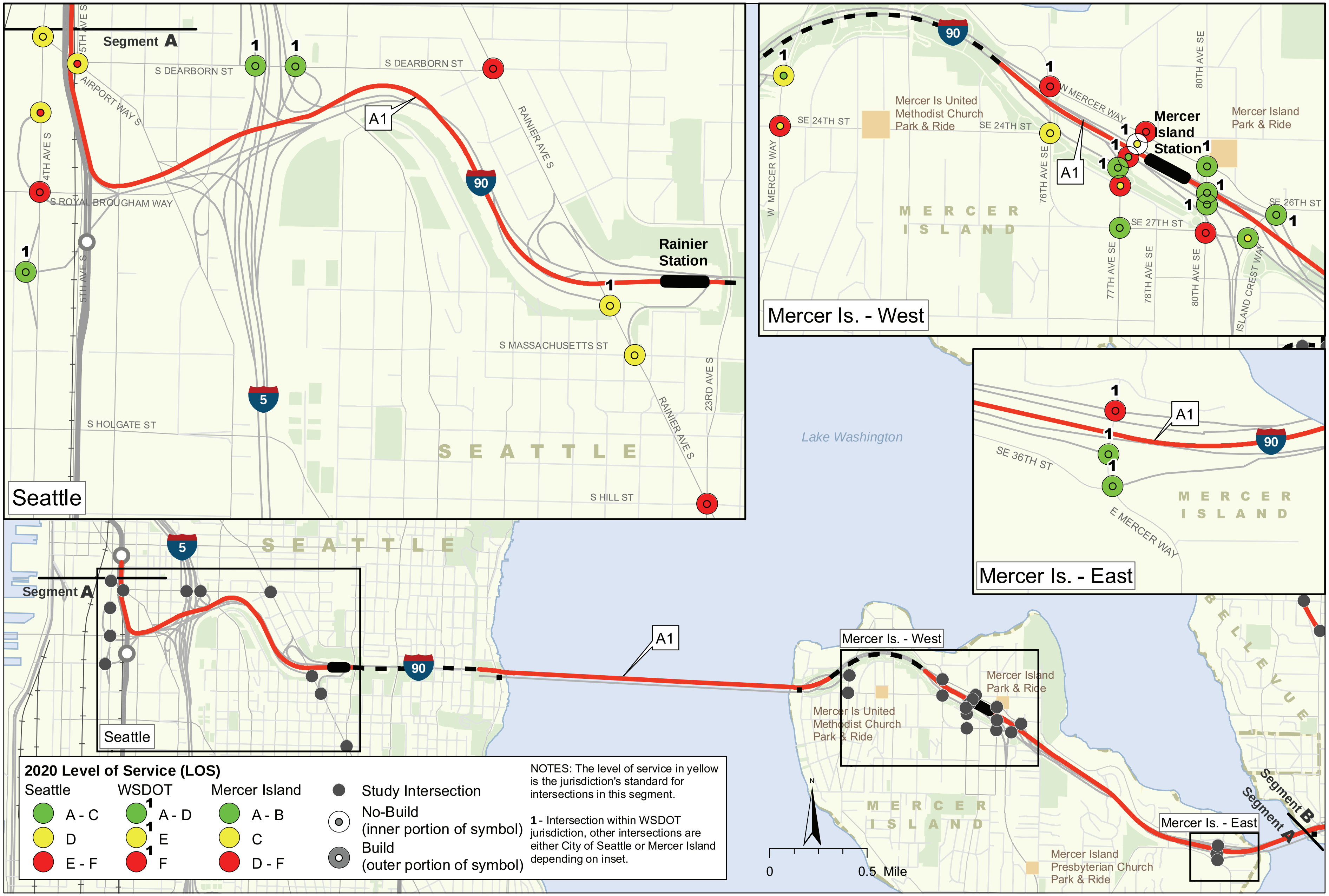
Station	Associated Alternative	Spaces Removed	Area Affected by Development
Rainier Station	A1	0	None
Mercer Island Station	A1	0	None

Parking impacts shown are permanent displacements; parking losses associated with construction staging are not included in this summary. Parking impacts shown are only those associated with the area covered by the station.



Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-6 **2020 AM No Build and Build Level of Service at Intersections**
Segment A
East Link Project

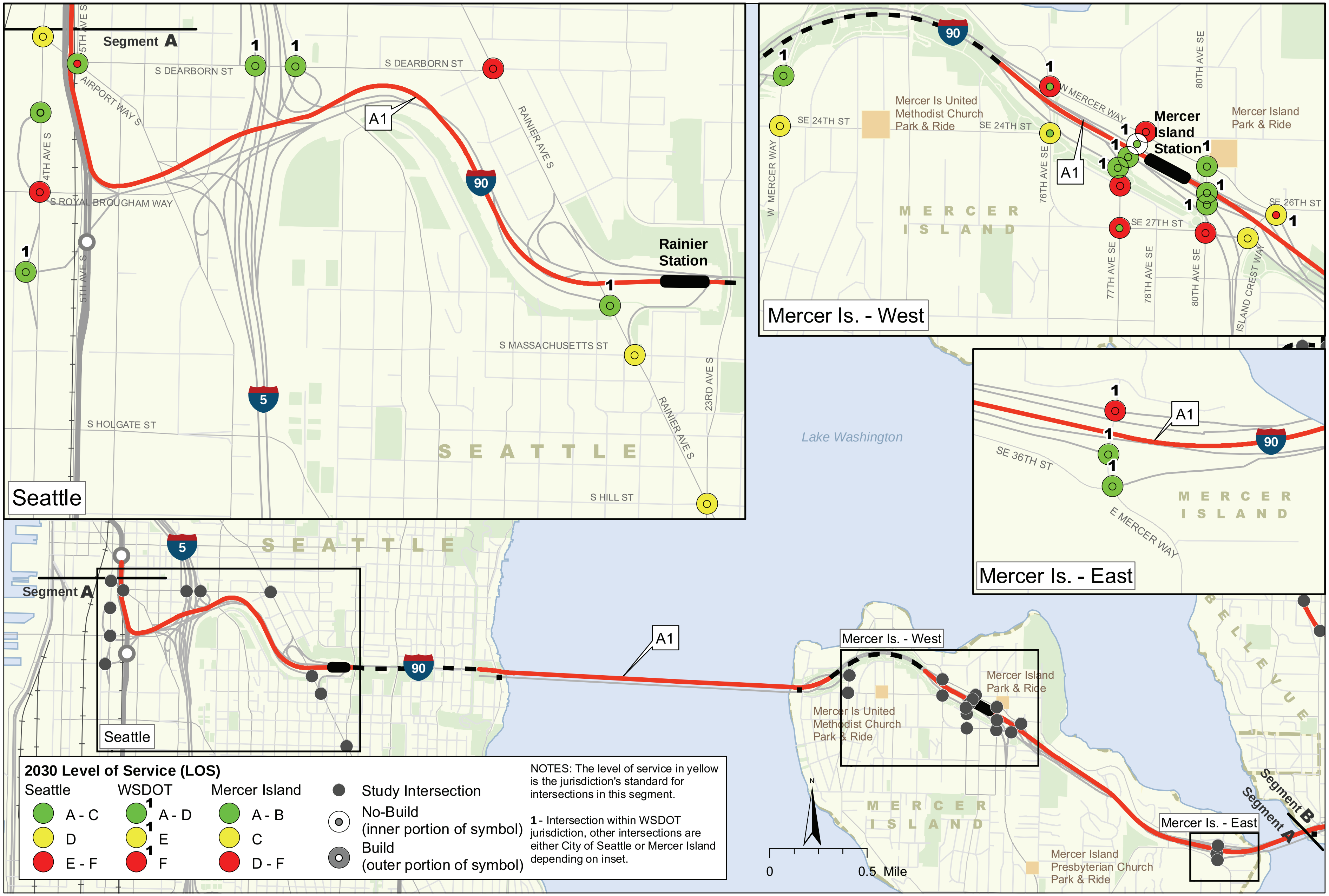


Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Traction Power Substation
- Proposed Station
- Central Link Alignment and Station

NOTE: The level of service in white indicates that this intersection does not exist for the build condition.

Exhibit 6-7 **2020 PM No Build and Build Level of Service at Intersections**
Segment A
East Link Project

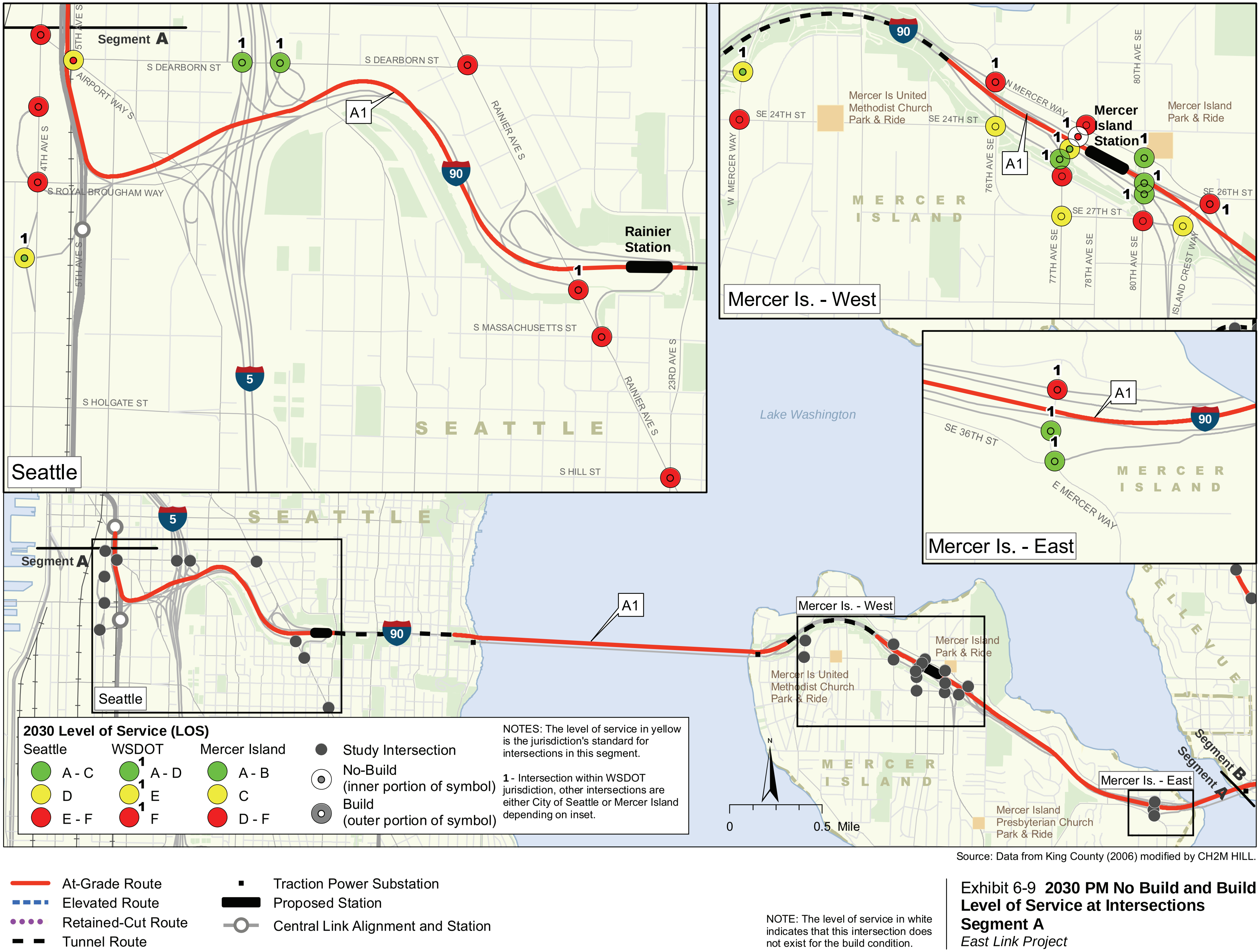


Source: Data from King County (2006) modified by CH2M HILL.

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Traction Power Substation
Proposed Station
Central Link Alignment and Station

NOTE: The level of service in white indicates that this intersection does not exist for the build condition.

Exhibit 6-8 **2030 AM No Build and Build Level of Service at Intersections**
Segment A
East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

Exhibit 6-9 **2030 PM No Build and Build Level of Service at Intersections**
Segment A
East Link Project

The potential for hide-and-ride parking impacts at the Rainier Station is expected to be high because there is a substantial amount of surrounding on-street parking available to accommodate riders (Table 6-3).

At the Mercer Island Station, there would be low potential for hide-and-ride impacts with alternatives that include the South Bellevue Station (Bellevue Way [B1], 112th SE At-Grade [B2A], 112the SE Elevated [B2E], and 112th SE Bypass [B3] alternatives). The location of the South Bellevue Station, which is proposed to provide between 1,455 and 1,476 stalls (depending on alternative selected), would provide riders with a higher-capacity option for parking along I-90. Additionally, although the current demand for the Mercer Island Park-and-Ride Lot is near its parking capacity, there is minimal parking spillover into the surrounding areas, which further indicates that the future potential for hide-and-ride impacts is low. For the BNSF Alternative (B7), there could be a higher potential for hide-and-ride parking at the Mercer Island Station because the forecasted auto usage is higher than the Mercer Island Park-and-Ride capacity. The current park-and-ride is almost fully used and this alternative does not include a nearby light rail station with a park-and-ride lot, there likely would be a potential for parking spillover in the unoccupied 50 on-street parking spaces surrounding the Mercer Island station (Table 6-3). Table 6-24 shows the existing and proposed parking stalls and forecasted park-and-ride auto demand at the Mercer Island Station.

TABLE 6-24
Segment A Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Auto Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Auto Demand[a]	2030 Park-and-Ride Auto Demand[a]
Mercer Island[b]	A1	447	447	300 (380)	310 (500)

[a] 3-hour PM peak-period park-and-ride auto demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

[b] The value in parentheses is the park-and-ride vehicle demand with the BNSF Alternative (B7).

In addition to the RPZs implemented in the residential neighborhoods north of I-90, surrounding the Mercer Island Station, the City of Mercer Island is discussing plans to implement restricted (time-limited) parking in selected parking areas surrounding the Town Center. This would further limit the potential for hide-and-ride activity. Section 6.5 discusses possible parking mitigation strategies to reduce hide-and-ride potential.

Property Access and Circulation

The I-90 Alternative (A1) is not expected to affect private property access and vehicular circulation on arterial streets because the route is located on a highway facility. The proposed stations would be located at existing transit stations, and impacts on private property circulation and access are not expected.

6.3.2.2 Segment B

Under the no-build condition, the physical roadway and operational characteristics would remain the same as in the existing condition for all major roadways within this segment.

With the build condition, Bellevue Way SE would be widened south of 112th Avenue SE to accommodate the Bellevue Way (B1), 112th SE At-Grade (B2A), and 112th SE Bypass (B3) alternatives. With each of these alternatives, the number of lanes and pedestrian facilities would be maintained. Bellevue Way SE north of 112th Avenue SE would be widened by B1 only. Travel lanes and pedestrian facilities also would be maintained. For approaches that parallel the light rail track, left-turning vehicles would have a turning pocket and a protected signal phase at signalized intersections.

The arterial 112th Avenue SE would be affected by B2A and B3. With each of these alternatives, the number of lanes and pedestrian facilities would be maintained, but the roadway would be widened to accommodate the light rail track. For approaches that parallel the light rail track, left-turning vehicles would have a turning pocket and a protected signal phase at signalized intersections.

SE 8th Street and 118th Avenue SE would not change from their existing physical condition under the no-build or build condition.

Traffic Control

In a comparison of the alternatives in Segment B, the Bellevue Way Alternative (B1) would have the most proposed traffic control measures because it is an at-grade alternative that runs in the median of Bellevue Way from I-90 to SE 6th Street (Table 6-25). Of the 12 at-grade intersections on Bellevue Way where traffic would cross the light rail tracks under B1, new signal installations are recommended at two intersections and signal replacements are recommended at five intersections. To prevent safety issues, left turns onto and off of Bellevue Way SE to cross the light rail tracks would be prevented by allowing only right-turn-in, right-turn-out access at private driveway locations and intersections where traffic controls are absent. Under B1, signalized intersections would allow for U-turn movements where necessary. The 112th SE At-Grade (B2A), 112the SE Elevated (B2E), and 112th SE Bypass (B3) alternatives would be at-grade and elevated and would leave Bellevue Way and follow 112th Ave SE; therefore, they would have fewer impacts on traffic control. Under these alternatives, a new signal at Bellevue Way SE and the South Bellevue Park-and-Ride Lot intersection would improve the intersection LOS at this location, and existing signals would be replaced with new signals. Right-turn-in, right-turn-out access would replace the stop-controlled and two-way left turn median traffic controls at the 112th Ave SE and SE 15th Street intersection so that safety concerns from left-turning vehicles would be minimized. Under B2A, U-turn movements at the intersection of SE 8th Street and 112th Avenue SE would be allowed from the southbound approach only. The BNSF Alternative (B7) would follow the BNSF corridor within an exclusive right-of-way and consequently would have no traffic control impacts. No gates are proposed in Segment B because the light rail is within separated right-of-way from the roadway (B2E, B3, B7) or is in the median (B1, B2A) and vehicle movements are allowed to cross the track only at signals. None of the at-grade sections of the Segment B alternatives would have gated traffic-control measures.

TABLE 6-25
Segment B Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
B1, Bellevue Way		
Bellevue Way & SE 30th Street	Stop controlled	Install new signal
Bellevue Way & S Bellevue P&R	Signal	Replace signal
Bellevue Way & S Bellevue P&R	None	Install new signal
Bellevue Way & 112th Avenue SE	Signal	Replace signal
Bellevue Way & 108th Avenue SE	Signal	Replace signal
Bellevue Way & SE 16th Street	Signal	Replace signal
Bellevue Way & SE 14th Street	None	Right-in, right-out
Bellevue Way & SE 13th Street	None	Right-in, right-out
Bellevue Way & SE 11th Street	None	Right-in, right-out
Bellevue Way & SE 10th Street	Signal	Replace signal
Bellevue Way & SE 8th Street	Signal	Replace signal
Bellevue Way & SE 6th Street	None	Right-in, right-out
Bellevue Way: mid-block/driveways and local access roads	None	Right-in, right-out
B2A, 112th SE At-Grade		
Bellevue Way & S. Bellevue P&R	None	Install new signal
Bellevue Way & 112th Avenue SE	Signal	Replace signal
112th Avenue SE & SE 15th Street	SE 15th Street stop controlled, TWLT median	Right-in, right-out
112th Avenue SE & SE 8th Street	Signal	Replace signal
Bellevue Way & S. Bellevue P&R	None	Install new signal

TABLE 6-25
Segment B Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
Bellevue Way & 112th Avenue SE	Signal	Replace signal
112th Avenue SE & SE 15th Street	SE 15th Street stop controlled, TWLT median	Right-in, right-out
112th Avenue SE & SE 8th Street	Signal	Replace signal
B2E, 112th SE Elevated		
Bellevue Way & S. Bellevue P&R	None	Install new signal
B3, 112th SE Bypass		
Bellevue Way & S. Bellevue P&R	None	Install new signal
Bellevue Way & 112th Avenue SE	Signal	Replace signal
112th Avenue SE & SE 15th Street	SE 15th Street stop controlled, TWLT median	Right-in, right-out
B7, BNSF		
No Impacts		

TWLT = two-way left turn

Operations and Level of Service

PM peak hour intersection LOS for the 2020 and 2030 no-build conditions is expected to degrade as traffic volumes increase on the roadways. Four intersections are expected to operate at LOS F during the PM peak hour in year 2020: 118th Avenue SE and SE 8th Street, Bellevue Way SE at SE 30th Street, Bellevue Way SE at the South Bellevue Park-and-Ride Lot entrance, and 114th Avenue SE and SE 6th Street. The unsignalized intersections at Bellevue Way SE at SE 30th Street and 114th Avenue SE and SE 6th Street intersections would not meet agency LOS standards because of the minor cross-street volume having difficultly finding gaps in the traffic streams. By 2030, with the WSDOT I-405 widening program in Bellevue, the 114th Avenue SE and SE 6th Street intersection will be modified and operate at an acceptable LOS. All other intersections that would not meet agency standards in 2020 are expected to continue operating at LOS F in 2030 PM peak hour no-build conditions.

Within Segment B, the at-grade light rail crossings would provide full signal priority to the light rail train.

The Bellevue Way Alternative (B1) would have an at-grade profile from I-90 to the South Bellevue Station. Intersection operations would degrade at Bellevue Way SE at the South Bellevue Park-and-Ride Lot entrance in 2020 and 2030 because of an increase in station traffic exiting the site. Adjustments to the internal park-and-ride circulation and channelization could produce delays similar to the no-build condition. In 2020 and 2030, the Bellevue Way SE and 112th Avenue South intersection is expected to operate at LOS F conditions because the at-grade rail profile is expected to create additional vehicle delay at the intersection. Bellevue Way SE at SE 30th Street would become signalized as part of B1, which would improve overall operations and access into and out of the Enatai Neighborhood because cross-street traffic would be served. All other intersections along Bellevue Way through which at-grade light rail would operate are not expected to experience worse intersection operations.

In most cases, the roadway capacity being provided would remain the same as in the no-build condition and the light rail train would travel safely through the intersections within the parallel northbound and southbound traffic signal phasing for vehicles. Because these two directions would accommodate the major flow of traffic, the signal phasing time allocated in these directions would be sufficient to accommodate light rail. Additionally, disturbances in signal coordination are expected to be minimized because train detection would occur up to 1 minute prior to the train arriving at the intersection, thereby allowing non-light-rail signal phases to be served without dramatic adjustments to the signal timing.

B2A would be at-grade from north of the South Bellevue Park-and-Ride Lot to the northern boundary of Segment B. Intersection operations would degrade at two intersections: Bellevue Way SE at the South Bellevue Station entrance and Bellevue Way SE at 112th Avenue South. Operations at the Bellevue Way SE at the South Bellevue

Park-and-Ride Lot intersection would degrade because of an increase in traffic exiting the station, as discussed under B1. The at-grade profile is expected to create additional vehicle delay at the intersection of Bellevue Way SE and 112th Avenue SE, causing it to operate at LOS F in 2020 and 2030 conditions. Similar to B1, all other intersections on Bellevue Way and 112th Avenue NE where B2A operates at-grade through intersections are not expected to experience worse intersection operations. The reasons for this expectation are the same as those described for B1.

Because B2E would be elevated throughout Segment B, intersection operations would not degrade because of modifications. Only one intersection, Bellevue Way SE and the South Bellevue Station entrance, would degrade because of the increase in traffic exiting the station, as discussed under B1.

B3 would be at-grade from north of the South Bellevue Park-and-Ride Lot to south of the intersection of SE 8th Street at 112th Avenue SE, where the profile would be elevated. Intersection operations would degrade noticeably at two intersections: Bellevue Way South at the South Bellevue Park-and-Ride Lot entrance and Bellevue Way SE at 112th Avenue South. Operations at Bellevue Way SE at the South Bellevue Park-and-Ride Lot would degrade because of the increase in traffic exiting the station, as discussed under B1. At the Bellevue Way SE at 112th Avenue SE intersection, the at-grade light rail operations would produce additional vehicle delay at the intersection. This intersection is expected to operate at LOS F in 2020 and 2030 build conditions.

At the 118th Avenue SE and SE 8th Street intersection, LOS F would occur with all Segment B alternatives, although with the BNSF Alternative (B7), this intersection would operate with a higher delay. This degradation would be due to the increase vehicle traffic from the new park-and-ride lot at the 118th Station. This station is located just south of this intersection. This intersection would get slightly worse in both 2020 and 2030 conditions.

Exhibits 6-10 and 6-11 and Table D-8 in Appendix D show 2020 and 2030 intersection PM peak hour LOS results for the no-build and build conditions.

Traffic Safety

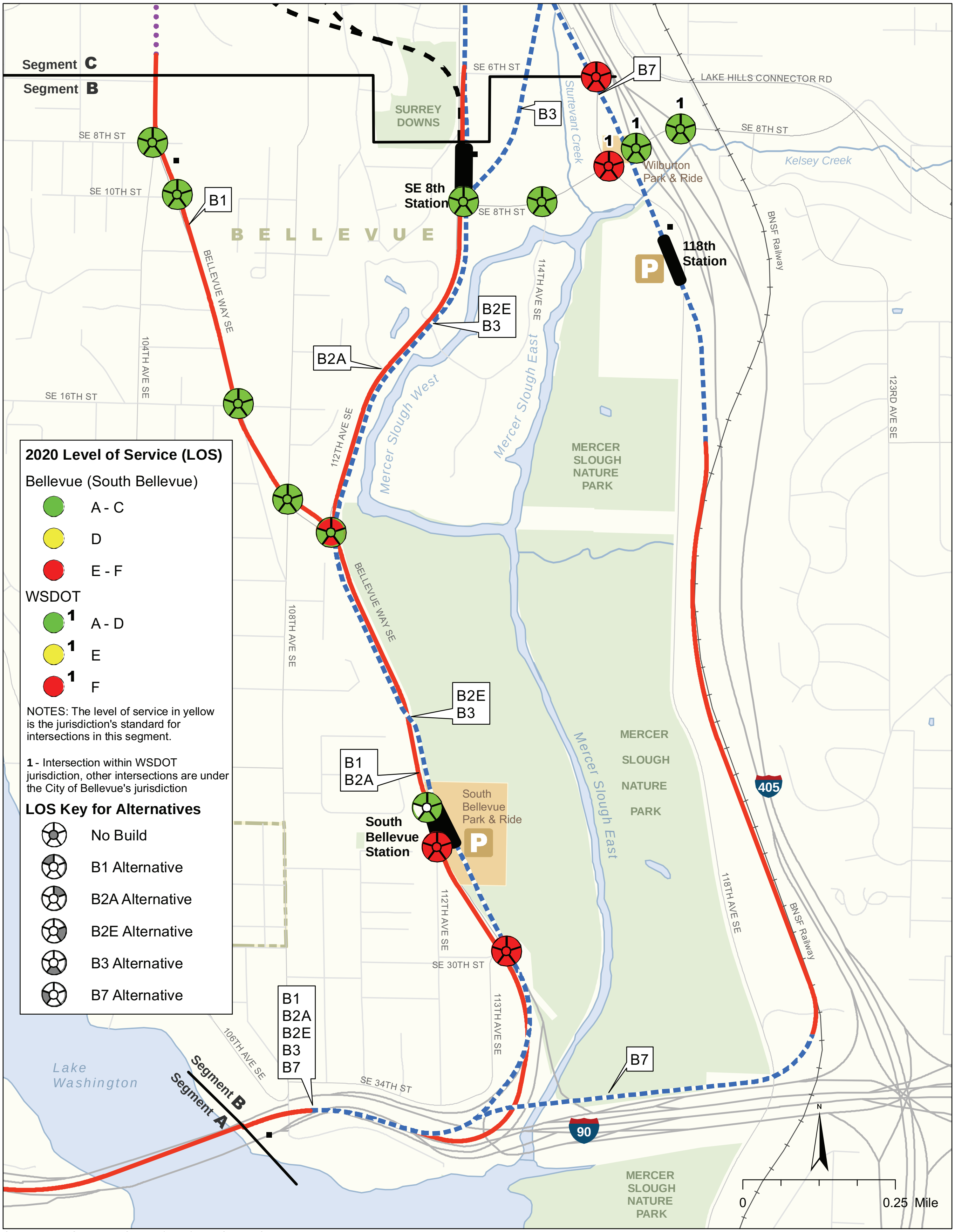
Table 6-26 discusses the expected safety impacts from the Segment B alternatives on arterial streets. Identified safety assessments were based on the alternatives' design type and case study research relevant to East Link project design conditions. Appendix E provides information regarding findings from national research projects for the various design types assessed for East Link.

TABLE 6-26
Segment B Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
B1, Bellevue Way	Bellevue Way from SE 30th Street to SE 6th Street	The proposed median-aligned light rail design is of the type expected to have greater exposure to accidents than alignments outside the roadway right-of-way, but severe accidents would likely be a rare event because of lower light rail travel speeds. Most signalized intersections would retain a left-turn pocket for traffic on Bellevue Way; however, the continuous left-turn lanes would be removed. This is not expected to be a substantial safety concern because light rail would prevent mid-block left turns and allow left turns only at signalized intersections. The conversions of some full-access intersections into right-in/right-out access would reduce the number of conflict points and would be expected to reduce accidents at these intersections. Left-turn traffic will redistribute to full-access signalized intersections, but the volumes may not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. Of the existing mid-block accidents, a few (for example, rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns. Despite the proposed design (median-aligned light rail), there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents.

TABLE 6-26
Segment B Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
B2A, 112th SE At-grade	Bellevue Way from park-and-ride entrance to approximately 500 feet north of north of park-and-ride entrance	The elevated median alignment would separate vehicular traffic from light rail operations, which would prevent any vehicle-train accidents. Appropriate use of curb, low-profile median barrier, wide median to provide offset, or guardrail (if needed) would minimize the risk of a vehicle striking the pier or an accident resulting in a severe or fatal injury. Overall, this short section is expected to have no substantial effect on the number of accidents.
	Bellevue Way and 112th Avenue SE from approximately 500 feet north of north of park-and-ride entrance to SE 8th Street	The proposed median-aligned light rail design is of the type expected to have a greater exposure to accidents than alignments outside the roadway right-of-way. However, the low travel speeds will typically result in less-severe accidents. The conversion of some full-access intersections into right in/right out access reduces the number of conflict points and would be expected to reduce accidents at these intersections. Left-turn traffic will redistribute to full-access signalized intersections, but the volumes may not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. Of the existing mid-block accidents, a few (e.g., rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns. As such, there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents.
B2E, 112th SE Elevated	Bellevue Way and 112th Avenue SE from 113th Avenue SE to SE 8th Street	This elevated alternative would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes. The largest apparent traffic safety issue is the relatively close location of some of the piers to the roadway — as little as 3 feet in some locations. However, relatively low travel speeds (< 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile barriers, or guardrail could be used to further minimize traffic safety risks. Overall, no substantial effect on the number of accidents is expected.
B3, 112th SE Bypass	Bellevue Way from park-and-ride entrance to approximately 500 feet north of north of park-and-ride entrance	The elevated median profile would separate vehicle traffic from light rail operations, which would prevent any vehicle-train accidents. Use of curb, wide median to provide offset, and properly designed impact attenuation (if needed) would minimize the risk of a vehicle striking the pier or an accident resulting in a severe or fatal injury. Overall, this short section is expected to have no substantial effect on the number of accidents.
	Bellevue Way and 112th Avenue SE from approximately 500 feet north of north of park-and-ride entrance to SE 15th Street	The conversions of some full-access intersections into right in/right out access would reduce the number of conflict points and would be expected to reduce accidents at these intersections. Left-turn traffic would redistribute to full-access signalized intersections, but the volumes may not lead to more accidents at those locations with appropriate intersection design and signal phasing, such as exclusive left-turn phasing. Of the existing mid-block accidents, a few (e.g., rear-end accidents involving a vehicle stopped and turning left into a driveway) could be prevented by the light rail median prohibiting mid-block turns. As such, there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents.
	112th Avenue SE from SE 15th Street to SE 8th Street	The elevated median profile would separate vehicular traffic from light rail operations, which would prevent any vehicle-train accidents. Use of curb, low-profile median barrier, wide median to provide offset, and guardrail (if needed) would minimize the risk of a vehicle striking the pier or an accident resulting in a severe or fatal injury. Overall, this short section is expected to have no substantial effect on the number of accidents.
B7, BNSF	Not applicable	The track design is elevated or at-grade, generally paralleling I-90 and I-405. There would be no interaction with at-grade streets.

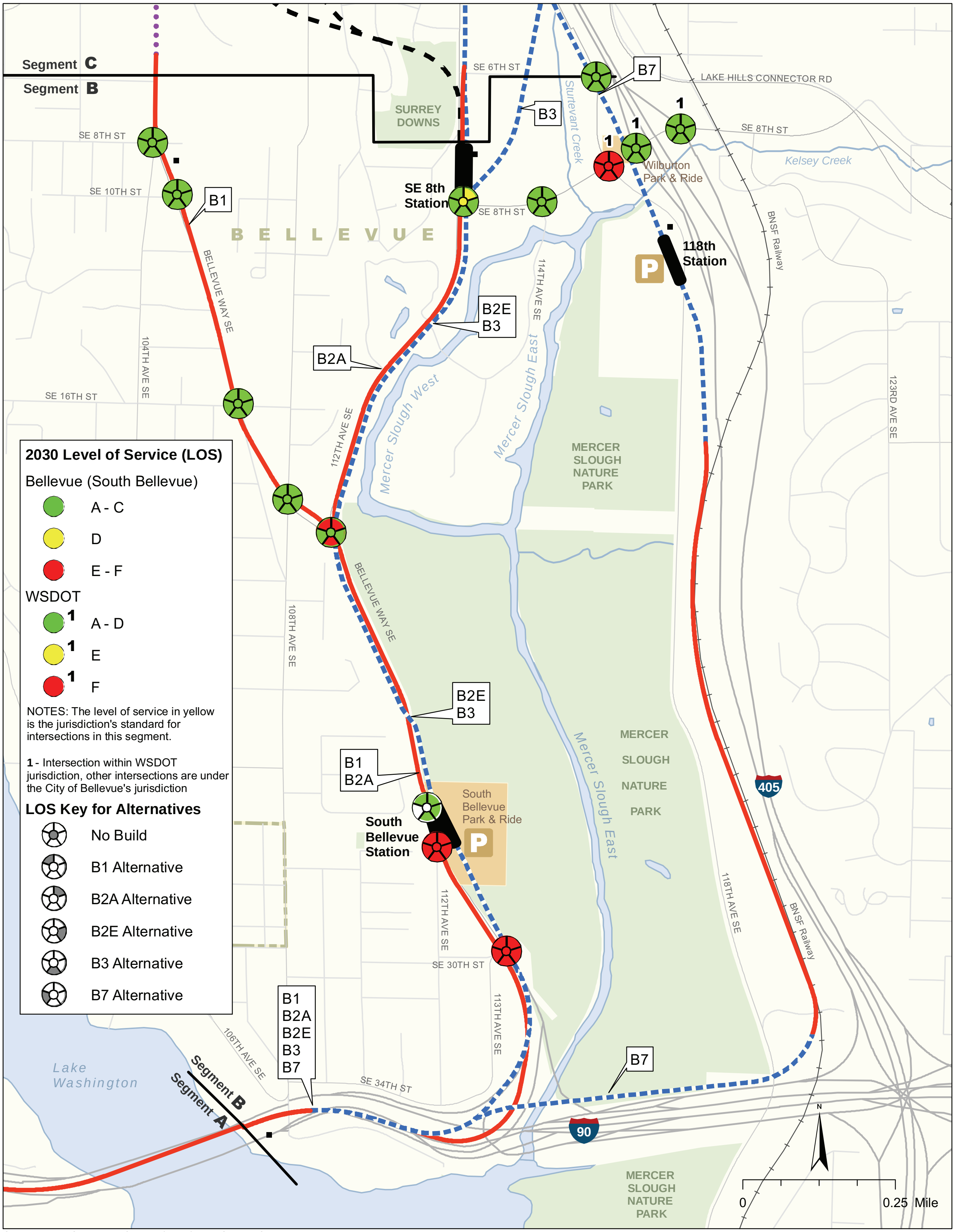


Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

NOTE: The level of service in white indicates that this intersection does not exist for this alternative.

Exhibit 6-10 **2020 PM No Build and Build Level of Service at Intersections Segment B**
East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

NOTE: The level of service in white indicates that this intersection does not exist for this alternative.

Exhibit 6-11 **2030 PM No Build and Build Level of Service at Intersections Segment B**
East Link Project

Parking

Parking impacts were quantified by overlaying a map of existing property boundaries on the alternatives. The number of on-street and off-street parking spaces that would be affected by each alternative was determined by identifying the number of existing parking spaces that fall within the proposed limits of improvements. Parking spaces within properties that are entirely occupied by the proposed alternatives were not included because there would be no demand for these spaces if the existing use is displaced. Table 6-27 summarizes the impacts by alternative.

TABLE 6-27
Segment B Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed	
	On-Street	Off-Street
B1, Bellevue Way	0	57
B2A, 112th SE At-Grade	0	7
B2E, 112th SE Elevated	0	18
B3, 112th SE Bypass	0	3
B7, BNSF	0	18

Note: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

The Bellevue Way Alternative (B1) is expected to require removing the most parking spaces of the five alternatives proposed in Segment B. With this alternative, 57 off-street parking spaces are expected to be removed. Most of these spaces are located in small commercial properties along both sides of Bellevue Way SE between 112th Avenue SE and SE 6th Street. Among the alternatives of Segment B, B3 would require the removal of the fewest parking spaces (three spaces), which are located in the Mercer Slough Nature Park. Overall, none of the alternatives in Segment B are expected to remove any on-street parking.

As shown in Table 6-28, none of the stations located in Segment B would result in a reduction in parking supply. The South Bellevue Station would occupy space currently occupied by the South Bellevue Park-and-Ride Lot. The proposed location of the SE 8th Station would not interfere with any existing on-street or off-street parking. The 118th Station, however, would require that several entire property parcels be taken for the construction and operations of the proposed park-and-ride lot. Because the entire parcels would be taken, the parking demand associated with the businesses also would be removed.

TABLE 6-28
Segment B Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
South Bellevue	B1, B2A, B2E, B3	0	None.
SE 8th	B2A, B2E	0	None.
118th	B7	0	Several entire parcels would be acquired along the west side of 118th Avenue SE, south of SE 8th Street.

Notes:
Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.
Parking impacts shown are only those associated with the area covered by the station.

There is a low potential for parking spillover to occur at the South Bellevue Station in year 2020, but there is a higher potential for parking spillover at this station in year 2030, when the auto demand of 1,570 exceeds the proposed parking (1,455 to 1,476 stalls), as shown in Table 6-29. Even though there could be a potential for spillover by 2030, it is expected that this spillover would not be substantial. The park-and-ride lot is currently at capacity and there is minimal parking spillover in the residential areas. This is illustrated by the low on-street parking utilization in the Enatai Neighborhood (Table 6-6), as most of the parking in the area is not easily identifiable or accessible from Bellevue Way. Additionally, the City of Bellevue constructed a sidewalk and eliminated on-street parking on 112th Avenue SE, south of the South Bellevue park-and-ride, to remove the potential for spillover near the station.

TABLE 6-29
Segment B Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Auto Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Auto Demand[a]	2030 Park-and-Ride Auto Demand[a]
South Bellevue	B1, B2A, B2E, B3	519	1,455 – 1,476[b]	1,180	1,570
118th	B7	--	1,030	390	460

[a] 3-hour PM peak-period park-and-ride auto demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

[b] With Alternative B1, 1,455 parking stalls are proposed at the South Bellevue Station. For alternatives B2A, B2E, and B3, 1,476 parking stalls are proposed.

At the SE 8th Station, there would be some potential for hide-and-ride because there is available parking surrounding the station (less than a 10 percent current utilization rate). This available parking is located in the Surrey Downs Neighborhood but is not easily accessible from or to the SE 8th Station. At the 118th Station, there is a low potential for hide-and-ride impacts because the park-and-ride lot is expected to accommodate year 2020 and 2030 auto demand (Table 6-29).

Property Access and Circulation

The location of vehicular driveway access at the South Bellevue Park-and-Ride Lot would remain unchanged at the proposed station. Similar vehicular access and egress to existing conditions would be maintained at the park-and-ride driveways; therefore, the alternatives that are located at this park-and-ride lot are not expected to affect traffic or transit circulation exiting or entering the station. B1, B2A, and B3 would include the installation of a traffic signal at the northern access location to facilitate transit bus movements across the at-grade light rail track.

B1 would restrict property access along Bellevue Way north of the 112th Avenue SE intersection to right-turn-in, right-turn-out movements with the at-grade median profile. South of the 112th Avenue SE intersection where there is already an existing median in place, no change in access to adjacent properties would occur for this section of the alternative. U-turn movements would be provided at signalized intersections along Bellevue Way to minimize the circulation impacts.

South of the 112th Avenue SE intersection, B2A and B3 would have impacts along Bellevue Way similar to those of B1. North of this intersection, these two alternatives would proceed along 112th Avenue SE and restrict the Bellefield Office Park access, south of the SE 8th Street intersection, to allow only right-turn in, right-turn out movements.

B2E and B7 would have minimal impacts on property access and traffic circulation because the majority of the length of these two alternatives would be elevated and outside the roadway rights-of-way.

The location of driveway access at the South Bellevue Park-and-Ride Lot would remain unchanged with the proposed station. Vehicular egress would be maintained at the unsignalized southern driveway with right-turn-in, right-turn-out movements at the park-and-ride driveways. However, this movement is not expected to affect traffic or transit circulation exiting or entering the station.

6.3.2.3 Segment C

Within Segment C, multiple projects built in the no-build condition would change the physical characteristics of major roadways from their existing conditions. The City of Bellevue, to improve vehicle circulation and roadway efficiency on 108th Avenue NE and 106th Avenue NE, will be converting these streets to one-way traffic operations southbound and northbound, respectively, between Main Street and NE 12th Street in the no-build condition. The number of lanes varies between three and four on both 106th Avenue NE and 108th Avenue NE, with left-turn pockets provided at all major cross streets. Between NE 4th Street and NE 8th Street, a northbound transit-only contra-flow lane is planned on 108th Avenue NE to provide bus access to the Bellevue Transit Center from all directions.

In the no-build conditions, NE 10th Street and NE 2nd Street would be extended over I-405 between 112th Avenue NE and 116th Avenue NE. The NE 10th Street extension would include access from SR 520, and the NE 2nd Street extension would include I-405 access to and from the south. Additionally, 110th Avenue NE would be widened from a three- or four-lane cross section to a five-lane cross section between NE 4th Street and NE 8th Street. In the 2030 no-build condition, NE 2nd Street would be widened from three lanes with on-street parking to five lanes between 112th Avenue NE and Bellevue Way NE. Appendix A provides the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment C.

Traffic Control

Within Segment C, traffic-control measures include signal replacements and modifications, right (or left)-in, right (or left)-out restrictions, light rail gates and access closures. Table 6-30 identifies locations and types of control measures for each alternative.

Because the Bellevue Way Tunnel (C1T) and 106th NE Tunnel (C2T) alternatives are tunnel profiles, only minimal traffic control changes are expected at the beginning and end of the tunnels near the portals. Under these alternatives, traffic control impacts at intersections near the portals would be alleviated with signal modifications at 112th Avenue NE and NE 6th Street and at 110th Avenue NE and NE 6th Street, as shown in Table 6-30. Additionally, C1T would require a signal replacement at the Bellevue Way SE and SE Kilmarnock Street intersection. No light rail gates would be installed in either alternative. Currently, traffic control measures are absent at mid-block private driveways on NE 6th Street. Under the project alternatives, mid-block access would be maintained with right-in, right-out access.

Because the Couplet Alternative (C4A) would consist of side alignments on 108th Avenue NE and 110th Avenue NE, traffic to and from private driveways on the west side and east side of the streets, respectively, would be signed to alert the drivers crossing the tracks when the light rail train is approaching. Additionally, because the train approaches from the left side of the street for the driveways, it follows standards to which drivers are accustomed. Light rail gates would be installed on the southern leg of the 110th Avenue NE and Main Street intersection and on the northern leg of the 110th Avenue NE and NE 12th Street intersection. Traffic signal replacements at intersections along the track couplet route also are proposed. In this alternative, 110th Avenue NE would operate as the southbound vehicle couplet to 108th Avenue NE. At each intersection along 110th Avenue NE, there would be a left-turn lane, a through lane, and a shared through/right lane. On 108th Avenue NE, three northbound vehicle lanes would be provided with an exclusive left-turn lane at the intersections. Under C4A, 106th Avenue NE would have two-way vehicle operations. Channelization along 106th Avenue NE would match existing conditions. When connecting with the 112th SE At-Grade Alternative (B2A), a signal replacement would be required at SE 6th Street and 112th Avenue SE. No other connections would result in additional traffic control measures.

The 112th NE Elevated (C7E) Alternative would have minor traffic control impacts. Under this alternative with a connection to the B2A alternative, the traffic signal at SE 6th Street and 112th Avenue SE would be replaced with a new signal. No other connections would result in additional traffic controls. Modifications to the signal at NE 6th Street and 112th Avenue NE also would be required because of column placement. No light rail gates would be installed with C7E.

The 110th NE Elevated (C8E) Alternative would have some traffic control impacts near the transitions from at-grade to elevated. Column placement would require a reduction in lanes to one through lane in each direction of 110th Avenue NE between NE 4th and NE 12th streets. Based on the conceptual plans, providing additional lanes was not feasible because of the constrained right-of-way along 110th Avenue NE. Under the B2A connection, the traffic signal at SE 6th Street and 112th Avenue SE would be replaced with a new traffic signal. No other connections would result in additional traffic control measures. Existing traffic signals on 110th Avenue NE from NE 4th Street to NE 12th Street would be modified for appropriate phasing and cycle lengths to allow the light rail vehicles to cross intersections. Exclusive northbound and southbound left turn lanes would be provided at each intersection along 110th Avenue NE with the exception at NE 8th Street and 110th Avenue NE, where the northbound left turn is not allowed. No light rail gates would be installed with C8E. No connections with C8E would result in additional traffic controls.

TABLE 6-30
Segment C Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
C1T, Bellevue Way Tunnel		
Bellevue Way driveways and mid-block access	None	Right-in, right-out
Bellevue Way and SE Kilmarnock Street	Signal	Replace signal
110th Avenue NE & NE 6th Street	Signal	Signal modifications
NE 6th Street driveways and mid-block access	None	Right-in, right-out
112th Avenue NE & NE 6th Street	Signal	Signal modifications
C2T, 106th NE Tunnel		
110th Avenue NE & NE 6th Street	Signal	Signal modifications
NE 6th Street driveways and mid-block access	None	Right-in, right-out
112th Avenue NE & NE 6th Street	Signal	Signal modifications
C3T, 108th NE Tunnel		
No Impacts		
C4A, Couplet (Eastbound/Northbound)		
112th Avenue SE driveways and mid-block access	None	Right-in, right-out
SE 6th Street & 112th Avenue SE	Signal	Replace signal
Main Street driveway and mid-block access on the south side	None	Close access
Main Street & 110th Avenue NE	Signal	Replace signal
110th Avenue NE driveways and mid-block access on east side	None	Close most access/driveways; Provide signage at major driveways
NE 2nd Street & 110th Avenue NE	Signal	Replace signal
NE 4th Street & 110th Avenue NE	Signal	Replace signal
NE 6th Street & 110th Avenue NE	Signal	Replace signal
NE 8th Street & 110th Avenue NE	Signal	Replace signal
NE 10th Street & 110th Avenue NE	Signal	Signal modifications
NE 12th Street & 110th Avenue NE	Signal	Replace signal
NE 12th Street driveway and mid-block access on the north side	None	Close access
C4A, Couplet (Westbound/Southbound)		
Main Street & 110th Avenue NE	Signal	Light rail gates
Main Street driveway and mid-block access on the south side	None	Close access
Main Street & 108th Avenue NE	Signal	Replace signal

TABLE 6-30
Segment C Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
108th Avenue NE driveways and mid-block access on west side	None	Close most access/driveways; Provide signage at major driveways
NE 2nd Street & 108th Avenue NE	Signal	Replace signal
Mid-block access	None	Signage
NE 4th Street & 108th Avenue NE	Signal	Replace signal
NE 6th Street & 108th Avenue NE	Signal	Replace signal
Parking garage & 108th Avenue NE	None	Signage
NE 8th Street & 108th Avenue NE	Signal	Replace signal
NE 10th Street & 108th Avenue NE	Signal	Replace signal
NE 12th Street & 108th Avenue NE	Signal	Replace signal
NE 12th Street driveway and mid-block access on the north side	None	Close access
NE 12th Street & 110th Avenue NE	Signal	Light rail gate
C7E, 112th NE Elevated		
SE 6th Street & 112th Avenue SE	Signal	Replace signal
NE 6th Street & 112th Avenue NE	Signal	Signal modifications
C8E, 110th NE Elevated		
SE 6th Street & 112th Avenue SE	Signal	Replace signal
NE 4th Street & 110th Avenue NE	Signal	Signal modifications
NE 6th Street & 110th Avenue NE	Signal	Signal modifications
NE 8th Street & 110th Avenue NE	Signal	Signal modifications
NE 10th Street & 110th Avenue NE	Signal	Signal modifications
NE 12th Street & 110th Avenue NE	Signal	Signal modifications

Operations and Level of Service

In year 2020 for the PM peak hour no-build condition, because major roadway projects will have been completed in Downtown Bellevue, the intersections are expected to operate fairly well for a downtown area. The couplet operation on 106th Avenue NE and 108th Avenue NE is expected to improve intersection operations, and no intersections on these two streets are predicted to operate at LOS F. Only three intersections in the 2020 PM peak hour no build condition are expected to operate at LOS F: Bellevue Way and Main Street, 112th Avenue NE and NE 8th Street (I-405 southbound off-ramp), and 112th Avenue NE and Main Street. Various other intersections are expected to operate at LOS D and E. By year 2030 in the no-build conditions, those three intersections are expected to operate at LOS F, along with the intersections of 110th Avenue NE at NE 8th Street and 112th Avenue NE at NE 12th Street. The 106th Avenue NE and 108th Avenue NE intersection operations with the couplet are expected to be LOS E or better in year 2030.

Within Segment C, at-grade light rail traffic crossings in the downtown core area would provide partial signal priority to the light rail train between Main Street and 12th Street and Bellevue Way and 112th Avenue NE to maintain east-west coordination. At-grade traffic crossings outside of the downtown core would provide full signal priority to light rail.

Generally, most intersections in the 2020 and 2030 PM peak hour build conditions are not expected to experience an impact from the East Link Project. Intersection operations would be similar to the 2020 and 2030 no-build intersection results because of roadway modifications with each alternative and modified travel patterns related to a shift to transit. Exhibits 6-12 and 6-13 and Tables D-9 and D-10 in Appendix D provide 2020 and 2030 intersection PM peak hour LOS results for the no-build and build conditions.

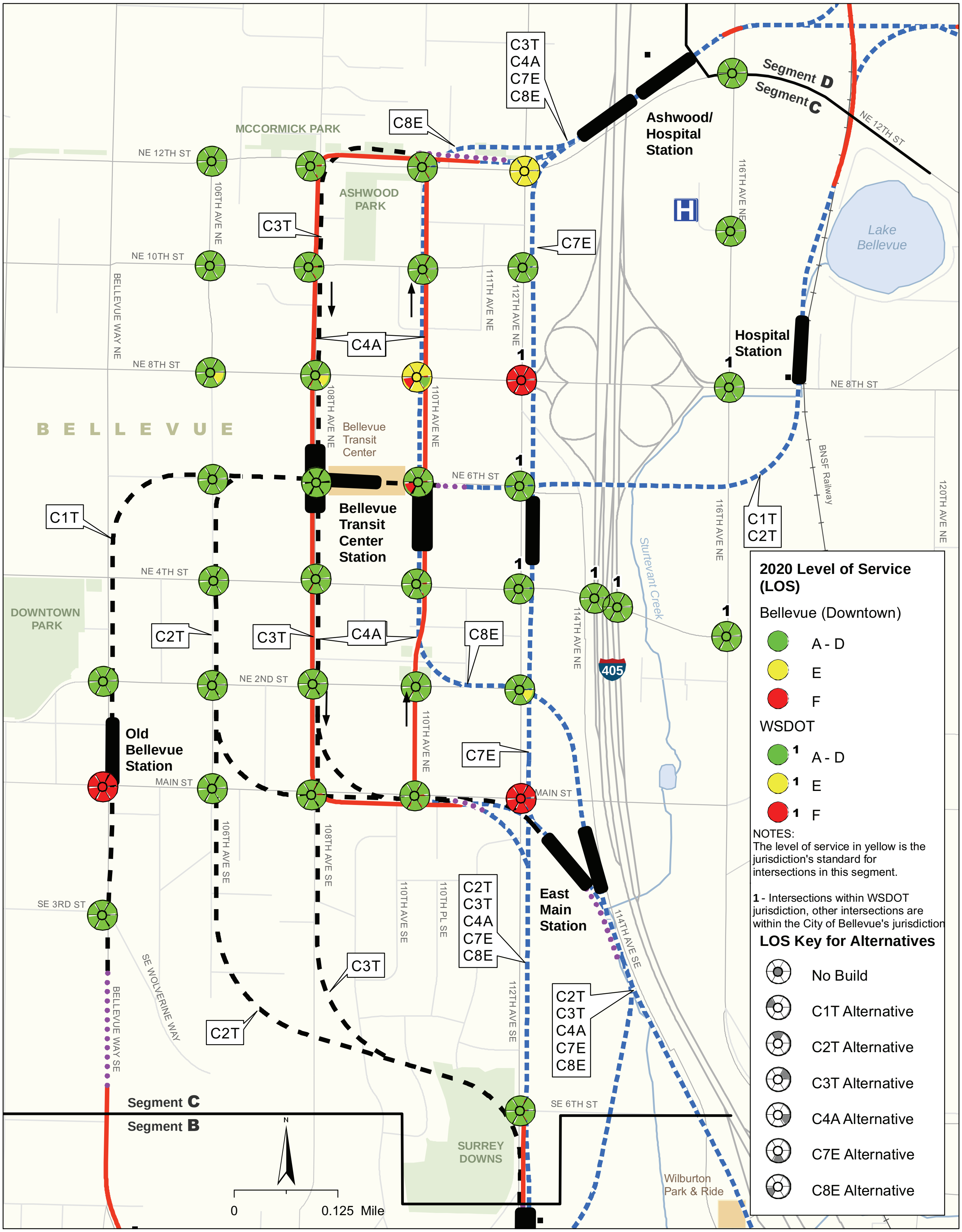
The Bellevue Way Tunnel Alternative (C1T) would be tunneled throughout most of Segment C except on Bellevue Way SE south of SE Kilmarnock Street, where the profile would transition into a tunnel, and on NE 6th Street between 110th Avenue NE and 112th Avenue NE, where the profile would be elevated to cross over I-405. C1T includes the Old Bellevue, Bellevue Transit Center, and Hospital stations. The Bellevue Way and Main Street intersection operations in 2020 and 2030 are expected to get slightly worse when compared to no-build conditions because of the traffic associated with the Old Bellevue Station. Overall, however, C1T is expected to cause little to no impact on the intersections on Bellevue Way because it would become a tunnel profile south of Main Street.

The 106th NE Tunnel (C2T) and 108th NE Tunnel (C3T) alternatives would be tunneled through much of Segment C and would have little to no impact on intersection operations. C2T would include the East Main, Bellevue Transit Center, and Hospital stations. C3T would include the East Main, Bellevue Transit Center, and Ashwood/Hospital stations. The intersection operations in both of these alternatives are expected to cause little to no change in the intersection LOS compared to the 2020 and 2030 no-build conditions.

The Couplet Alternative (C4A) would have an at-grade profile throughout Segment C except where the connecting Segment B alternative is the 112th SE Bypass (B3), BNSF (B7), or 112th NE Elevated (B2E) Alternative, where C4A south of Main Street would be elevated to connect with these alternatives. C4A would operate as a light rail track couplet along 110th Avenue NE and 108th Avenue NE. Light rail would operate northbound along the east side of 110th Avenue NE and southbound along the west side of 108th Avenue NE between Main Street and NE 12th Street. To improve the safety of vehicles crossing the light rail tracks on 110th Avenue NE, autos would be limited to travel only in the southbound direction. Along 110th Avenue NE there would be two southbound lanes and one southbound left-turn lane at each intersection. In the no-build condition, 110th Avenue NE generally has one through lane and a left turn pocket in each direction at the intersections, except between NE 4th Street and NE 8th Street where two through lanes in each direction are provided. Right turn pockets also are provided in the northbound direction at NE 4th Street and NE 6th street and in the southbound direction at NE 2nd Street.

To improve the safety of vehicles crossing the light rail tracks on 108th Avenue NE, the direction of autos would be reversed from the no-build condition and would head northbound. Along 108th Avenue NE, there would be two northbound lanes and one northbound left turn lane at each intersection. In the no-build condition, 108th Avenue NE generally has three southbound through lanes and one southbound left turn pocket. This would reverse the auto couplet operations from vehicles traveling southbound on 108th Avenue NE and northbound on 106th Avenue NE in the no-build condition, to southbound on 110th Avenue NE and northbound on 108th Avenue NE and two-way operations on 106th Avenue NE in the build condition. C4A includes the East Main, Bellevue Transit Center, and Ashwood/Hospital stations. In general, light rail operations would affect some north-south vehicle operations and there may be an impact on light rail travel time because full signal priority is not proposed for the light rail train with this alternative. Intersection operations with C4A are expected to experience little to no change compared to 2020 and 2030 no-build conditions. The lone exception is at 110th Avenue NE and NE 8th Street, which operates at an acceptable LOS with C4A compared to failing with the No Build Alternative because of vehicle patterns changing with the northbound auto couplet. These conclusions are further explained in the following paragraphs.

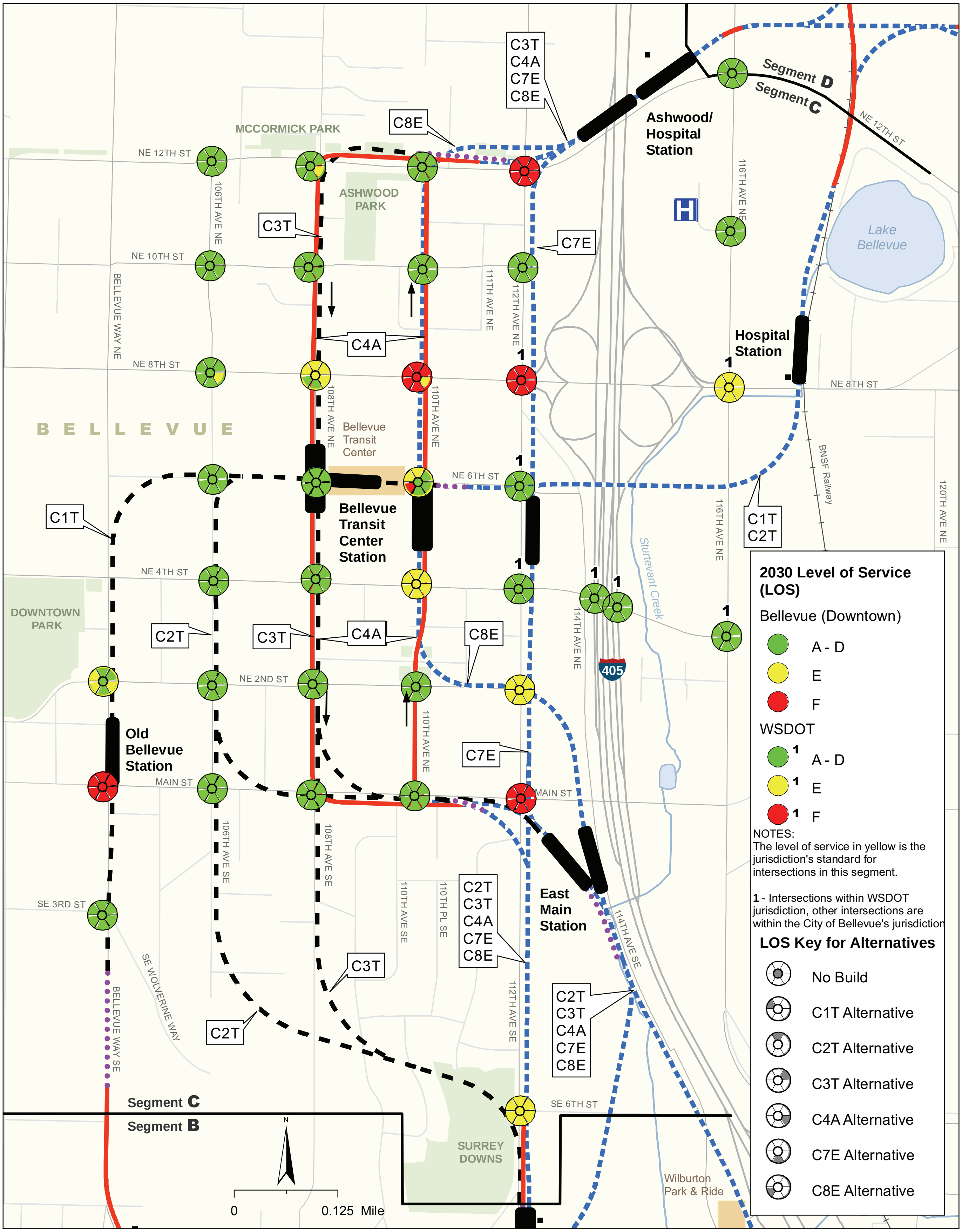
Along 110th Avenue NE, intersections are expected to operate at an acceptable LOS E or better in C4A in 2020 and 2030. This is similar to no-build condition except at the intersection of 110th Avenue NE and NE 8th Street, where the no-build condition operates at LOS F. Intersection operations are not expected to be adversely affected along 110th Avenue NE for several reasons. First, two through lanes and a left-turn lane would be provided at each intersection to accommodate the expected traffic demand, and the light rail train also would be able to safely proceed through the intersections within the required southbound vehicle signal phase time. Additionally, at the two ends of 110th Avenue NE, Main Street and NE 12th Street, these intersections would have an all-red signal phase to allow the light rail train to proceed through. In 2020 and 2030, both intersections would operate at an acceptable LOS. Finally, disturbances to the signal coordination are expected to be minimized because light rail in Downtown Bellevue is expected to receive priority over minor signal phases and not the key east-west arterials (such as NE 8th Street and NE 4th Street), which would maintain signal coordination. Light rail operations would



Source: Data from City of Bellevue (2005) and King County (2006) modified by CH2M HILL.

- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Traction Power Substation
- Proposed Station
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-12 **2020 PM No Build and Build Level of Service at Intersections Segment C**
East Link Project



Source: Data from City of Bellevue (2005) and King County (2006) modified by CH2M HILL.

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Traction Power Substation
Proposed Station
New and/or Expanded Park-and-Ride Lot

Exhibit 6-13 **2030 PM No Build and Build Level of Service at Intersections Segment C**
East Link Project

impact some north-south vehicle operations. Some slight impact on the light rail travel time may occur as a result of maintaining signal coordination along these east-west arterials.

Along 108th Avenue NE, intersections are expected to operate at an acceptable LOS E or better in C4A in 2020 and 2030. Intersection operations are not expected to be adversely affected along 108th Avenue NE for several reasons. First, three lanes of traffic would be provided to accommodate the expected traffic demand. Additionally, the light rail train would be able to safely proceed through the intersections within the required northbound vehicle signal phase time. At the two ends of 108th Avenue NE—Main Street and NE 12th Street—the intersections require an all-red signal phase to allow the light rail train to proceed through. In 2020 and 2030, both intersections would operate at LOS E or better. Finally, disturbances to the signal coordination are expected to be minimized because key east-west arterials (such as NE 8th Street and NE 4th Street) would maintain signal coordination. This would have an impact on some north-south vehicle operations, and there may be an impact on the light rail travel time because full signal priority is not proposed for the light rail train with this alternative.

Under C4A, two-way traffic operations are assumed along 106th Avenue NE. Even with the conversion from one-way operations in the no-build condition to two-way operations in the build condition, intersections are expected to operate at an acceptable LOS of E or better in 2020 and 2030.

The 112th NE Elevated (C7E) and 110th NE Elevated (C8E) alternatives would be elevated throughout Segment C. C7E would include the East Main, Bellevue Transit Center, and Ashwood/Hospital stations. In this alternative, the Bellevue Transit Center Station would be located on 112th Avenue NE between NE 4th Street and NE 6th Street. The resulting shift in passenger drop-off/pick-up traffic is not expected to create additional delay at the intersections near this station. C7E is expected to have little to no change in intersection LOS compared to the no-build condition.

C8E would include the East Main, Bellevue Transit Center, and Ashwood/Hospital stations. In 2020 and 2030, the intersections of NE 6th Street and NE 8th Street with 110th Avenue NE would operate at LOS F. This is a result of the reduction in travel lanes because of the median column placement for the elevated center-running C8E. All other intersections are expected to have little to no change in intersection LOS compared to the no-build condition.

Traffic Safety

The expected safety impacts of the alternatives within Segment C on arterial streets are outlined in Table 6-31. Overall, the Segment C alternatives are expected to have a minimal impact on roadway safety conditions. C4A would interact with a large number of vehicles and major business driveways and is therefore designed with protected crossings to limit accident exposure. Aligning the track on 108th and 110th avenues NE, which are one-way streets, would reduce the number of vehicle conflicts. Protecting all vehicle movements across the light rail track also would minimize safety risks. Appendix E provides information regarding findings from national research projects for the various design types assessed for East Link.

TABLE 6-31
Segment C Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
C1T, Bellevue Way Tunnel	Bellevue Way from north of SE 6th Street to south of SE Kilmarnock Street	The alternative quickly transitions from median at-grade to a median retained cut. The retained-cut design would eliminate the opportunity for train-vehicle collisions. Furthermore, the median alignments would prohibit mid-block turning movements, providing some expected safety benefit. Overall, this short section is expected to cause no substantial change in the number of accidents.
	NE 6th Street from 110th Avenue NE to I-405	The alternative quickly transitions from tunnel to a median elevated. The design would eliminate the opportunity for train-vehicle collisions. Overall, this short section is expected to cause no substantial change in the number of accidents.
C2T, 106th NE Tunnel	112th Avenue SE from SE 6th Street to SE 1st Place	The connection from the 112th SE Elevated Alternative (B2E) would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes.

TABLE 6-31
Segment C Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
		The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (< 35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile median barrier, or guardrail could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected. The connection from the 112th SE At-Grade Alternative (B2A) is a retained cut and transitions for approximately 200 feet to tunnel, minimizing the potential for a light rail accident with other modes. The connections from the 112th SE Bypass (B3) and BNSF (B7) alternatives would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes.
	NE 6th Street from 110th Avenue NE to I-405	The alternative quickly transitions from tunnel to a median elevated. The design would eliminate the opportunity for train-vehicle collisions. Overall, this short section is expected to cause no substantial change in the number of accidents.
C3T, 108th NE Tunnel	112th Avenue SE from SE 6th Street to SE 1st Place	The connection from B2E would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (<35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile median barrier, or guardrail could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected. The connection from B2A is an open trench and transitions for approximately 200 feet to tunnel, minimizing the potential of a light rail accident with other modes. The connections from B3 and B7 would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes.
	NE 12th Street from 110th Avenue to 112th Avenue NE	The alternative quickly transitions from tunnel to a side elevated. The design would eliminate the opportunity for train-vehicle collisions. Furthermore, several cross streets to NE 12th Street would be closed, and alternative access would be provided. The largest potential traffic safety issue would occur if any piers for the elevated track are placed close to the roadway. At locations where collisions with a pier are of concern, taller curbs (9-inch), low-profile median barrier, or guardrail could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected.
C4A, Couplet	Along 112th Avenue SE & Main Street from SE 6th Street to 108th Avenue NE	The elevated connection from B2E would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes on the street level. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (<35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile barrier, or guardrail could be used to further minimize traffic safety risks. The connection from B2A quickly transitions from median at-grade to median elevated to side elevated. The greatest potential for vehicle-train collisions is at SE 6th Street, where the track is median at-grade. However, this design type typically has less-severe accidents because of slower vehicle speeds. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway and where there are piers for the structures that straddle the roadway when the track transitions from median elevated to side elevated. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile barrier, or guardrail could be used to further minimize traffic safety risks. The connections from B3 and B7 would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes.
	108th Avenue NE and 110th Avenue NE from Main Street to NE 12th Street (WB and EB tracks of one-way couplet)	The use of a side-aligned route within the vehicle travel way has greater potential for accident exposure than other track profiles. Converting both 108th and 110th avenues NE to one-way vehicle streets would reduce the number of locations where vehicles interact with light rail by removing possible movements that would cross the light rail tracks. With the configuration of vehicles traveling in the direction opposite from light rail, drivers can see the light rail train coming toward them. To avoid accidents at intersections, only protected movements (with turn pockets)

TABLE 6-31
Segment C Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
	to NE 12th Street	would be allowed to cross the light rail tracks. To keep vehicles from using the counter-flow lanes, pavement marking messages or signs could be used to inform drivers the lane is for transit use only. At driveways, signs and other messages also could be used to remind drivers to look in the direction opposite of the approaching vehicles for transit approaching in the counter-flow lane. Additionally, the counter-flow lane will be a joint-use lane for buses in the four block section between NE 4th Street and NE 8th Street. At the entrance points to the joint-use lanes, the turning movements would be signed for buses only. Furthermore, these turn movements will be at signalized intersections and the signal phasing would minimize the risk of a collision from a bus and light rail from entering the lane at the same time. Operations within the joint-use lanes is expected to have little risk of a collision because of the short four-block segment, relatively low bus and train volumes, and train speeds of 25 mph or less.
C7E, 112th NE Elevated	112th Avenue SE from SE 6th Street to Main Street	The elevated connection from B2E would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of a light rail accident with these travel modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (<35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile barrier, or guardrail could be used to further minimize traffic safety risks. The connection from B2A quickly transitions from median at-grade to median elevated to side elevated. The greatest potential for vehicle-train collisions is up to SE 6th Street, when light rail is median at-grade. However, this design type typically has less-severe accidents because of slower vehicle speeds. An additional traffic safety issue would occur where piers for the elevated track are placed close to the roadway and also where the piers for the structures straddle the roadway when the track transitions from median elevated to side elevated. At locations where collisions with a pier are of concern, taller curbs (9 inch), low-profile barrier, or guardrail could be used to further minimize traffic safety risks. The elevated connections from B3 and B7 would have no light rail interactions with vehicles, pedestrians, or bicycles, eliminating the possibility of a light rail accident with these travel modes. Overall, this section is expected to cause no substantial change in the number of accidents.
	112th Avenue SE from Main Street to NE 12th Street	The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (<35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch) or low-profile barrier could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected.
C8E, 110th NE Elevated	112th Avenue SE from East Main Station to Main Street	This section would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of an at-grade light rail accident with these travel modes.
	112th Avenue SE from Main Street to NE 4th Street	This section would have no light rail interactions with vehicles, pedestrians, or bicycles on the street level, eliminating the possibility of an at-grade light rail accident with these travel modes. The largest apparent traffic safety issue would be the relatively close location of some of the piers to the roadway—as little as 3 feet in some locations. However, relatively low travel speeds (<35 mph) and 6-inch curbs should provide adequate protection. At locations where collisions with a pier are of concern, taller curbs (9 inch) or low-profile barrier could be used to further minimize traffic safety risks. No substantial change in the number of accidents is expected.
	110th Avenue from NE 4th Street to NE 12th Street	The elevated median profile separates vehicle traffic from light rail operations, which would prevent any vehicle-train accidents. Track piers would be close to the vehicle travel way, but low speeds should reduce the potential for a vehicle collision with a track pier to cause severe or fatal injury. Furthermore, use of curb or low-profile median barrier can reduce the likelihood a vehicle colliding with a pier. This section currently has few mid-block accidents related to mid-block turning movements; therefore, light rail track in the median is unlikely to substantially reduce mid-block accidents. Overall, this section is expected to cause no substantial change in the number of accidents.

Parking

The parking impacts associated with the light rail alternatives and stations in Segment C are discussed in this section. Table 6-32 summarizes the impacts by alternative. Table 6-33 summarizes the impacts associated with the area covered by each station.

Parking impacts were quantified by overlaying a map of existing property boundaries on the alternatives. The number of on-street and off-street parking spaces that would be affected by each alternative was determined by counting the number of existing parking spaces that fall within the limits of the improvements. Parking spaces within properties that are entirely occupied by the proposed alternatives were not counted because the demand for these spaces would be removed if the existing use is displaced.

TABLE 6-32
Segment C Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed		
	Unrestricted On-Street	Restricted On-Street[a]	Off-Street[b]
C1T, Bellevue Way Tunnel	0	0	158
C2T, 106th NE Tunnel	0	0	82-172
C3T, 108th NE Tunnel	0	0	2-82
C4A, Couplet	7	4	39-94
C7E, 112th NE Elevated	0	0	198-226
C8E, 110th NE Elevated	0	0	92-125

[a] Restricted parking includes all parking spaces with special-use restrictions, such as drop-off/loading zones.

[b] The range of off-street parking removal is related to connectors with Segment B.

Note: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.

TABLE 6-33
Segment C Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
Old Bellevue	C1T	0	None.
East Main	C2T, C7E	0	Several entire parcels would be acquired on the southern side of Main Street near the intersection with 112th Avenue SE.
Bellevue Transit Center	C1T, C2T	0	None.
	C3T	24	Private off-street parking lot on the northeast corner of the intersection of NE 6th Street and 108th Avenue NE.
	C4A	0	None.
	C7E	18	Private off-street parking lots on the southeast corner of the intersection of NE 6th Street and 112th Avenue NE.
	C8E	0	None.
Ashwood/Hospital	C3T, C4A, C8E, C7E	0	None.
Hospital	C1T, C2T	10	Private off-street parking lot on northeast corner of the intersection of NE 8th Street and 116th Avenue NE.

Notes: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

Parking impacts shown are only those associated with the area covered by the station.

The parking impacts associated with each alternative in Segment C depend on which transition option is used to connect to the alternative in Segment B. C4A, for example, is expected to affect 39 and 94 off-street parking spaces if B2E or B3 are constructed in Segment B, respectively. The expected number of affected off-street parking spaces associated with B7 and B2A is between 66 and 77 spaces, respectively. The largest single contributor to the 94 affected off-street spaces associated with C4A (connection with B3) is a commercial office building located on the corner of the SE 6th Street and 112th Avenue SE intersection. Forty off-street parking spaces are expected to be lost in this location. The C4A connection with B2E has the lowest number of affected off-street parking spaces of the C4A options, but also would have the greatest impact on property at the intersection of Main Street and 112th Avenue SE, where 25 off-street spaces are expected to be lost. C4A is the only alternative in Segment C that is expected to result in the removal of on-street parking. Seven unrestricted on-street spaces and four on-street spaces that have been designated as short-term loading zones would be removed. All 11 spaces are located along 108th Avenue NE. Implementation of the couplet between 108th Avenue NE and 110th Avenue NE may require the removal of additional on-street parking spaces planned as part of the future couplet conversion being performed by the City of Bellevue.

C1T would remove 158 off-street parking spaces within Segment C. Approximately two-thirds of these parking spaces are located on commercial property located in Downtown Bellevue. The remaining third is composed of parking spaces located at various residential apartment buildings on the west side of Bellevue Way between SE 3rd Street and SE 6th Street.

The C2T connection with B3 is expected to result in the greatest number of lost off-street parking spaces (172 spaces) of the options associated with C2T. A commercial building located at the intersection of SE 6th Street and 112th Avenue SE is expected to lose 50 parking spaces if the C2T connection with B3 is chosen. The C2T connection that is expected to require the removal of the fewest parking spaces (82 spaces) is with B2A. The C2T connections with B2E, B3, or B7 would affect the same locations as the C2T connection with B2A, but would require the removal of additional off-street parking.

C7E would remove the most off-street stalls of any Segment C alternative. Between 198 and 226 off-street parking spaces may be removed, depending on its connection to Segment B. The connection with B3 would remove 226 stalls, while the B7 connection would remove 198 stalls. A total of 201 stalls would be removed with either the B2E or B2A connections. These stalls would not occur at one property but throughout the corridor. The property with the most stalls removed (slightly more than 50) is a commercial property in the northeast corner of 112th Avenue NE and Main Street.

Between 92 and 125 stalls are expected to be removed under C8E. With the B7 connection, 92 off-street stalls would be removed. With the B3 connection, 125 parking stalls would be removed. Again, similar to C7E, the property with the most parking removed is a commercial property in the northeast corner of 112th Avenue NE and Main Street. Slightly more than 50 stalls are expected to be removed at this location.

As shown in Table 6-33, only three station designs would result in the removal of parking spaces. The design of the Bellevue Transit Center Station would not affect any on-street or off-street parking spaces for C1T, C2T, C4A, and C8E. The design of C3T would require the removal of approximately 24 off-street parking spaces in a private parking lot on the northeast corner of the intersection of NE 6th Street and 108th Avenue NE. Depending on its connection to Segment B, C3T would remove the fewest off-street stalls of any Segment C alternative. The design of the Bellevue Transit Center Station for C7E is expected to require the removal of 18 parking spaces in a private off-street parking lot on the southeast corner of the intersection of NE 6th Street and 112th Avenue NE.

No impacts on parking spaces are expected with the construction of the Old Bellevue, East Main, and Ashwood/Hospital stations for any of the alternatives in Segment C. The Hospital Station, associated with C1T and C2T, is expected to require the removal of 10 off-street parking spaces in a private parking lot on the northeast corner of the intersection of NE 8th Street and 116th Avenue NE.

At Old Bellevue, Ashwood/Hospital, and Bellevue Transit Center stations, there is available on-street parking (Table 6-9); however, there is only low potential for hide-and-ride parking at these stations because most of the on-street parking provided in this area is either restricted or private lots that are monitored. There is low potential for hide-and-ride parking at the East Main and Hospital stations because there is a minimal amount of available on-street parking surrounding the station areas. Most of the stations in Segment C are designed for bus and pedestrian access and would not be attractive stations for auto access because of the surrounding congestion and restricted public parking opportunities.

Property Access and Circulation

The majority of the Segment C alternatives would have minimal property access impacts. Impacts on pedestrian and bicycle circulation within Downtown Bellevue are expected to be minimal because pedestrian crossings would be maintained and the alternatives would not alter the location of existing and future bicycle routes.

C1T, C2T, and C3T would have minimal property access and circulation impacts because they mainly would operate underground and not affect vehicle movements. C1T would restrict driveway access on Bellevue Way between the short segment of SE 6th Street and SE Kilmarnock Street to allow only right-turn-in, right-turn-out movements. C2T and C3T would restrict driveway access on 112th Avenue SE south of SE 6th Street under the B2A connection. All other connections to C2T and C3T would not result in additional property access and circulation impacts on 112th Avenue SE. C1T and C2T also would restrict the driveway movements on NE 6th Street to allow only right-turn-in, right-turn-out. This would affect the Meydenbauer Center. U-turn movements on the east leg of the 110th Avenue NE and NE 6th Street intersection would be allowed to minimize the impact on vehicles exiting Meydenbauer Center. There are no access impacts on 112th Avenue NE. C3T would require two road modifications north of NE 12th Street to serve the remaining residential properties. New connections to 110th Avenue NE would be constructed to the north and connect with 110th Avenue NE.

C4A would have some impact on traffic circulation along 110th Avenue NE and 108th Avenue NE in Downtown Bellevue. The intersection at Main Street and 110th Avenue NE would be reconfigured to allow for a realignment of 110th Avenue SE and 110th Place SE. These low-volume approaches would be relocated to the realigned 110th Avenue SE and Main Street intersection. The realignment at 110th Avenue NE and Main Street would allow traffic to flow directly southbound, avoiding turning movements onto Main Street. Realignment at this intersection would remove the property access on the southern side of this short block.

Along 110th Avenue NE, property access under the build condition would change to one-way operations from the two-way operations associated with the no-build condition. At high-volume driveways, additional signage would be provided to alert drivers crossing the light rail train tracks. To provide a northbound light rail route along 110th Avenue NE, vehicle traffic would operate in the southbound direction.

Along 108th Avenue NE, traffic would operate in the northbound direction and traffic along 106th Avenue NE would operate in the northbound and southbound directions. Along 108th Avenue NE, property access would remain similar to the no-build condition but in the opposite one-way direction. The proposed station location would require closure of the City Hall parking driveway on 110th Avenue NE. Parking access would continue at the NE 6th Street access. At high-volume driveways, additional signage would be provided to alert drivers crossing the light rail train tracks. Additionally, driveway locations on 108th Avenue NE and 110th Avenue NE, where vehicles would cross light rail tracks, would be closed if access is available at another driveway location. C4A would reverse and shift the vehicle couplet operations in the downtown area compared to the no-build condition, but this is not expected to increase overall impacts on the system.

Minor impacts on traffic circulation at the NE 12th Street and 110th Avenue NE intersection are expected as a result of realigning 111th Avenue NE to connect to 110th Avenue NE. This would require reorientation of 111th Avenue NE to connect to the existing intersection at 110th Avenue NE, thus removing vehicle delays for vehicles turning off and onto NE 12th Street. Private driveway access from existing properties on 111th Avenue NE would be maintained, and impacts on circulation are expected to be minimal.

If C4A connects with B2A, there would be some additional property access and circulation impacts between SE 6th Street and just south of Main Street because the alternative is at-grade in the median. Therefore, turning movements into and out of driveways would be restricted to allow only right-turn-in and right-turn-out movements. U-turn movements would be provided at the SE 6th Street and Main Street intersections along 112th Avenue NE to minimize any impacts. All other connections would not result in property access or circulation impacts.

C7E would be elevated and side aligned along 112th Avenue NE. When connected to B2A, driveways north of SE 6th Street would allow only right-in/right-out movements because of median placed columns as the alternative transitions to elevated profile through the Main Street and 112th Avenue intersection. All other connections would not result in additional property access and circulation impacts. Many driveways on 112th Avenue NE already allow only right-in/right-out access movements; additional individual driveways may need to be converted to right-in/right-out access, depending on column placement. This configuration would have minimal additional property access and circulation impacts.

C8E would have minimal impact on access and circulation, except where the route travels along 110th Avenue NE. Along this street, between NE 6th Street and NE 12th Street, the profile is elevated in the median, which would restrict turning movements into and out of driveways to right-turn-in and right–turn-out only. To minimize circulation issues, U-turn movements at signalized intersections would be allowed. This movement would be available only when a left turn is allowed. Because of right-of-way constraints along 110th Avenue NE, the northbound left-turn movement at NE 8th Street would be prohibited, and vehicles in this direction would turn left at either NE 4th Street or NE 10th Street. Under the B2A connection, driveways north of SE 6th Street would allow only right-in/right-out movements as the alternative transitions from at-grade to elevated.

As part of any of the Segment C alternatives, 108th Avenue NE between NE 4th Street and NE 8th Street would include a transit counter-flow lane opposite the one-way travel lanes to maintain bus connections in all directions to and from the Bellevue Transit Center and minimize transit travel delays. For C4A, this transit counter-flow lane would be shared with the light rail track for a "joint-use" operation within the four-block section between NE 4th Street and NE 8th Street on 108th Avenue NE and 110th Avenue NE. During the peak hour, light rail would operate at peak headways of 9 minutes, less than 30 buses are expected to travel in the joint-use lane on 108th Avenue NE, and less than 10 buses would travel in the joint-use lane on 110th Avenue NE. With the expected number of trains and buses and because the signal phasing at the entry points to this joint-use lane would be different for light rail and buses, conflicts between buses and light rail in this joint-use lane should be minimal.

Interim Terminus Stations

The Ashwood/Hospital and Hospital stations are potential interim termini. The ridership at these two interim termini would be similar to the representative alternative (Table 6-20); therefore, these interim termini are not expected to generate additional vehicle trips (Table 6-21) or to have any additional transportation impacts.

6.3.2.4 Segment D

Within Segment D, two no-build condition roadway projects that alter the roadway channelization from the existing condition are scheduled. The first is a widening project along 130th Avenue NE to provide a center two-way left-turn lane. The second is along Northup Way, where it will be widened to accommodate an additional eastbound lane between 120th Avenue NE and 124th Avenue NE. An intersection improvement at the 140th Avenue NE and NE 20th Street intersection, to provide an additional left-turn pocket in both eastbound and westbound directions, is also assumed in the future no-build and build conditions. Additional projects in Segment D have not been included in the analysis because of lack of clear implementation plans, such as the NE 16th Street extension. Appendix A provides the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment D.

Traffic Control

In the NE 16th At-Grade (D2A) and NE 20th (D3) alternatives, light rail crossing signals and gates would be needed to provide a protected safe rail crossing near the 1600 block along 124th Avenue NE, 130th Avenue NE, and 132nd Avenue NE. Also in D2A and D3, NE 16th Street between 132nd Avenue NE and 136th Avenue NE and 136 Avenue NE between NE 16th Street and NE 20th Street would be widened to accommodate light rail, but the number of lanes and pedestrian facilities would be maintained. An exclusive left-turn lane would be provided for the southwest-bound approach at the intersection of NE 16th Street and 136th Avenue NE.

D3 east of 136th Avenue NE would operate at-grade in a retained cut in the median along NE 20th Street, which would require widening the signalized intersections at 136th Avenue NE, 140th Avenue NE, and the 14300 block of NE 20th Street (aligns with the driveway access to commercial properties). At the 148th Avenue NE and 152nd Avenue intersections along NE 20th Street, a covered lid would be provided to maintain intersection channelization. Pedestrian facilities would be maintained along NE 20th Street.

Finally, D3 along 152nd Avenue NE between NE 20th Street and Microsoft Road is at-grade in the median of the road. The number of lanes and pedestrian facilities would be maintained. Exclusive northbound and southbound left-turn pockets would be provided at the intersection of NE 24th Street and 152nd Avenue NE.

The SR 520 Alternative (D5) would operate entirely outside of arterial roadway right-of-way and would not affect the travel lanes or pedestrian facilities on any roadways in Segment D.

Because D2A and D2E would travel outside the roadway right-of-way for most of the route length, the traffic control treatments would be minimal, as shown in Table 6-34. Light rail traffic gates would control traffic at locations on 116th Avenue NE, 120th Avenue NE, 124th Avenue NE, and 130th Avenue NE where traffic controls are currently absent. D3 would have the highest number of traffic control revisions because it travels in the median on NE 20th Street and 152nd Avenue NE. Minimal traffic control devices are proposed for D5 because it travels along the SR 520 corridor outside vehicle traffic operations. Along 152nd Avenue NE, new traffic controls are not proposed except for driveway modifications.

TABLE 6-34
Segment D Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
D2A, NE 16th At-Grade		
116th Avenue NE	None	Light rail gates
120th Avenue NE	None	Light rail gates
124th Avenue NE	None	Light rail gates
130th Avenue NE	None	Light rail gates
NE 16th Street & 132nd Avenue NE	Minor approach stop controlled	Install new signal
NE 16th Street & 134th Avenue NE	Minor approach stop controlled	Minor approach right-in, right-out
NE 16th Street & 136th Avenue NE	NE 16th Street westbound stop controlled, east to north and south to west are the major movements	Install new signal
136th Place NE	None	Light rail gates
NE 20th Street & 136th Avenue NE	Signal	Replace signal
NE 24th Street & 151st Avenue NE	Signal	Light rail gates, signal modifications
NE 24th Street at 152nd Avenue NE	Signal	Light rail gates, signal modifications
152nd Avenue NE	None	Close access
NE 20th Street	None	Close access
D2E, NE 16th Elevated		
116th Avenue NE	None	Light rail gates
NE 24th Street & 151st Avenue NE	Signal	Light rail gates, signal modifications
NE 24th Street at 152nd Avenue NE	Signal	Light rail gates, signal modifications
152nd Avenue NE	None	Close access
NE 20th Street	None	Close access
D3, NE 20th		
116th Avenue NE	None	Light rail gates
120th Avenue NE	None	Light rail gates
124th Avenue NE	None	Light rail gates
130th Avenue NE	None	Light rail gates
NE 16th Street & 132nd Avenue NE	Minor approach stop controlled	Install new signal

TABLE 6-34
Segment D Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
NE 16th Street & 134th Avenue NE	Minor approach stop controlled	Minor approach right-in, right-out
NE 16th Street & 136th Avenue NE	NE 16th Street westbound stop controlled; east to north and south to west are the major movements	Install new signal
NE 20th Street & 136th Avenue NE	Signal	Replace signal
NE 20th Street & 140th Avenue NE	Signal	Replace signal
NE 20th Street	Signal	Replace signal
NE20th & 148th Avenue NE	Signal	Replace signal
NE 20th & 152nd Avenue NE	Signal	Replace signal
NE 21st Street & 152nd Avenue NE	None	Right-in, right-out
NE 24th Street & 152nd Avenue NE	Signal	Replace signal
NE 26th Street & 152nd Avenue NE	Signal	Replace signal
NE 20th Street, 152nd Avenue NE, NE 16th Street & 136th Avenue NE	None	Right-in, right-out
152nd Avenue NE	None	Light rail gates
D5, SR 520		
116th Avenue NE	None	Light rail gates
151st AVE NE	None	Light rail gates
152nd Avenue NE	None	Driveway modifications
NE 24th Street & 152nd Avenue NE	Signal	Signal modifications
NE 26th Street & 152nd Avenue NE	Signal	Signal modifications

Operations and Level of Service

PM peak hour no-build intersection operations in Segment D for years 2020 and 2030 are expected to worsen as traffic volumes increase on the roadways. Two intersections in year 2020 are expected to operate at LOS F: NE 24th Street and 148th Avenue NE, and NE 40th Street and 156th Avenue NE. A few other intersections on 140th Avenue NE, 148th Avenue NE, and 156th Avenue NE are expected to operate at LOS E. By year 2030, the NE 40th Street and 148th Avenue NE and NE 20th Street and 140th Avenue NE intersections are expected to degrade to LOS F during the PM peak hour.

With any of the Segment D alternative connections with the C3T, C4A, C7E and C8E alternatives, the gated crossing of 116th Avenue NE would be coordinated with the traffic signal at NE 12th Street and 116th Avenue NE to allow enough clearance for southbound vehicles potentially queued between NE 12th Street and the gated crossing. Intersection operations are not expected to degrade with this coordination.

Within Segment D, all at-grade light rail traffic crossings would provide full signal priority to the light rail train.

Even though D2A would operate at-grade throughout most of Segment D, the intersection LOS results would not noticeably change because the assumed roadway widening (to accommodate light rail) would replace the existing travel lanes and the light rail train would be able to safely travel through the intersections within the adjacent traffic signal phasing for vehicles. Additionally, disturbances to the signal coordination are expected to be minimized because light rail train detection would occur up to 1 minute prior to the train arriving at the intersection, thereby allowing non-light-rail signal phases to be served without dramatic adjustments to their signal timing.

Intersection operations would degrade noticeably only at the intersections of NE 24th Street and 151st Avenue NE and NE 24th Street and 152nd Avenue NE because of delays caused by the light rail train as it traverses through this short block. The cause of the impact at these two intersections is the signal phasing required to clear the potential queued vehicles along NE 24th Street, allowing an open a path for the train to proceed through. This, in addition to the changes required in signal phasing that restrict the northbound left and southbound right turn movements on 152nd Avenue NE when the train operations cross NE 24th Street, would cause noticeable impacts on intersection operations. Only at the NE 24th Street and 151st Avenue NE intersection are the operations expected to degrade to LOS F conditions.

Because D2E generally shares the same route as D2A, the intersection results are similar. Again, intersection operations would degrade noticeably only at the intersections of NE 24th Street and 151st Avenue NE and NE 24th Street and 152nd Avenue NE because of delays caused by the light rail train as it travels through this short block and affects the operations at these two adjacent intersections. The discussion on why the 151st Avenue NE and 152nd Avenue NE intersections degrade along NE 24th Street for D2A applies to D2E. Only the NE 24th Street and 151st Avenue NE intersection is expected to operate at LOS F.

The NE 20th Alternative (D3) would be at-grade or in a trench throughout most of Segment D. D3 along 152nd Avenue NE operates at-grade in the median, where it continues until it becomes side aligned to the north of Microsoft Road. By operating in the median on 152nd Avenue NE, the train would proceed with the north-south through movements, thereby minimizing the turning movement impacts at this intersection. In 2020, the intersection of NE 20th Street and 140th Avenue NE would operate at LOS F. In 2030, intersection operations also would degrade to LOS F at 148th Avenue NE and NE 20th Street. Otherwise, there would be little variation in intersection operations from the no-build condition.

D5 would be elevated throughout most of Segment D. To the west of 152nd Avenue NE, D5 would become at-grade and side aligned along 152nd Avenue NE. There would be little variation in intersection operations compared to the no-build condition.

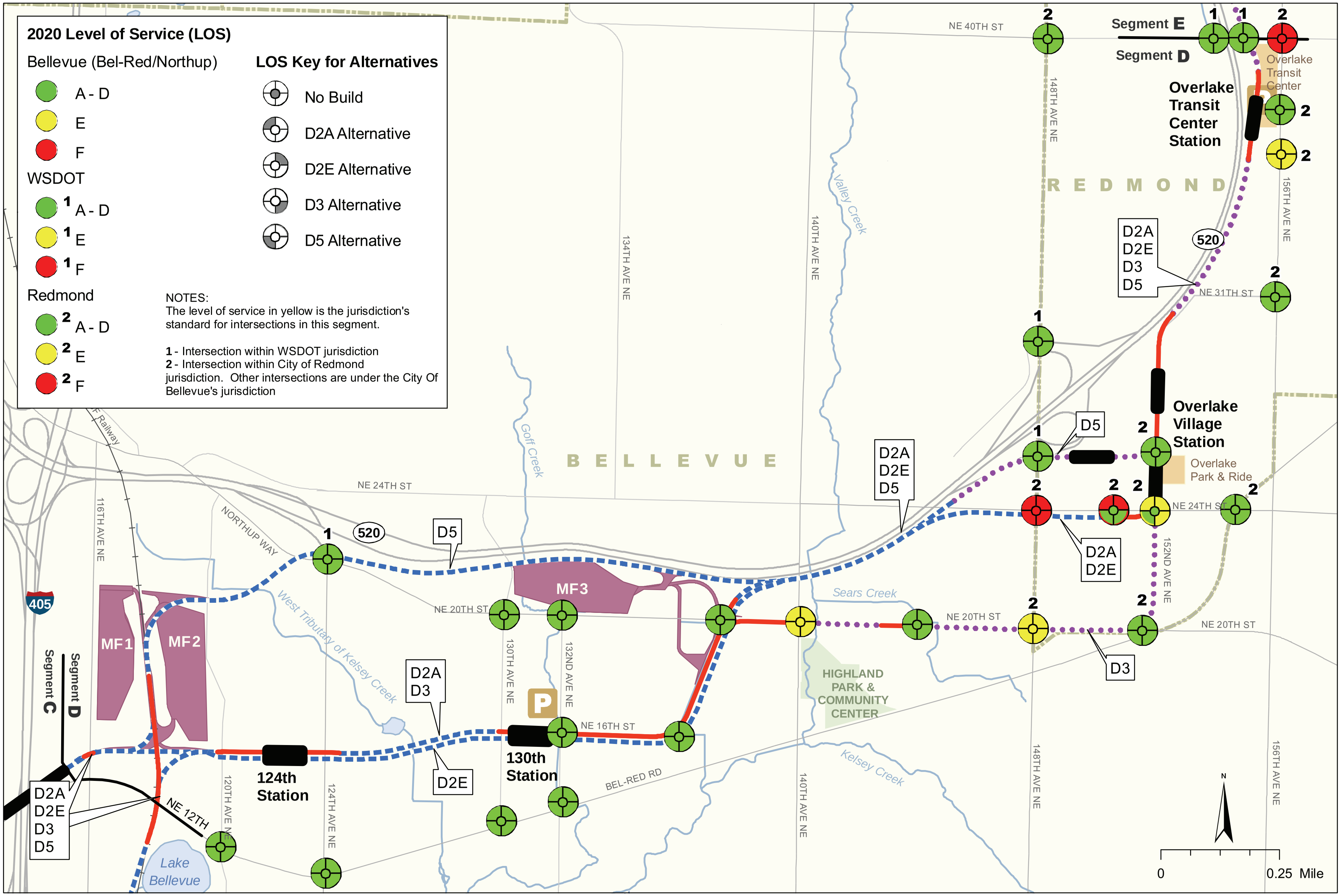
As indicated in the light rail ridership discussion (Section 4.3.3), the cities of Bellevue and Redmond have identified long-range plans that would increase the residential density and employment in Segment D. Much of these land use changes would include transit-oriented development around light rail stations that would encourage Bel-Red and Overlake residents, workers, and shoppers to access the stations by walking, bicycling, or taking transit. Even with these land-use changes, the number of vehicle trips generated by the project is expected to be similar because the park-and-ride lots at the East Link stations are assumed to be full. Therefore comparisons between the no-build and build conditions with these land use changes would be similar.

Exhibits 6-14 and 6-15 and Table D-11 in Appendix D provide 2020 and 2030 intersection PM peak hour LOS results for the no-build and build conditions.

Traffic Safety

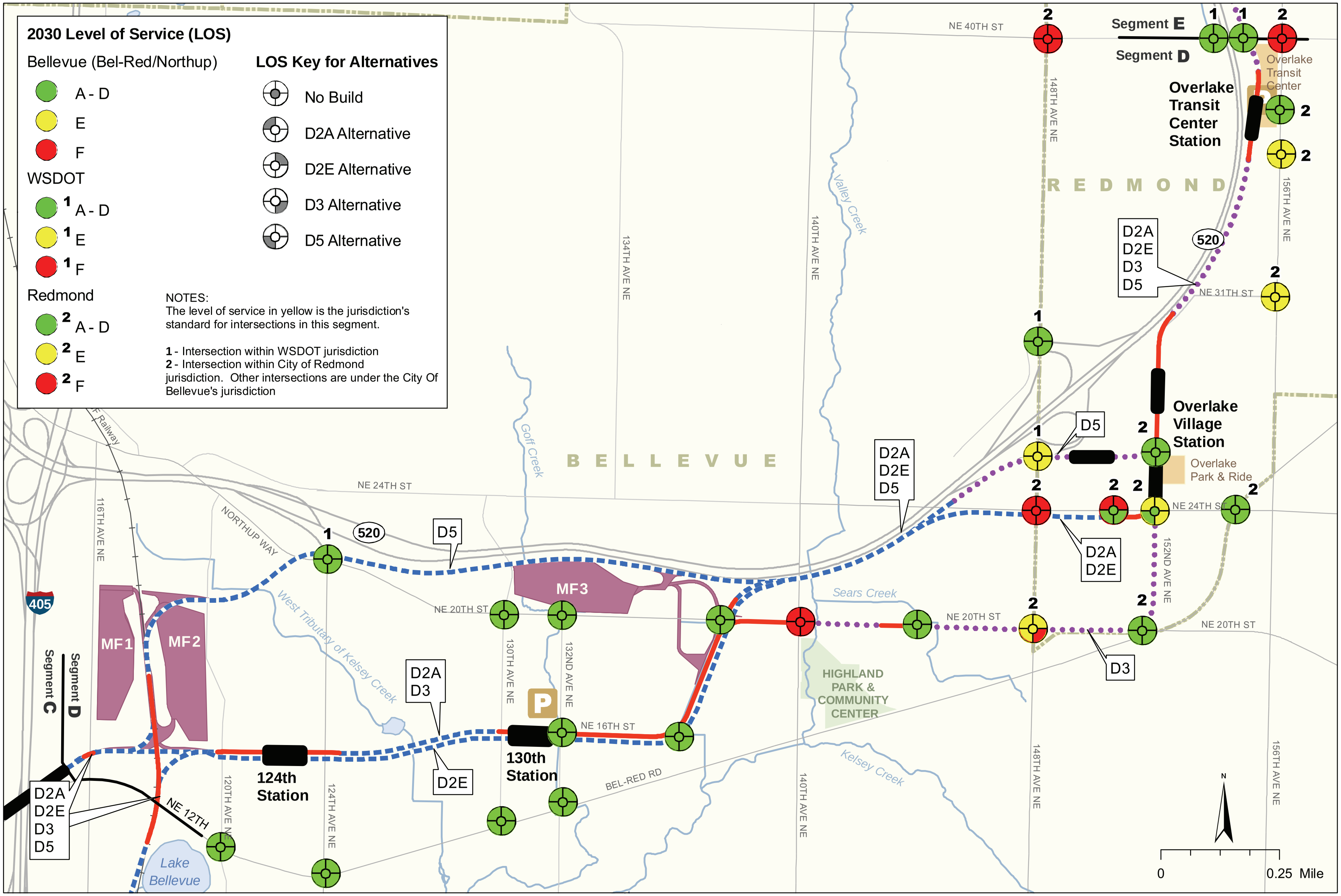
The expected safety impacts from the Segment D alternatives on arterial streets are described in Table 6-35. Identified safety assessments were based on the alternatives' design type and case study research relevant to East Link Project design conditions. D2E and D5 are expected to cause a minimal change in the roadway safety conditions because they mostly operate outside the roadway right–of-way. Because D2A and D3 would have portions of their lengths within the roadway right-of–way, there is a potential for accidents. However, by reducing the number of vehicle conflict points with protected turning movements and by restricting mid-block access over tracks, accident conditions are assumed to remain similar to current conditions or be slightly improved. Refer to Appendix F for information regarding findings from national research projects for the various design type assessed in East Link.

No substantial changes are expected in the accident frequency along the roadways surrounding the maintenance facilities in Segment D. The only maintenance facility in Segment D that would have track that crosses roadway is the SR 520 Maintenance Facility (MF3). The track access spurs off the main light rail track and crosses NE 20th Street. Light rail trains would not cross the road frequently and it would be protected with gates, so there would be no change to the roadway safety conditions.



Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

Exhibit 6-14 **2020 PM No Build and Build Level of Service at Intersections Segment D**
East Link Project



Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006) modified by CH2M HILL.

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Traction Power Substation
Proposed Station
Maintenance Facility and Access Track
New and/or Expanded Park-and-Ride Lot

Exhibit 6-15 **2030 PM No Build and Build Level of Service at Intersections Segment D**
East Link Project

TABLE 6-35
Segment D Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
D2A, NE 16th At-Grade	Connection from C3T, C4A, C7E, and C8E from 116th Avenue S to 124th Avenue NE	The only conflict points would be at-grade crossings with existing roadways at 116th, 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize traffic safety concerns. No substantial change in the number of accidents is expected.
	Connection from C1T and C2T from 120th Avenue NE to 124th Avenue NE	Only conflict points would be at-grade crossings with existing roadways at 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize traffic safety concerns. No substantial change in the number of accidents is expected.
	NE 16th Street & 136th Place NE from 130th Avenue NE to NE 20th Street	The existing section has no mid-block accidents that are expected to be prevented by addition of light rail tracks that prevent mid-block turns. Low-speed median alignments are expected to have the highest accident exposure, but less severe accidents. As such, total accident frequency in the track section may increase.
	NE 24th Street & 152nd Street from 151st Place NE to SR 520	The use of side alignment within the right-of-way but outside of the vehicle travel way would reduce the risk of collisions by separating traffic types. Furthermore, gates at vehicle-train crossings would reduce risk of collisions at these conflict points. No substantial change in the number of accidents is expected.
D2E, NE 16th Elevated	Connection from C3T, C4A, C7E and C8E at 116th Avenue S	The only conflict point would be the at-grade crossing with existing roadway. Use of gates at this intersection is expected to minimize traffic safety concerns.
	Connection from C1T and C2T from 120th Avenue NE to 124th Avenue NE	This connection would not have at-grade crossings with existing roadways as the track would be in a separate right-of-way. Therefore, no conflicts with vehicle traffic are expected.
	NE 24th Street & 152nd Avenue from 151st Place NE to SR 520	The use of side alignment within the right-of-way but outside of the vehicle travel way would reduce the risk of collisions by separating traffic types. Furthermore, gates at vehicle-train crossings would reduce risk of collisions at these conflict points. No substantial change in the number of accidents is expected.
D3, NE 20th	Connection from C3T, C4A, C7E and C8E from 116th Avenue S to 124th Avenue NE	The only conflict points would be at-grade crossings with existing roadways at 116th, 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize traffic safety concerns. No substantial change in the number of accidents is expected.
	Connection from C1T and C2T from 120th Avenue NE to 124th Avenue NE	The only conflict points would be at-grade crossings with existing roadways at 120th, 124th, and 130th avenues NE. Use of gates at these intersections is expected to minimize traffic safety concerns. No substantial change in the number of accidents is expected.
	NE 16th Street & 136th Place NE from 130th Avenue NE to 143rd Avenue NE	Although low-speed median alignments are expected to have the highest accident frequency (but less severe accidents), there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents. Three to four mid-block accidents that have occurred in this section over the last 5 years are expected to be prevented by the elimination of mid-block turns with the addition of light rail tracks.
	NE 20th Street & 152nd Avenue NE from 143rd Avenue NE to NE 24th Street	The addition of the light rail retained cut would prevent mid-block left turn movements. Use of retained cut would eliminate some existing conflicts between motorists, pedestrians and bicycles. Accident frequencies are expected to decrease in this section as two to three mid-block accidents over the last 5 years could be prevented.
	152nd Avenue from NE 24th Street to SR 520	.Although low-speed median alignments are expected to have the highest exposure to accidents (but less severe accidents), there is the potential to reduce the overall accident frequency by eliminating mid-block rear-end and turning accidents. Over the last 5 years three to four mid-block accidents that have occurred in this section are expected to be prevented by the elimination of mid-block turns with the addition of light rail tracks.
D5, SR 520	Connection from C3T, C4A, C7E and C8E at 116th Avenue S	The only conflict point is the at-grade crossing with the existing roadway at 116th Avenues NE. Use of gates at this intersection is expected to minimize traffic safety concerns.
	Connection from C1T and C2T through proposed maintenance facilities	This connection would not have at-grade crossings with existing roadways as the track would be in a separate right-of-way. Therefore, no conflicts with vehicle traffic are expected.
	152nd Avenue from 151st Place NE to SR 520	The only conflict point is the at-grade crossing with the existing roadway. Use of gates at this intersection is expected to minimize traffic safety concerns. Otherwise, the use of side alignment within the right-of-way but outside the vehicle travel way would reduce the risk of collisions by separating traffic types.

Parking

The parking impacts associated with the proposed alternatives and stations in Segment D are discussed in this section. Table 6-36 summarizes the impacts by alternative. Table 6-37 summarizes the impacts associated with the area covered by each station.

Parking impacts were quantified by overlaying a map of existing property boundaries on the alternatives. The number of on-street and off-street parking spaces that would be affected by each alternative was determined by counting the number of existing parking spaces that fall within the proposed limits of improvements. Parking spaces within properties that are entirely occupied by the proposed alternatives were not counted, because the demand for these spaces would be removed if the land use is displaced.

The number of parking spaces that are expected to be removed with any of the alternatives in Segment D ranges from 0 to 30 on-street parking spaces and 239 to 816 off-street parking spaces. D5 is expected to impact the fewest parking spaces of the four alternatives in Segment D. This alternative would require the removal of 239 off-street parking spaces and no on-street parking spaces. The alternative affecting the most parking spaces in Segment D is D3, which would require the removal of at least 808 off-street parking spaces. The largest unique contributor to the relatively high number of affected off-street parking spaces associated with D3 is a commercial space on the northwest corner of the intersection of NE 20th Street and 152nd Avenue NE, which would lose approximately 100 parking spaces. An adjacent shopping center, on the northeast corner of the intersection of NE 20th Street and 148th Avenue NE, is expected to lose 55 parking spaces under D3. D3 also would require the removal of off-street parking spaces on multiple properties located along 152nd Avenue NE between NE 20th Street and NE 24th Street. D2A, D2E, and D3 would also affect the parking provided at the light industrial properties on the southwest end of Segment D near 120th Avenue NE between NE 14th Street and NE 15th Street.

D2A and D3 are expected to require the removal of 30 on-street parking spaces located on the north side of NE 16th Street between 132nd Avenue NE and 134th Avenue NE, and on the east side of 136th Avenue NE between NE 16th Street and NE 20th Street. No impacts on on-street parking are anticipated with D2E and D5.

As shown in Table 6-37, the only station designs that are expected to have no impact on parking spaces are the designs for the 124th and Overlake Transit Center stations. The 124th Station, however, would require the removal of several buildings located between 120th Avenue NE and 124th Avenue NE, near NE 14th Street. The 130th Station would affect 10 parking spaces if designed for D2A, D2E, and D3. The design associated with D2E also would require the removal of an additional 10 parking spaces, for a total of 20 removed off-street parking spaces. All affected parking spaces would be located within private off-street parking lots between 130th Avenue NE and 132nd Avenue NE, near NE 16th Street.

TABLE 6-36
Segment D Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed	
	On-Street	Off-Street [a]
D2A, NE 16th At-Grade	30	376-382
D2E, NE 16th Elevated	0	348-356
D3, NE 20th	30	808-816
D5, SR 520	0	239

[a] The range of off-street parking removal is related to connectors with Segment C.

Note: Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.

TABLE 6-37
Segment D Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
124th	D2A, D2E, D3	0	Businesses between 120th Avenue NE and 124th Avenue NE in the vicinity of NE 14th Street
130th	D2A, D3	10	Private off-street parking lots between 130th Avenue NE and 132nd Avenue NE in the vicinity of NE 16th Street
	D2E	20	
Overlake Village	D2A, D2E	40	Private off-street lots on the northwest corner of the intersection of NE 24th Street and 152nd Avenue NE
	D3	100	Private off-street lots along 152nd Avenue NE, north of NE 24th Street
	D5	20-40	Private off-street parking lots northwest of the intersection of NE 24th Street and 152nd Avenue NE
Overlake Transit Center	D2A, D2E, D3, D5	0	None

Notes: Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

Parking impacts shown are only those associated with the area covered by the station.

The design of the Overlake Village Station would require the removal of 40 parking spaces located in private off-street parking lots on the northwest corner of the intersection of NE 24th Street and 152nd Avenue NE for D2A and D2E. D5 would affect the same private parking lots, but the number of affected parking spaces would vary between 20 and 40 depending on which of the two proposed station locations is chosen. The design of the Overlake Village Station associated with D3 requires the removal of approximately 100 parking spaces located in private lots along 152nd Avenue NE north of NE 24th Street.

At the Overlake Village and Overlake Transit Center stations, there is the potential for parking spillover as the future parking demand is higher than the station's parking capacity, as shown in Table 6-38. The Overlake Village Park-and-Ride Lot is not planned to be expanded with the East Link Project and currently accommodates slightly over 200 vehicles. The Overlake Transit Center lot would be expanded with the project to approximately 320 stalls. Both stations are expected to have at least 100 more vehicles trying to use these lots than can be accommodated. By 2030, the Overlake Transit Center expects additional park-and-ride demand that could further increase the potential for spillover. However, because there is a minimal amount of available on-street parking surrounding these stations (see Table 6-12), there is a low potential for hide-and-ride impacts. Potential spillover from the Overlake Transit Center could affect private parking at nearby businesses; however, these parking lots are currently monitored. Therefore hide-and-ride activity is expected to be low.

TABLE 6-38
Segment D Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Auto Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Auto Demand[a]	2030 Park-and-Ride Auto Demand[a]
130th	D2A, D2E, D3	--	300	240	290
Overlake Village	All D Alternatives	203	203	280	480
Overlake Transit Center	All D Alternatives	170	320	430	570

[a] 3-hour PM peak-period park-and-ride auto demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

At the 124th Station, there is available on-street parking surrounding the station, indicating a high potential for hide-and-ride impacts.

The park-and-ride capacity at the 130th Station in years 2020 and 2030 is not forecasted to be fully utilized; therefore, there is a low potential for parking spillover to occur. Additionally, there is a minimal amount of available on-street parking available for hide-and-ride to occur.

In Segment D, because there are numerous private parking lots surrounding the stations, measures such as security enforcement or time-limited parking by private owners would minimize the potential for hide-and-ride activities.

Property Access and Circulation

Impacts on property access and circulation in Segment D are expected to be focused along NE 16th Street, NE 20th Street, and 152nd Avenue NE. Most of the alternatives are outside the roadway right-of-way within the Bel-Red area.

With any of the Segment D connections to C3T, C4A, C7E and C8E, the gated crossing of 116th Avenue NE is not anticipated to create substantial vehicle queues; however, driveways adjacent to the track crossing may require turn restrictions. Traffic volume forecasts indicate adequate spacing between the gated crossing and NE 12th Street for northbound vehicle storage. In the southbound direction, the traffic volume forecasts are higher than in the northbound direction, but substantial vehicle queues are not anticipated when considering the time it would take for the train to safely cross the street.

D2A and D2E would have similar access and circulation impacts, except along NE 16th Street and 136th Avenue NE. In D2A, the route on these two short street segments would be at-grade in the median; therefore, driveway movements would be restricted to allow only right-turn-in, right-turn-out movements. To minimize access and circulation impacts, U-turn movements would be provided at the three nearby signalized intersections: 132nd Avenue NE and NE 16th Street, 136th Avenue NE and NE 16th Street, and 136th Avenue NE and NE 20th Street. In D2E, the route is elevated along the side of NE 16th Street and 136th Avenue NE, minimizing impacts on property access and circulation.

In both of these alternatives, driveway access on the south side of NE 24th Street between 148th Avenue NE and 151st Place NE would be removed to prevent vehicles from crossing the at-grade track. Internal circulation within properties would be modified to allow access via 148th Avenue NE and/or 151st Place NE. Similarly, western access to and from the business park along 152nd Avenue NE between NE 24th Street and NE 28th Street would be closed, and vehicle circulation within surrounding office parks would likely reroute vehicle entry and egress onto 151st Place NE.

D3 would have impacts on access and circulation along NE 16th Street and 136th Avenue NE similar to those of D2A, but D3 would have the most property access and circulation issues because it would operate in the median along NE 20th Street. This would prohibit all mid-block left-turn movements (unsignalized locations) along this arterial between 136th Avenue NE and 152nd Avenue NE. These movements would either redistribute to the signalized intersections and perform a U-turn movement at 140th Avenue NE, Ross Plaza (approximately 143rd Avenue NE), and at 148th Avenue NE intersections, or drivers would readjust their travel patterns and use the surrounding streets. North of NE 20th Street, D3 proceeds along 152nd Avenue NE within the median in an at-grade profile. This also would prohibit mid-block left-turn movements and potentially relocate the U-turn movements to the signalized intersections of NE 24th Street and NE 26th Street. The western property access along 152nd Avenue NE, between NE 24th Street and NE 28th Street, would remain, but only allow right turns in and right turns out of the driveways. Vehicles also would be able to recirculate north of NE 28th Street because of the NE 36th street extension and associated improvements.

D5 would have the least property access and circulation impacts because most of the alternative is outside of the roadway right-of-way. Similar to D2A and D2E, the western driveway access along 152nd Avenue NE between NE 26th Street and NE 28th Street would be closed and vehicle circulation would be rerouted to 151st Place NE.

For all alternatives, internal vehicle circulation at the Overlake Transit Center would be reconfigured as a result of a new internal road that separates vehicles from the light rail station platform. However, access to the Overlake Transit Center would be maintained, and internal circulation impacts are not expected to be substantial.

Maintenance Facilities

The three maintenance facility sites in Segment D are not expected to substantially affect intersection operations, property access, or traffic or nonmotorized circulation. Vehicular access to the 116th Maintenance Facility (MF1) and BNSF Maintenance Facility (MF2) would be located off 120th Avenue NE by way of an access road. The access road also would provide connectivity to the maintenance facility parking. Vehicular access to the SR 520 Maintenance Facility (MF3) would be located on NE 20th Street, and track access would spur off the main light rail track route running parallel to 136th Place NE. For D2A, vehicles traveling southbound on 136th Place NE and eastbound and westbound on NE 20th would be gate controlled when light rail train vehicles access MF3. Existing driveway access on NE 20th Street between 132nd Avenue NE and 136th Place NE would be limited or signalized at specific locations.

The alternative maintenance facilities in Segment D would have approximately 60 parking stalls for the employees and visitors. Maintenance facility staff shift hours would be similar to Central Link operation and maintenance facilities: 6:00 a.m. to 2:00 p.m. and 2:00 p.m. to 10:00 p.m. These shift hours occur outside the peak periods, so little shift in traffic is expected to occur during the peak hour. Less than 10 vehicle trips would occur to and from the maintenance facility in peak periods. These trips would include visitors and deliveries to and from the maintenance facility.

Interim Terminus Stations

The 124th, 130th, Overlake Village, and Overlake Transit Center stations are potential interim termini. Most of the interim terminus stations did not have a substantial increase in ridership and further traffic analysis is not warranted.

As an interim terminus, the 124th Station would generate 20 additional peak-hour auto trips in year 2020 and 30 additional auto trips in 2030. The 130th Station, as an interim terminus, would generate eight additional peak-hour auto trips in years 2020 and 2030. The Overlake Village Station, as an interim terminus, would generate 48 additional peak-hour bus trips in years 2020 and 2030. As an interim terminus, The Overlake Transit Center Station would generate 12 additional peak-hour bus trips in years 2020 and 2030. This increase in bus service would be mainly from the north along 156th Avenue NE. Table 6-21 shows the PM peak-hour interim terminus trip generation for each of these potential interim termini.

Although the Overlake Transit Center and Overlake Village stations both show increases in ridership (see Table 6-20), only the Overlake Village Station is expected to generate trips to warrant further impact analysis. At both stations, auto trips did not show substantial increases. Increased bus service to the Overlake Village Station as an interim terminus would be substantial. Because the additional ridership at the Overlake Village Station would be largely composed of people using bus service, the impact on vehicle operations would be minimal. Therefore, increases in vehicle delay under interim terminus conditions when compared to the alternative routes would be negligible, and no change in intersection LOS is expected. The increase in bus service at the Overlake Village Station would be mainly routes to and from the north along 156th Avenue NE. Table 6-39 shows the build and no-build intersection LOS and delay results at the Overlake Village interim terminus station.

6.3.2.5 Segment E

In Segment E in Downtown Redmond, Cleveland Street and Redmond Way operate as a one-way couplet with traffic operating eastbound and westbound, respectively, in existing conditions. Two travel lanes with turn pockets are provided on Cleveland Street, and three travel lanes are provided on Redmond Way. In the no-build condition, these two streets are planned to be converted to two-way operations with Redmond Way providing one through lane and one left-turn pocket in both eastbound and westbound directions at intersections and Cleveland Street providing one lane in the eastbound and westbound directions. Additionally, right-turn pockets will be provided for the eastbound and westbound approach at the intersection of Redmond Way and 164th Avenue NE. In the no-build condition, Bear Creek Parkway and 161st Avenue NE will be extended to intersect south of the BNSF Railway right-of-way. Appendix A presents the complete list of roadway and intersection projects assumed in 2020 and 2030 for Segment E.

Segment E alternatives directly interact with WSDOT intersections at Redmond Way (SR 908). In cities with more than 25,000 in population, WSDOT generally has jurisdiction over and responsibility for pavement structure, channelization and traffic control devices (type and location), and mobility. All study intersections within Segment E have been identified as owned and operated by the City of Redmond, with the exception of the three

TABLE 6-39
2020 and 2030 PM Peak-Hour Intersection LOS at Overlake Village Interim Terminus

Intersection	2020				2030			
	Build		Interim Terminus		Build		Interim Terminus	
	LOS	Delay[a]	LOS	Delay[a]	LOS	Delay[a]	LOS	Delay[a]
NE 40th Street & SR 520 Westbound Ramps	C	22.9	C	23.0	C	27.0	C	27.2
NE 40th Street & SR 520 Eastbound Ramps	B	18.6	B	17.3	D	40.2	D	44.0
NE 40th Street & 156th Avenue NE	**F**	**95.7**	**F**	**95.8**	**F**	**134.5**	**F**	**134.9**
Overlake P&R Entrance & 156th Avenue NE	C	22.7	C	23.0	D	43.4	D	43.8
NE 36th Street & 156th Avenue NE	E	67.0	E	67.1	E	79.1	E	79.2
NE 31st Street & 156th Avenue NE	D	44.3	D	50.8	E	66.3	E	71.8

[a] Delay shown in terms of seconds per vehicle.

Notes:
P&R = park-and-ride lot

All project alternatives affected by the interim terminus would operate at the same LOS and delay. Text in bold indicates intersections that do not meet the jurisdiction's intersection LOS standards.

SR 520 ramp terminal intersections. Responsibility for pavement design for an at-grade crossing of SR 908, new signal installations (for light rail, vehicles, or pedestrians) on SR 908, and channelization revisions on SR 908 (curb-to-curb) would be determined by the City of Redmond and WSDOT. Other responsibilities may include reviewing level of service of SR 908 to make sure no substantial degradation occurs with any proposed changes.

Traffic Control

The Redmond Way Alternative (E1) would travel along the BNSF corridor through Downtown Redmond before serving the SE Redmond Station, resulting in fewer traffic control modifications or treatments than the other alternatives (Table 6-40). With this alternative, gates for light rail operations would replace the existing railroad gates and serve as traffic controls at locations where they are absent along the BNSF corridor. Traffic controls for intersections for Leary Way Alternative (E4) primarily would include replacing existing railroad gates with light rail gates and signals similar to E1. The Redmond Way (E1) and Leary Way (E4) alternatives would not affect the roadway channelization and pedestrian facilities that are maintained along the Segment E roadways.

The Marymoor Alternative (E2) would have the highest number of traffic control treatments because it would travel into Downtown Redmond at-grade with the track center running along 161st Avenue NE between Cleveland Street and NE 85th Street to serve the Redmond Transit Center. The through lanes and pedestrian facilities on 161st Avenue NE would be maintained with E2. At the intersections of 161st Avenue NE and Redmond Way and NE 83rd Street, a northbound left-turn movement would not be provided because of right-of-way and station constraints. The southbound approach would maintain an exclusive left-turn lane at both intersections. Northbound vehicles on 161st Avenue NE desiring to perform a left-turn movement would need to reroute their travel pattern or travel north to NE 85th Street. If E2 terminates at the Redmond Town Center Station, no traffic control measures would be implemented west of the Redmond Town Center station and channelization on 161st Avenue NE would be consistent with the no-build condition.

Operations and Level of Service

As traffic volumes increase in 2020 and 2030, the no-build intersection LOS results for the PM peak hour will worsen from existing operations. In the year 2020, four intersections are expected to operate at LOS F during the PM peak hour: NE Leary Way and West Lake Sammamish Parkway, NE 76th Street and Bear Creek Parkway, Avondale Road NE and Union Hill Road, and SR 202 and E Lake Sammamish Parkway (180th Avenue NE). The intersections of NE Leary Way and West Lake Sammamish Parkway, Avondale Road NE and Union Hill Road, and SR 202 and East Lake Sammamish Parkway already operate at LOS F in existing condition. The NE 76th Street and Bear Creek Parkway intersection is unsignalized in the existing and future conditions. By year 2030, the intersections of SR 202 and SR 520 eastbound off-ramp and NE 85th Street and 164th Avenue NE are also expected to operate at LOS F.

TABLE 6-40
Segment E Traffic Control

Alternative/Control Location	Existing Control	Proposed Control
E1, Redmond Way		
BNSF & 161st Avenue NE	None	Light rail gates
BNSF & NE Leary Way	Railroad gates	Light rail gates
BNSF & 164th Avenue NE	None	Light rail gates
BNSF & 166th Avenue NE	Railroad gates	Light rail gates, install signal
BNSF & 170th Avenue NE	Railroad gates	Light rail gates, install signal
E2, Marymoor		
BNSF & 170th Avenue NE	Railroad gates	Light rail gates
BNSF & 166th Avenue NE	Railroad gates	Light rail gates, replace signal
BNSF & NE Leary Way	Railroad gates	Light rail gates, replace signal
BNSF & 161st Avenue NE	None	Light rail gates
BNSF & 164th Avenue NE	None	Light rail gates
SR 202 & 161st Avenue NE	Signal	Install signal
NE 80th Street & 161st Avenue NE	Signal	Replace signal
NE 83rd Street & 161st Avenue NE	Signal	Install signal
NE 85th Street & 161st Avenue NE	Signal	Install signal
E4, Leary Way		
Bear Creek Parkway & Leary Way	Signal	Light rail gates, replace signal
NE 76th Street	None	Light rail gates
BNSF & 164th Avenue NE	None	Light rail gates
BNSF & 166th Avenue NE	Railroad gates and signal	Light rail gates, replace signal
BNSF & 170th Avenue NE	Railroad gates	Light rail gates, replace signal

Within Segment E, all light rail train at-grade traffic crossings would give full signal priority to the light rail train, with the exception of the E2 route along 161st Avenue NE through Downtown Redmond, which would give partial signal priority to the light rail train.

E1 would have at-grade crossings at the 161st Avenue NE, NE Leary Way, 164th Avenue NE, 166th Avenue NE, and 170th Avenue NE. Otherwise, this alternative would operate independently from vehicle traffic. Intersection operations would degrade at SR 202 and NE 70th Street, SR 202 and SR 520 eastbound ramp, Redmond Way and 161st Avenue NE, NE 70th Street at 176th Avenue NE, 166th Avenue NE and Cleveland Street, and SR 202 and SR 520 westbound ramp intersections; otherwise, intersections would operate similarly to the no-build condition. The increased delay at these intersections is because of additional volumes from the SE Redmond Station, with the exception of Redmond Way and 161st Avenue NE and 166th Avenue NE and Cleveland Street. Although these intersections are expected to have noticeable LOS changes in the year 2020, none are expected to operate at LOS F. In year 2030, all of these intersections, except 166th Avenue NE and Cleveland Street and SR 202 and SR 520 westbound ramp, are expected to operate at LOS F because of the to the increase in traffic associated with the SE Redmond Park-and-Ride Lot.

E2 would parallel SR 520 to the SE Redmond Station. The alternative would then operate at-grade along the existing BNSF Railway right-of-way and have at-grade crossings at 161st Avenue NE, NE Leary Way, 164th Avenue NE, 166th Avenue NE, and 170th Avenue NE. The alternative would transition from the BNSF Railway right-of-way to at-grade median on 161st Avenue NE between Cleveland Street and NE 85th Street. The intersection operations for this alternative would be similar to those of E1, except at the NE 83rd Street and 161st Avenue NE intersection. This intersection is expected to operate at LOS D and E in years 2020 and 2030 because of the roadway modifications along 161st Avenue NE as part of the median track alignment. The explanations for the intersections that have noticeable changes in intersection LOS in E1 apply to E2. If E2 terminates at the Redmond Town Center Station, intersection operations would be similar to E1.

E4 would have at-grade crossings at 164th Avenue NE, 166th Avenue NE, 170th Avenue NE, and Bear Creek Parkway. Intersection operations in this alternative would be similar to those of E1, except at the NE 70th Street and 176th Avenue NE intersection. This intersection is expected to degrade to LOS F because of the configuration of its stop approaches in relationship to the station access locations. The explanations for the intersections that have noticeable changes in intersection LOS in E1 apply to E4. In all Segment E alternatives, the intersection LOS results are expected to improve near the Beak Creek Park-and-Ride Lot because a substantial number of transit users would relocate to the SE Redmond Station and use the light rail service.

Exhibits 6-16 and 6-17 and Table D-12 in Appendix D provide 2020 and 2030 intersection LOS results for the PM peak hour in the no-build and build conditions.

Traffic Safety

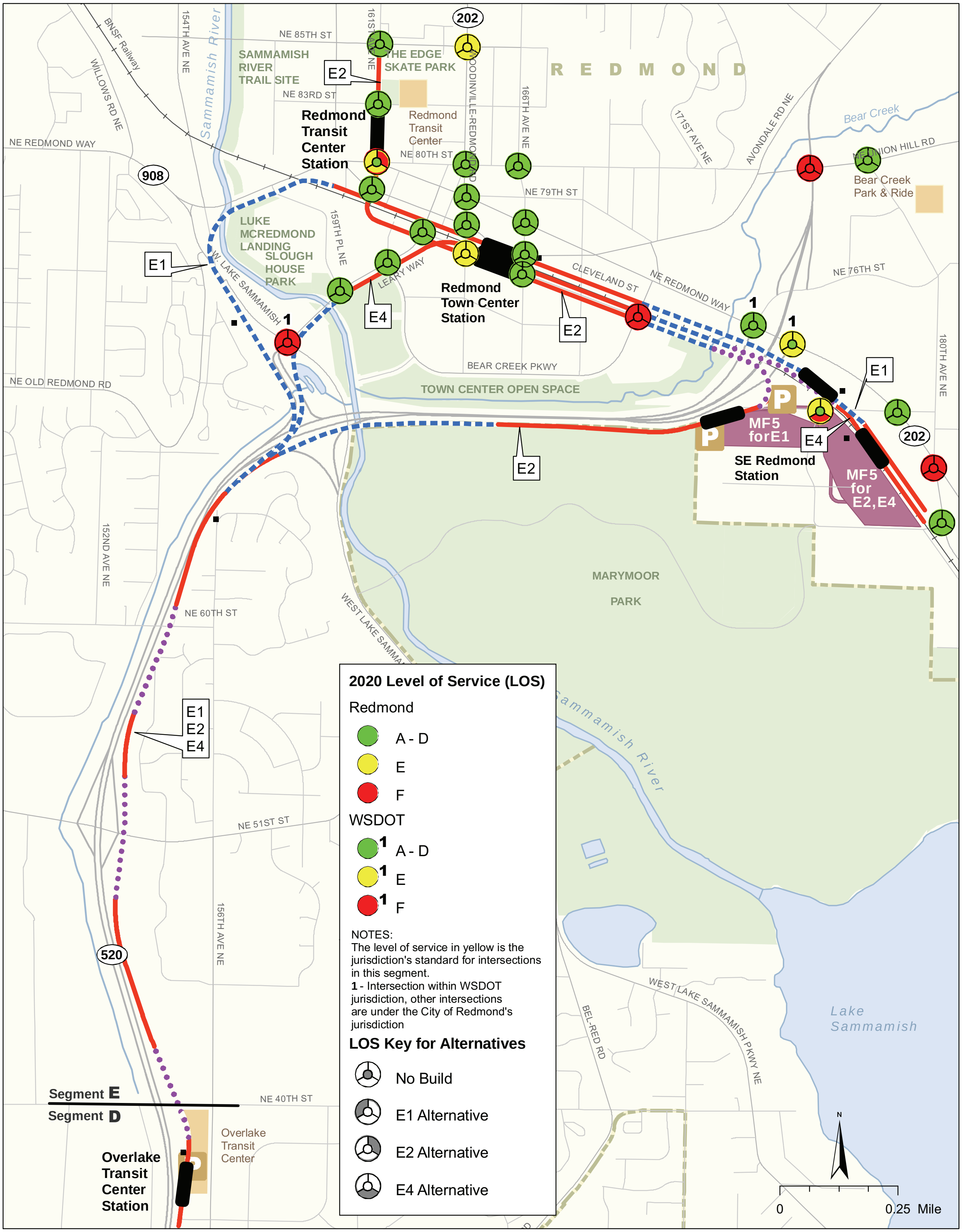
The expected safety impacts that the Segment E alternatives would have on arterial streets are described in Table 6-41. Identified safety assessments were based on the alternative's design type and case study research relevant to East Link Project design conditions. E1 and E4 are expected to cause a minimal change in roadway safety conditions because they mostly operate outside the roadway right-of-way. E2 potentially could be exposed to more accidents with the median route, but the reduced number of conflict points along 161st Avenue NE and the protection of traffic movements across the tracks would provide a safety benefit. Overall, it is expected that the accident frequency would not substantially change, and any accidents that occur in the median at-grade section likely would be relatively minor accidents because of the low speed of light rail as it is entering/exiting the station. If E2 terminates at the Redmond Town Center Station, this alternative would have roadway safety conditions similar to E1 and E4. Appendix E provides information regarding findings from national research projects for the various design types assessed for East Link.

No substantial changes are expected in the accident frequency along the roadways surrounding the maintenance facility in Segment E. The SE Redmond Maintenance Facility (MF5), the only maintenance facility in Segment E, would have track crossing NE 70th Street. The light rail train would not cross this road frequently, and it would be protected with gates, so there would be no change in the roadway safety conditions.

Parking

The parking impacts associated with the alternative routes and stations in Segment E are discussed in this section. Table 6-42 summarizes the impacts by alternative. Table 6-43 summarizes the impacts associated with the area covered by each station.

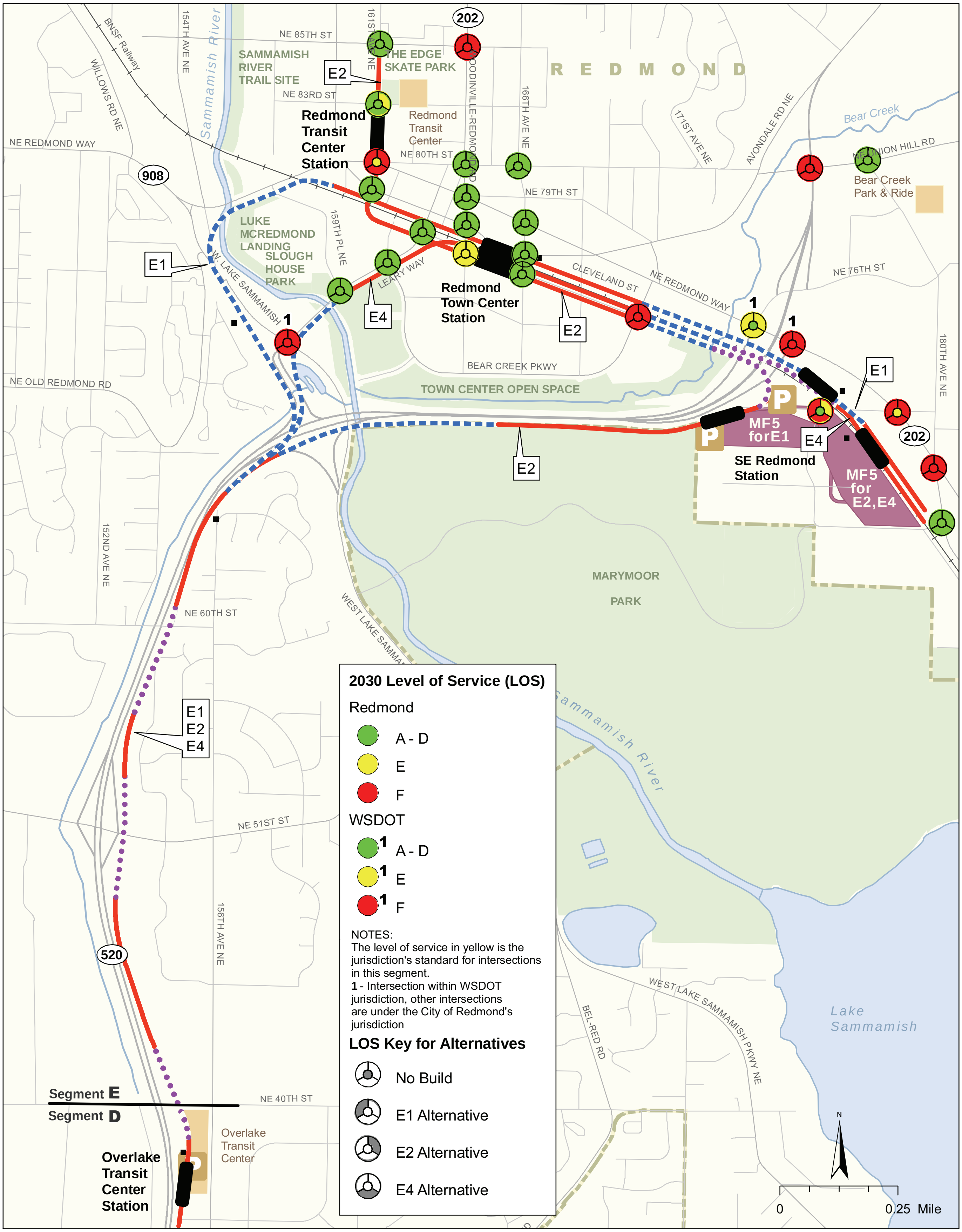
Parking impacts were quantified by overlaying a map of existing property boundaries on the alternatives. The number of on-street and off-street parking spaces that would be affected by each alternative was determined by counting the number of existing parking spaces that fall within the proposed limits of improvements. Parking spaces within properties that are entirely occupied by the alternatives were not counted because the demand for these spaces would vanish when the property is cleared.



Source: Data from City of Redmond (2005) and King County (2006) modified by CH2M HILL.

- Traction Power Substation
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Maintenance Facility and Access Track
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-16 **2020 PM No Build and Build Level of Service at Intersections Segment E**
East Link Project



Source: Data from City of Redmond (2005) and King County (2006) modified by CH2M HILL.

- Traction Power Substation
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route
- Proposed Station
- Maintenance Facility and Access Track
- New and/or Expanded Park-and-Ride Lot

Exhibit 6-17 **2030 PM No Build and Build Level of Service at Intersections Segment E**
East Link Project

TABLE 6-41
Segment E Alternative Safety Assessment

Alternative	Track Section in Right-of-Way	Safety Assessment
E1, Redmond Way	NE 76th Street from Redmond Way to 170th Avenue NE	The use of side-aligned trackway within the right-of-way but outside the vehicle travel way would reduce the risk of collisions by separating traffic types. Furthermore, gates at vehicle-train crossings would reduce risk of collisions at these conflict points. No substantial change in the number of accidents is expected.
E2, Marymoor	NE 76th Street from 170th Avenue NE to 161st Avenue NE	The use of side-aligned trackway within the right-of-way but outside the vehicle travel way would reduce the risk of collisions by separating traffic types. Furthermore, gates at vehicle-train crossings would reduce risk of collisions at these conflict points. No substantial change in the number of accidents is expected.
	161st Avenue from Bear Creek Parkway to NE 85th Street	Existing section has relatively few mid-block accidents that would be expected to be prevented by addition of light rail tracks that would prevent mid-block left turn movements. Low-speed median alignments are expected to have the highest exposure to accidents, but less-severe accidents.
E4, Leary Way	NE Leary Way & NE 76th Street from Bear Creek Parkway to 170th Avenue NE	The use of side-aligned trackway within the right-of-way but outside the vehicle travel way would reduce the risk of collisions by separating traffic types. Furthermore, gates at vehicle-train crossings would reduce risk of collisions at these conflict points. No substantial change in the number of accidents is expected.

TABLE 6-42
Segment E Parking Impacts Summary by Alternative

Alternative	Parking Spaces Removed		
	Unrestricted On-Street	Restricted On-Street[a]	Off-Street
E1, Redmond Way	0	0	37
E2, Marymoor	14	2	94
E4, Northeast Leary Way	0	0	45

Note
Indicated parking impacts are permanent displacements. Parking losses associated with construction are not included in this summary.

[a] Restricted parking includes all parking spaces with special-use restrictions, such as drop-off/loading zones.

TABLE 6-43
Segment E Parking Impacts Summary by Station

Station	Associated Alternatives	Spaces Removed	Area Affected by Development
Redmond Town Center	E1, E2, E4	0	None.
SE Redmond	E1, E2	0	Several entire parcels will be acquired near the intersection of NE 70th Street and 176th Avenue NE.
	E4	0	None.
Redmond Transit Center	E2	30	Private off-street parking lots along the west side of 161st Avenue NE, between NE 80th Street and NE 83rd Street.

Notes:
Parking impacts shown are permanent displacements. Parking losses associated with construction staging are not included in this summary.

Parking impacts shown are only those associated with the area covered by the station.

E2 would have the greatest impact on parking of the three Segment E alternatives. A total of 94 off-street private parking spaces and 16 on-street public parking spaces would be removed under E2. All of the removed on-street public parking spaces would be located along 161st Avenue NE between NE 83rd Street and NE 85th Street. Two of the parking spaces prohibit parking longer than 15 minutes. If E2 terminates at Redmond Town Center Station, the 16 on-street parking spaces along 161st Avenue NE would not be removed. E1 and E4 are expected to have no impact on on-street parking but would affect between 37 and 45 off-street parking spaces, respectively. All three alternatives would require the removal of 16 parking spaces located in a private parking lot on the southwest corner of the intersection of NE 40th Street and 156th Avenue NE.

As shown in Table 6-43, the only station that would require the removal of parking spaces in Segment E is the Redmond Transit Center Station associated with E2. This station would require the removal of 30 off-street parking spaces in lots located along the west side of 161st Avenue NE between NE 80th Street and NE 83rd Street. If E2 terminates at Redmond Town Center Station, the 30 off-street parking spaces removed with the Redmond Transit Center Station would not occur The design for the SE Redmond Station in E1 and E2 would require the acquisition of several entire parcels near the intersection of Northeast 70th Street and 176th Avenue NE, but the demand for the parking spaces located on these parcels would be removed if the existing land use is displaced.

At the two stations with park-and-ride lots, Redmond Transit Center and SE Redmond, the expected auto demand is less than the available parking capacity, as shown in Table 6-44; therefore, there is a low potential for parking spillover to occur. Additionally, because of the low amount of on-street parking near the SE Redmond Station, there likely would not be a substantial hide-and-ride impact at this station if the parking demand exceeded the park-and-ride capacity. At the Redmond Town Center Station, which does not have a proposed park-and-ride lot and which has a substantial amount of available on-street parking surrounding the station, there is a high potential for hide-and-ride impacts. However, the City of Redmond is planning to implement a restricted (time-limited) parking policy in the future in the downtown area. This would limit opportunities for hide-and-ride parking. Hide-and-ride parking also could occur in the neighboring retail center. This development has already implemented security enforcement, which minimizes the potential for hide-and-ride activities in this location.

TABLE 6-44
Segment E Existing and Proposed Park-and-Ride Parking Stalls and Forecasted Park-and-Ride Auto Demand

Station	Alternative	Total Existing Parking Stalls	Total Proposed Parking Stalls	2020 Park-and-Ride Auto Demand[a]	2030 Park-and-Ride Auto Demand[a]
SE Redmond	All E Alternatives	--	1,400	750	990
Redmond Transit Center	E2	377	377	140	200

[a] 3-hour PM peak-period park-and-ride auto demand. 3-hour PM peak period is a close representation of daily park-and-ride demand.

Property Access and Circulation

Alternatives in Segment E include at-grade, elevated, and retained-cut profiles. The general route travels parallel to SR 520 for a large portion of the segment length and therefore would not affect any property access. Additionally, the alternatives use a substantial portion of existing BNSF Railway right-of-way parallel to NE Redmond Way, so property access to the Redmond Town Center and surrounding businesses and circulation would not be affected.

E1 would have minimal impact on property access and circulation because the alternative would operate almost fully outside the roadway right-of-way. Properties with access on the south side of Redmond Way near the 159th Place NE intersection may have their access altered to accommodate this alternative. West Lake Sammamish Parkway and the BNSF Railway right-of-way would be modified to accommodate the tracks along the road.

E2 would have slightly more impact on property access and circulation because this alternative would proceed at-grade in the median of 161st Avenue NE between Cleveland Street and NE 85th Street. Mid-block property access would be restricted to allow only right turns in and out of the driveways. To minimize vehicle recirculation, NE 83rd Street and 161st Avenue NE would be signalized, and U-turn movements would be allowed at the intersection of NE 85th Street and 161st Avenue NE. If E2 terminates at the Redmond Town Center Station, property access and circulation impacts would not occur along 161st Avenue NE. E4 also would have minimal impact on property access and circulation because the alternative operates almost fully outside the roadway right-of-way. Potentially one access to a residential property along the south side of Leary Way, just west of the Sammamish River, would be modified to accommodate the tracks along the road.

A service access road would be constructed near the SR 520 eastbound on-ramp and West Lake Sammamish Parkway to allow access to a traction power substation. However, this access point would be used by service vehicles only, and it is not expected to affect circulation or property access near the on-ramp.

Pedestrian and bicycle circulation would not experience adverse impacts. Potential development of a multi-use trail located along the BNSF Railway tracks parallel to E1, E2, and E4 was included in the Segment E conceptual design. Development of a multi-use trail on this corridor would extend bicycle circulation from the southern portion of the SR 520 Trail to Lake Sammamish. The alternatives would not affect pedestrian circulation on sidewalks within or surrounding the Redmond Town Center or Downtown Redmond.

Impacts on business access are expected to be minor, and the alternatives are located on corridors where business access is already limited.

Maintenance Facilities

The SE Redmond Maintenance Facility (MF5) would be located adjacent to the SE Redmond Station and would be connected to the station by tail track. The position of MF5 would differ for E1 and E2/E4, but the traffic circulation surrounding this area is not expected to differ between these alternatives. Vehicular access to MF5 in E1 would be located off NE 70th Street between Redmond Way and the SR 520 eastbound off-ramp. Vehicular access to MF5 in E2 and E4 would be located off NE 65th Street between 176th Avenue NE and East Lake Sammamish Parkway. The additional access into MF5 is not expected to affect business, residential, or nonmotorized circulation and access on either of these streets. For E2/E4 vehicles traveling along NE 70th Street, there would be gate controlling the crossing when the light rail trains access MF5.

MF5 in Segment E would have approximately 60 parking stalls for the employees and visitors. Maintenance facility staff shift hours would be similar to Central Link operation and maintenance facilities: 6:00 a.m. to 2:00 p.m. and 2:00 p.m. to 10:00 p.m. These shift hours occur outside the peak periods, so little shift in traffic is expected to occur during the peak hour. Less than 10 vehicle trips would occur to and from the maintenance facility in peak periods. These trips would include visitors and deliveries to and from the maintenance facility.

Interim Terminus Stations

The SE Redmond and Redmond Town Center stations are potential interim termini. At both of these stations, an interim terminus is not expected to generate enough auto trips beyond the full-length alternative analysis to warrant further station impact analysis because the full-length analysis assumed the SE Redmond Park–and-Ride Lot will be at capacity and no parking will be provided at the Redmond Town Center. As an interim terminus, the SE Redmond Station would generate 8 additional peak-hour vehicle trips in year 2020 and 10 additional peak-hour trips in 2030. The Redmond Town Center Station, as an interim terminus, would generate 4 additional peak-hour vehicle trips in 2030 and 18 additional peak-hour trips in 2030. With an interim terminus at the Redmond Town Center, operational and access and circulation impacts, as described in E2, would be avoided on 161st Avenue NE. Table 6-21 shows the PM peak-hour interim terminus trip generation for each of these potential interim termini.

6.4 Construction Impacts

Constructing the East Link Project alternatives would result in temporary impacts on local and regional automobile, transit, truck, and pedestrian or bicycle activity. Construction activities analyzed include construction operations, truck routes, and staging schemes, and their related effects, including the following:

- Potential roadway or lane closure requirements, alignment shifts, areas of construction activity adjacent to travel lanes, or other reductions in street capacity due to construction activities

- Major construction activities with complete roadway closures requiring construction of interim detour facilities or identification of available detour routes
- Areas that would require extensive construction coordination between Sound Transit and local jurisdictions, affected neighborhoods, adjacent businesses, and other affected agencies
- Locations where existing on- or off-street parking supply would be affected by construction activity or staging

Construction traffic impacts could also occur where construction site access routes require using streets not typically used by or designated for use by trucks. The complete closure of arterials during peak periods could create substantial transportation impacts (i.e., congestion and increasing the potential for cut-through traffic, reduction of bicycle travel routes), especially if alternate routes would be congested or lengthy. Impacts could also result from arterial closures that prohibit access to businesses. During construction, some roads immediately adjacent to or within the construction staging areas would have to be temporarily closed or narrowed. This includes the following:

- Full closure: road closed to all traffic
- Partial closure: individual lane closures could be expected, but at least one travel lane in each direction would be maintained
- Short-term closure: closed up to 12 months
- Long-term closure: closed more than 12 months
- Peak closures: closures scheduled for periods of highest traffic (typically mornings and late afternoons/early evenings on weekdays)
- Off-peak closures: closures scheduled for periods of lowest traffic (typically weekends and nights)
- 24-hour closures: all day closures for both weekdays and weekends

Even with careful designation of haul routes, access to construction areas could require using collector or local designated streets in certain areas. Coordination with local jurisdictions and WSDOT would take place as part of final engineering and permitting so that streets and highways with adequate signage and any necessary traffic control measures are installed.

Linear projects such as East Link are typically divided into various segments or line sections for construction. Segments include construction of retained cut-and-fill trackway, elevated structures, tunnels and underground stations, park-and-ride facilities, station platforms, transit centers, substation and control facilities, and other related improvements. A work-specific construction approach would be developed during the final design effort to establish the limits for the various construction phases and construction contracts, their estimated schedule and duration, and appropriate sequencing. Where possible, construction activities would be coordinated with other capital improvement projects to help minimize construction impacts.

Typical construction for surface and elevated guideways and stations would occur on a 6-day-per-week work schedule, although in some locations (such as when street detours are involved and/or construction periods need to be abbreviated to reduce impacts), additional shifts, all-week, or 24-hour construction activities could be necessary. While underground construction activities could occur on a 24-hour basis, truck activity at the surface staging area could be limited to a shorter period daily.

The overall construction duration would include a period of civil construction during which site preparation, primary construction, and finish construction take place, followed by a typically shorter period of system installation, integration, and testing.

The civil construction work at each site would normally begin with site preparation, including property acquisition, demolition and clearing, and utilities rerouting. In some areas, it would be necessary to demolish existing buildings or structures before starting construction of light rail facilities. Demolition would involve implementing stormwater and erosion control measures, tearing down buildings and structures, relocating utilities, removing debris, and containing and disposing of hazardous materials. Demolition work would create noise and dust, and there would be truck traffic for debris removal.

Staging areas are also needed before, during, and for a short time after construction work occurs. The staging areas for tunnel boring and mining would be located at or near tunnel portals, stations, or construction shafts. Staging areas for cut-and-cover stations would be located at or near the station site. At-grade, elevated, and retained cut-and-fill line sections would have construction staging areas all along the routes. Staging areas for the stations (both at-grade and elevated) would generally need to be larger than for the guideway/trackway segments (line sections). For the line sections, contractors would generally use as the staging area the property in which the facility is being constructed and adjacent properties, although larger areas could be required.

Staging areas could be used for construction, equipment storage, construction materials delivery and storage, demolition or spoils handling (in accordance with applicable regulations), contractor trailers, and parking.

For discussion of construction impacts on the regional highways in the project vicinity, (I-90, I-405, and SR 520) refer to Section 5.3.4; for construction impacts to transit, refer to Section 4.4.

6.4.1 Truck Volume and Haul Routes

The exact number of truck trips that would be needed for each alternative is dependent on many variables that cannot be fully determined or finalized at this time. An estimate was prepared to understand the impact constructing the alternatives would have on the transportation system. A range of truck trips is shown in Table 6-45, based on known quantities for the main trip-generation activities, including imported fill material, concrete, asphalt concrete pavement, and excavated waste material that would be needed for the construction of each alternative. Each truck was assumed to carry 15 cubic yards of imported material, 15 cubic yards of excavated material, 9 cubic yards of concrete, or 22.5 tons of asphalt concrete pavement. The estimated quantities of excavated material also include a 30 percent swell factor. The variation between the minimum and maximum number of truck trips per day or hour is also shown in Table 6-45. Truck trips associated with activities such as miscellaneous deliveries have not yet been quantified and are excluded from this estimate.

In Segment A, a relatively low amount of truck activity (less than 20 trucks per day) is expected since the alternative requires minimal excavation and import of loose materials. Trucks would access and use I-90 as a haul route. In Segment A, the most intensive period of truck trips would last approximately 2 years.

Of the alternatives in Segment B, the Bellevue Way Alternative (B1) is predicted to require the most truck trips due to the relatively high amount of excavation and asphalt concrete pavement required. With this alternative, between 54 and 66 truck trips per day would need to access Bellevue Way SE, NE 8th Street, and 112th Avenue SE from I-90 and I-405. For all the Segment B alternatives, the trucks would access construction areas from these same streets. In Segment B, the most intensive period of truck trips would last approximately 2 to 3 years.

In Segment C, the 108th NE tunnel Alternative (C3T) connecting with the 112th SE At-Grade Alternative (B2A) is expected to result in the greatest number of truck trips per day of the alternatives in Segment C. Between 172 and 211 haul truck trips per day would be required to access 112th Avenue NE between SE 8th Street and NE 12th Street. There is substantial variability in the number of trucks expected in Segment C, because the tunnel alternatives are expected to generate a large amount of trucks excavating material, and 112th NE Elevated Alternative (C7E) is expected to generate a relatively small number of trucks because the alternative does not require an extensive amount of waste excavation. In Segment C, the most intensive period of truck trips would last up to approximately 3 years for surface and elevated alternatives and 4 years for tunneled alternatives. Generally, truck trips would access Segment C construction areas from I-405 via SE 8th, NE 4th, and NE 8th streets.

The NE 20th Alternative (D3) would require the most truck trips of the alternatives in Segment D with the construction of the retained-cut section. Between 61 and 75 truck trips per day could be expected with D3. In Segment D, the most intensive period of truck trips would last approximately 3 to 4 years. Generally, truck trips would access Segment D construction areas from SR 520 via 124th, 140th, and 148th avenues NE.

In Segment E, the Marymoor (E2) and Leary Way (E4) alternatives would require about the same number of truck trips: between 71 and 87 trips per day. In Segment E, the most intensive period of truck trips would last approximately 2 to 3 years. These trips would likely be routed on a frontage road along SR 520 and along SR 202, West Lake Sammamish Parkway NE, and other streets. Generally, truck trips would access the Segment E construction areas from West Lake Sammamish Parkway and SR 202.

Suggested haul routes are also provided in Table 6-45 and provided in the conceptual design drawings (Appendix G1 of the Draft EIS). Established truck routes were identified using the classified truck routes from WSDOT, King County, and the cities of Seattle, Bellevue, and Redmond. Final truck routes would be determined in conjunction with local jurisdictions through the permitting processes. The truck routes for each alternative have been split into several sections based on the access to and from the alternative and the classified truck routes. Each section requires a unique truck route to deliver materials to the construction site. The truck routes listed in Table 6-45 were selected to use the established truck routes as much as possible. The routes deviate onto local streets and frontage roads only when necessary. Trucks were assumed to arrive from I-90, I-405, or SR 520; they were also assumed to be capable of turning around in staging areas and maintenance facility sites. When an alternative includes a tunnel, haul routes were assumed to end and begin at the tunnel portals.

The average number of truck trips per day and per hour for the construction of maintenance facilities is provided in Table 6-46. These truck trips include imported fill material, concrete, asphalt concrete pavement, excavated material, and miscellaneous materials. Of the maintenance facilities proposed within Segment D, the 116the Maintenance Facility (MF1) is expected to require the greatest number of truck trips: between 111 and 141 per day. MF1 would be located between 116th Avenue NE and the BNSF Railway and has auto access to 120th Avenue NE. Truck trips were assumed to use the SR 520 interchange with 124th Avenue NE to make deliveries and haul materials. The maintenance facilities proposed in Segment E would require between 16 and 24 trips per day. The suggested truck route for all three of these facilities would use the SR 520 interchange with SR 202. The most intensive period of truck trips would last approximately 2 years.

6.4.2 Roadway and Parking Impacts

The construction impacts by segment are detailed in Table 6-47. For the discussion of the East Link construction impacts on transit service and facilities, and to regional highways (I-90, I-405 and SR 520), refer to Sections 4.4 and 5.3.4, respectively.

Within Segment A, short-term roadway shoulder and/or lane closures due station construction may occur on Rainier Avenue S, 77th Avenue SE, and 80th Avenue SE.

Within Segment B, primarily principal arterials would be affected by construction, mostly by partial road closures for long-term durations during construction. Under the Bellevue Way Alternative (B1), construction impacts would be along Bellevue Way throughout the segment. Under the 112th SE At-Grade (B2A), 112th SE Elevated (B2E), and 112th SE Bypass (B3) alternatives, construction impacts would be along Bellevue Way, south of 112th Avenue SE, and along 112th Avenue SE north of Bellevue Way. B2A would have more impacts along Bellevue Way than B2E and B3, as it is an at-grade profile. The BNSF Alternative (B7) would affect 118th Avenue SE.

Detour routes would be available with the exception of Bellevue Way SE, south of 112th Avenue SE, where only partial closures would occur so that a detour would not be needed. The potential for traffic to detour into residential neighborhoods would be minimal because of limited north-south connections, with the possible exception of Bellevue Way SE north of 112th Avenue SE, and 112th Avenue NE north of Bellevue Way SE. Vehicles could adjust and use 108th Avenue SE, but with the current traffic calming devices installed on this road, the probability of traffic detouring through this area is low.

Within Segment C, local, minor, and principal arterials would be affected by construction. Road closures would range from none at staging areas and partial road closures for short-term durations to full road closures for long-term durations. The Bellevue Way Tunnel Alternative (C1T) would affect Bellevue Way and NE 6th Street. The 106th NE Tunnel Alternative (C2T) would have impacts along 112th Avenue SE, 106th Avenue NE, and NE 6th between 110th Avenue NE and 112th Avenue NE. The 108th NE Tunnel C3T Alternative (C3T) would have impacts along 112th Avenue SE and 108th Avenue NE. These tunnel alternatives have impacts as a result of the cut–and-cover construction. The 106th Avenue NE, 108th Avenue NE, 110th Avenue NE cross-streets would be at least partially closed for short durations with the cut-and-cover construction of C1T. Cross-streets would be at least partially closed along the C2T route with the cut-and-cover construction between Main Street and 110th Avenue NE. Lastly, NE 6th Street and NE 12th Street cross-street would at least be partially closed during the C3T cut-and-cover construction. Cut-and-cover construction durations could be shortened by fully closing impacted

TABLE 6-45
Average Truck Trips for Construction of Alternatives

Alternative/ Connection[a]	Average Truck Trips To/From Location[c]		Haul Origin / Destination	Suggested Haul Route
	Per Day	Per Hour[b]		
A1	12-14	1	West of I-5	I-90 to Airport Way to 4th Avenue to Jackson Street to 5th Avenue to I-90.
			East of I-5	I-90 center HOV lanes, turnaround at 76th Avenue and Island Crest Way in Mercer Island.
B1	54-66	5-7	South of 112th Avenue SE	I-90 to Bellevue Way SE to 112th Avenue SE to SE 8th Street to I-405.
			North of112th Avenue SE	I-405 to SE 8th Street to 112th Avenue SE to Bellevue Way SE.
B2A	35-42	3-4	South of SE 8th Street	I-90 to Bellevue Way SE to 112th Avenue SE to SE 8th Street to I-405.
			North of SE 8th Street	I-405 to SE 8th Street to 112th Avenue SE to NE 8th Street to I-405.
B2E	18-23	2	Entire Alternative	(same as B2A)
B3	26-32	3	South of SE 8th Street	(same as B2A)
			North of SE 8th Street	To I-405 to SE 8th Street to 114th Avenue SE to SE 6th Street to 112th Avenue SE to I-405.
B7	24-30	2-3	South of SE 8th Street	I-405 to 118th Avenue SE to I-405.
			North of SE 8th Street	(same as B3)
C1T	169-206	17-21	Up to Tunnel Portal	I-90 to Bellevue Way SE to NE 8th Street to I-405.
			Northern Tunnel Portal	I-405 to NE 8th Street to 108th Avenue NE to NE 4th Street to 112th Avenue NE to I-405.
			East of 112th Avenue, South of NE 8th Street	I-405 to SE 8th Street to 116th Avenue NE to NE 8th Street to I-405.
			North of NE 8th Street	I-405 to NE 8th Street to 112th Avenue NE to NE 12th Street to 120th Avenue NE to Bel-Red Road to NE 8th Street to I-405.
C2T-B2A	123-150	12-15	Up to Tunnel Portal	I-405 to SE 8th Street to 112th Avenue NE, return via same route.
			Remainder	(same as C1T)
C2T-B2E	100-122	10-12	Up to Tunnel Portal	I-405 to SE 8th Street to 112th Avenue NE to NE 8th Street to I-405.
			Remainder	(same as C1T, north of tunnel)
C2T-B3	102-124	10-12	Up to Tunnel Portal	I-405 to SE 8th Street to 114th Avenue SE to SE 6th Street to 112th Avenue SE to I-405.
			South Tunnel Portal	(same as C2T-B2E, "Up To Tunnel Portal")
			Remainder	(same as C1T, north of tunnel)
C2T-B7	103-126	10-13	Up to Tunnel Portal	(same as C2T-B3)
			Remainder	(same as C1T, north of tunnel)
C3T-B2A	172-211	17-21	Up to Tunnel Portal	(same as C2T-B2A)

TABLE 6-45
Average Truck Trips for Construction of Alternatives

Alternative/ Connection[a]	Average Truck Trips To/From Location[c]		Haul Origin / Destination	Suggested Haul Route
	Per Day	Per Hour[b]		
			Remainder	I-405 to NE 8th Street to 112th Avenue NE to NE 12th Street to 104th Avenue NE to I-405.
C3T-B2E	154-188	15-19	Up to Tunnel Portal	(same as C2T-B2E)
			Remainder	(same as C3T-B2A)
			Up Through Tunnel	(same as C2T-B3)
			Remainder	(same as C3T-B2A)
C3T-B7	161-196	16-20	Entire Alternative	(same as C3T-B3)
C4A-B2A	122-149	12-15	South of Main Street	(same as C2T-B2E, “Up To Tunnel Portal”)
			Along 108th Avenue NE	I-405 to SE 8th Street to 112th Avenue SE to Main Street to 108th Avenue NE to NE 12th Street to 112th Avenue NE to NE 8th Street to I-405.
			Along 110th Avenue NE	I-405 to SE 8th Street to 112th Avenue NE to Main Street to 110th Avenue NE to NE 12th Street to 112th Avenue NE to NE 8th Street to I-405.
			Along NE 12th Street	I-405 to NE 8th Street to 112th Avenue NE, return via same route.
C4A-B2E	115-141	12-14	Entire Alternative	(same as C4A-B2A)
C4A-B3	112-137	11-14	South of Main Street	(same as C2T-B3, “Up To Tunnel Portal”)
			Remainder	(same as C4A-B2A)
C4A-B7	112-137	11-14	Entire Alternative	(same as C4A-B3)
C7E-B2A	26-32	3	South of NE 8th Street	(same as C2T-B2E, “Up To Tunnel Portal”)
			North of NE 8th Street	(same as C4A-B2A, “Along NE 12th Street”)
C7E-B2E	16-20	2	Entire Alternative	(same as C7E-B2A)
C7E-B3	14-18	1-2	South of Main Street	(same as C2T-B3, “Up to Tunnel Portal”)
			Remainder	(same as C7E-B2A)
C7E-B7	14-18	1-2	Entire Alternative	(same as C7E-B3)
C8E-B2A	117-143	12-14	South of NE 8th Street	I-405 to SE 8th Street to 112th Avenue SE to NE 2nd Street to 110th Avenue NE to I-405.
			Between NE 8th Street and NE 12th Street	I-405 to NE 8th Street to 110th Avenue NE to NE 12th Street to 112th Avenue NE to I-405.
			Along NE 12th Street	(same as C4A-B2A)
C8E-B2E	109-133	11-13	Entire Alternative	(same as C8E-B2A)
C8E-B3	106-130	11-13	South of Main Street	(same as C2T-B3, “Up to Tunnel Portal”)

TABLE 6-45
Average Truck Trips for Construction of Alternatives

Alternative/ Connection[a]	Average Truck Trips To/From Location[c]		Haul Origin / Destination	Suggested Haul Route
	Per Day	Per Hour[b]		
			Remainder	(same as C8E-B2A)
C8E-B7	106-129	11-13	Entire Alternative	(same as C8E-B3)
D2A-12th	33-40	3-4	West of 140th Avenue NE	I-405 to NE 8th Street to Bel-Red Road to 116th, 120th, or 124th Avenue NE to access alternative.
			East of 140th Avenue NE	SR 520 to 148th Avenue NE to Bel-Red Road or NE 24th Street and 152nd Avenue NE to access alternative.
D2A-BNSF	32-40	3-4	Entire Alternative	(same as D2A-12th)
D2E-12th	27-33	3	Entire Alternative	(same as D2A-12th)
D2E-BNSF	27-33	3	Entire Alternative	(same as D2A-12th)
D3-12th	61-74	6-7	West of140th Avenue NE	(same as D2A-12th)
			East of 140th Avenue NE	SR 520 to 148th Avenue NE to Bel-Red Road or NE 20th Street and 152nd Avenue NE.
D3-BNSF	61-75	6-7	Entire Alternative	(same as D3-12th)
D5-12th-Safeway	26-32	3	West of 140th Avenue NE	I-405 to NE 8th Street to 116th Avenue NE, along alignment, to Northup Way and SR 520.
			East of 140th Avenue NE	(same as D2A-12th)
D5-12th-152	26-32	3	Entire Alternative	(same as D5-12th-Safeway)
D5-BNSF-Safeway	27-33	3	Entire Alternative	(same as D5-12th-Safeway)
D5-BNSF-152	27-33	3	Entire Alternative	(same as D5-12th-Safeway)
E1	59-72	6-7	South of West Lake Sammamish Parkway	Use SR 520 / NE 51st Street interchange to access SR 520 roadside and alternative.
			North of West Lake Sammamish Parkway	Use SR 520 / W Lake Sammamish Parkway NE and SR 520 / SR 202 to access alternative along Redmond Way and NE 76th Street.
E2	71-87	7-9	South of West Lake Sammamish Parkway	(same as E1)
			North of West Lake Sammamish Parkway	Same as E1, but does not follow West Lake Sammamish Parkway north of SR 520, and follows 161st Avenue NE.

TABLE 6-45
Average Truck Trips for Construction of Alternatives

Alternative/ Connection[a]	Average Truck Trips To/From Location[c]		Haul Origin / Destination	Suggested Haul Route
	Per Day	Per Hour[b]		
E4	71-87	7-9	South of West Lake Sammamish Parkway	(same as E1)
			North of West Lake Sammamish Parkway	Same as E1, but does not follow NE 85th Street.

[a] C2T-B2A and D2A-12th and similar designations indicate design option for the connection between the alternatives.

[b] Assuming a minimum of 10 construction hours per day.

[c] A range of truck trips has been provided in this table, based on known quantities of imported fill material, concrete, asphalt concrete pavement, and excavated waste material that would be needed for the construction of each alternative.

TABLE 6-46
Average Truck Trips for Construction of Maintenance Facilities

Maintenance Facility	Associated Alternatives	Average Haul Truck Trips To/From Location[a]		Suggested Haul Route
		Per Day	Per Hour	
MF1, 116th	D2A, D2E, D3	115-141	12-14	SR 520 to 124th Avenue NE, return via same route.
	D5	111-135	11-14	(same as above)
MF2, BNSF	D2A, D2E, D3	21-26	2-3	(same as MF1)
	D5	34-42	3-4	(same as MF1)
MF3, SR 520	D2A, D2E	49-60	5-6	SR 520 to 124th Avenue NE to Northup Way, return via same route.
	D3	50-62	5-6	(same as above)
	D5	25-31	3	(same as above)
MF5, SE Redmond	E1	17-21	2	SR 520 to SR 202 to NE 70th Street, return via same route.
	E2	20-24	2	SR 520 to SR 202 to E Lake Sammamish Parkway NE to NE 65th Street, return via same route.
	E4	16-19	2	(same as above)

[a] A range of truck trips has been provided in this table, based on known quantities of imported fill material, concrete, asphalt concrete pavement, and excavated waste material that will be needed for the construction of each maintenance facility.

TABLE 6-47
Roadway Construction Impacts by Segment

Segment/Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b,]	Detour of Traffic		On-Street Parking Loss?[c]	Bus Route Impact?
					Detour Route Available?	Neighborhood Traffic Intrusion		
Segment A, Interstate 90								
Rainier Avenue S	A1	Principal Arterial	Low	Partial, short term	Yes	Low	No	Yes
77th Avenue SE	A1	Principal Arterial	Low	Partial, short term	Yes	Low	No	Yes
80th Avenue SE	A1	Principal Arterial	Low	Partial, short term	Yes	Low	No	Yes
Refer to Section 5.3.4 for I-90 mainline construction impacts								
Segment B, South Bellevue								
Bellevue Way south of 112th Avenue SE	B1	Principal Arterial	Moderate	Partial, long term	No	Moderate	No	Yes
	B2A	Principal Arterial	Low	Partial, long term Full, short term	No	Moderate	No	Yes
	B2E	Principal Arterial	Low	Partial, long term	No	Moderate	No	Yes
	B3	Principal Arterial	Low	Partial, long term	No	Moderate	No	Yes
Bellevue Way north of 112th Avenue SE	B1	Principal Arterial		Partial, long term	Yes	Moderate	No	Yes
112th Avenue SE	B2A	Principal Arterial	Low	Partial, long term	Yes	Moderate	No	Yes
	B2E	Principal Arterial	Low	Partial, short term	Yes	Moderate	No	Yes
	B3	Principal Arterial	Low	Partial, long term	Yes	Moderate	No	Yes
118th Avenue SE	B7	Collector Arterial	Low	Partial, long term	Yes	Low	No	No
Segment C, Downtown Bellevue								
Bellevue Way	C1T	Principal Arterial	High	Partial, long term Full, short term	Yes	Moderate	No	Yes
106th Avenue NE	C2T	Local Arterial	Moderate	Partial, long term	Yes	Low	No	Yes
106th Avenue NE (Main Street to NE 12th Street)	C4A	Local Arterial	None	None	Yes, but limited for commercial access on the street	Low	No	Yes
108th Avenue NE	C3T	Minor Arterial	High	Partial, short term Full, short term	Yes	Low	No	No
108th Avenue NE (Main Street to NE 12th Street)	C4A	Minor Arterial	High	Partial, long term Full, short term	Yes, but limited for commercial access on the street	Low	No	No

TABLE 6-47
Roadway Construction Impacts by Segment

Segment/Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b,]	Detour of Traffic: Detour Route Available?	Detour of Traffic: Neighborhood Traffic Intrusion	On-Street Parking Loss?[c]	Bus Route Impact?
110th Avenue NE (Main Street to NE 12th Street)	C4A	Minor Arterial	High	Partial, long term Full, short term	Yes, but limited for commercial access on the street	Low	No	Yes
	C8E	Minor Arterial	Low	Partial, long term	Yes	Low	No	Yes
112th Avenue NE south of Main Street	C2T, C3T, C4A, C7E, C8E (with B3 or B7	Principal Arterial	Moderate	Partial, short term	Yes, but limited for commercial access on the street	Low	No	No
112th Avenue NE south of Main Street	C2T, C3T, C4A, C7E (with B2A or B2E	Principal Arterial	Moderate	Partial, long term	Yes, but limited for commercial access on the street	Low	No	Yes
112th Avenue NE north of Main Street	C7E	Principal Arterial	Low	Partial, short term	Yes	Low	No	No
Main Street	C4A	Minor Arterial	High	Partial, long term	Yes, but limited for commercial access on the street	Low	No	Yes
NE 12th Street	C4A, C3T, C8E	Principal Arterial	High	Partial, short term	Yes, but limited for commercial access on the street	Low	No	No
NE 6th Street, between Bellevue Way and 106th Avenue NE	C1T	Local Arterial	High	Full, long term	Yes	Low	No	Yes
NE 6th Street, between 110th Avenue NE and 405	C1T, C2T	Minor Arterial	Moderate	Partial, long term Full, short term	Yes	Low	No	Yes
Main Street (staging areas)	All C Alts	Minor Arterial	Moderate	None	Yes		No	No
NE 12th Street (staging areas)	All C Alts	Principal Arterial	Moderate	None	Yes		No	No
Segment D, Bel-Red/Overlake								
116th Avenue NE crossing	All D Alts	Principal Arterial	Low	Partial, short term	Yes	Low	Yes	No
120th Avenue NE crossing	D2A, D3	Collector Arterial	Low	Partial, short term	Yes	Low	Yes	No
124th Avenue NE crossing	D2A, D3	Minor Arterial	Low	Partial, short term	Yes	Low	Yes	No
130th Avenue NE crossing	D2A, D3	Collector Arterial	Low	Partial, short term	Yes	Low	Yes	No
NE 16th Street/between 132nd Avenue NE and 136th Avenue NE	D2A, D3	Local Arterial	Low	Full, long term	Yes	Low	Yes	Yes

TABLE 6-47
Roadway Construction Impacts by Segment

Segment/Location	Alternative	Roadway Classification	Construction Truck Traffic[a]	Road Closure[b]	Detour of Traffic: Detour Route Available?	Detour of Traffic: Neighborhood Traffic Intrusion	On-Street Parking Loss?[c]	Bus Route Impact?
136th Avenue NE/between NE16th Street and NE 20th Street	D2A, D3	Collector Arterial	Low	Full, long term with Partial, short term	Yes	Low	Yes	Yes
	D2E				Yes	Low	Yes	Yes
NE 20th Street/between 136th Avenue and 152nd Avenue NE	D3	Minor Arterial	Moderate	Partial, long term	Yes	Moderate	No	Yes
NE 24th Street, between 151st PL NE and 152nd Avenue NE	D2A, D2E, D5	Minor Arterial	Low	Partial, long term	No	Low	No	Yes
NE 151st PL NE at NE 24th Street	All D Alts	Minor Arterial	Low	Full, short term	Yes	Low	No	No
152nd Avenue NE north of NE 24th Street	D2A, D2E, D5	Local Arterial	Low	Partial, long term	No	Low	No	Yes
152nd Avenue NE/between NE 20th Street and SR520	D3	Local Arterial	Moderate	Partial, long term	No	Low	No	Yes
Microsoft Road	All D Alts	Local Arterial	Low	Partial, short term	Yes	Low	No	No
Segment E, Downtown Redmond								
NE 40th Street, NE 51st Street, and NE 60th Street	All E Alts	Collector Arterial	Moderate	Partial, short term	No	Moderate	No	No
161St Avenue NE, 166th Avenue NE, 170th Avenue NE	E1, E4	Local Arterials	Moderate	Partial, short term	Yes	Low	No	Yes
NE Leary Way	E4	Principal Arterial	Moderate	Partial, long term	Yes	Low	No	Yes
NE 70th Street	E1, E4	Local Arterial	Moderate	Full, short term	Yes	Low	Yes	Yes
161st Avenue NE, between Redmond Way and NE 85th Street[d]	E2	Collector Arterial	Moderate	Full, long term	Yes	Moderate	Yes	Yes
Leary Way at Bear Creek Parkway (future by others)	E4	N/A		Partial, long term	Yes	Low	No	No
SR 520 on- and off-ramps at SR 202	E2, E4	State Highway	Moderate	Partial, long term	No	Low	No	No

[a] Low truck traffic is associated with alternatives that would have minimal fill, excavation, and concrete work; high truck traffic is associated with major fill, excavation, and concrete work. Moderate is between these two boundaries.

[b] Partial road closure assumes some lanes are open to traffic. Short- and long-term duration was determined to be less or more than 1 year. Full short-term closures would be required for specific activities like station construction, retained cut and fill construction, column drilling or girder placement, and can be as short as 1 night/day closure to less than 1 year.

[c] On-street parking loss is characterized for street parking only and does not consider that some off-street parking might be lost due to the location of construction and staging areas.

[d] If Alternative E2 terminates at the Redmond Town Center Station, this roadway construction impact would not occur.

roadways rather than partially closing the impacted roadways. The Couplet Alternative (C4A) would have impacts along 112th Avenue SE, Main Street, 108th Avenue NE, 110th Avenue NE, and NE 12th Street. The 112th NE Elevated Alternative (C7E) would have impacts along 112th Avenue. The 110th NE Elevated Alternative (C8E) would have impacts along 112th Avenue SE and 110th Avenue NE.

Detour routes are available in the central business district, but commercial vehicles would have limited access in some cases. Construction vehicle traffic would range from low to high, and neighborhood traffic intrusion would range from low to moderate. NE 6th Street between Bellevue Way and 106th Avenue NE is the only road expected to have a long-term full closure for the construction of C2T, but it has a low volume of traffic. Short-term full closures are expected for Bellevue Way for C1T, 108th Avenue NE for C3T, 108th Avenue NE and 110th Avenue NE to convert the roadways to one-way traffic operations for C4A, and 106th Avenue NE direct access ramp to/from I-405 for C1T and C2T.

Within Segment D, collector, local, minor, and principal arterials would be affected by construction. Road closures range from partial road closures for short-term durations to full road closures for long-term durations. The NE 16th At-Grade Alternative (D2A) would have impacts along NE 16th Street, 136th Avenue NE, NE 24th Street, 152nd Avenue NE, and Microsoft Road with at-grade crossings at 116th Avenue NE, 120th Avenue NE, 124th Avenue NE, 130th Avenue NE, 132nd Avenue NE, and NE 20th Street. The NE 16th Elevated Alternative (D2E) would have impacts along 136th Avenue NE, NE 24th Street, 152nd Avenue NE, and Microsoft Road with an at-grade crossing at 116th Avenue NE. The NE 20th Alternative (D3) would have impacts along NE 16th Street, 136th Avenue NE, NE 20th Street, 152nd Avenue NE, and Microsoft Road with at-grade crossings at 116th Avenue NE, 120th Avenue NE, 124th Avenue NE, 130th Avenue NE, 132nd Avenue NE, 140th Avenue NE, and NE 24th Street. The SR 520 Alternative (D5) would have impacts along NE 24th Street, 152nd Avenue NE, and Microsoft Road with an at-grade crossing at 116th Avenue NE. Full closures are expected only on NE 16th Street and 136th Avenue NE.

Detours would be available through commercial areas. The potential for detoured traffic and construction vehicles to affect neighborhood areas would be low because there is not a substantial amount of residential development in the area, and the construction would occur on or near designated truck routes. There would be some on-street parking loss associated with construction impacts within Segment D.

Within Segment E, local and collector arterials would be affected by construction. Road closures would range from partial closures for short-term durations to full closures for long-term durations. The Redmond Way Alternative (E1) would have impacts along 161st Avenue NE, 166th Avenue NE, 170th Avenue NE, and NE 70th Street. The Marymoor Alternative (E2) would have impacts along 161st Avenue NE between Redmond Way and NE 85th Street, and SR 520 on- and off-ramps at SR 202. If E2 terminates at the Redmond Town Center Station, the roadway impact along 161st Avenue NE would not occur. The Leary Way Alternative (E4) would have impacts along 161st Avenue NE, 166th Avenue NE, 170th Avenue NE, NE 70th Street, SR 520 on- and off-ramps at SR 202, along Leary Way and a crossing at Bear Creek Parkway. All E alternatives would have grade-separated crossings at NE 40th Street, NE 51st Street, and NE 60th Street. The roadways with full closures are NE 70th Street for a short duration, and 161st Avenue NE between Redmond Way and NE 85th Street for a long duration, while the potential station and track are being constructed. Detours would be available through commercial areas. Construction vehicle traffic would be moderate, and the potential for traffic to detour through residential neighborhoods is low. There would be some on-street parking loss associated with construction impacts within Segment E.

In all segments, cross streets that intersect the alternatives would be closed for short durations to construct the track or other associated features through the intersection. These closures would most likely occur during off-peak hours to avoid traffic disruptions, and would generally occur for less than a week. Likewise, temporary full closures of private driveways and any roads that need to be paved would also occur. An example of this is 116th Avenue NE under the Segment D alternatives.

A relatively high number of construction workers (traffic and parking) are expected to construct the project. The largest number of employees at any given site is anticipated during two periods: excavation for tunnel or retained-cut activities, and construction of the guideway and stations, especially if grade separated. Contractors and construction workers parking near designated construction staging areas could affect area parking supply during heavy construction periods by using unrestricted on-street parking in residential or other areas near the construction site. The contractor is generally responsible for providing parking for construction workers where necessary. It is expected that some worker parking could be accommodated at the staging areas and along track routes. Sound Transit or its contractors may lease parking for construction workers near construction sites. Sound Transit may acquire additional properties for temporary use for contractor parking.

Construction of the maintenance facilities for the NE 16th At-Grade (D2A), NE 16th Elevated (D2E), and Redmond Way (E1) alternatives would require short duration closure of streets that intersect the track leading to and from the maintenance facility. These closures would most likely occur during off-peak hours to avoid traffic disruptions, and would generally last for less than a week. Temporary full closures of private driveways and any roads that need to be paved could also occur. Otherwise, there would be no impacts from construction of the maintenance facilities.

6.5 Potential Mitigation

This section describes the potential mitigation required to operate and construct the East Link Project. This includes any construction mitigation and arterial and local street mitigation where the intersection LOS with the East Link Project would degrade to levels that do not meet the LOS standards of the jurisdiction. In addition, mitigation may be required where there are potential impacts on parking around stations.

6.5.1 Potential Operational Impact Mitigation

For impacts during project operation, arterial and local street mitigation is potentially required at intersections where the intersection LOS in the build condition would degrade to levels that do not meet the LOS standards of the jurisdiction and where there are potential impacts on the parking surrounding potential stations. Intersection and parking impact mitigation are discussed in the following subsections.

6.5.1.1 Segment A Intersections

In Segment A, no mitigation would be required in the City of Seattle. However, seven intersections in Mercer Island may potentially require turn pockets or traffic signal improvements to adjust for the change in travel patterns to and from the island with the project:

- West Mercer Way and 24th Avenue SE: Provide westbound right-turn and southbound left-turn pockets
- 80th Avenue SE and SE 27th Street: Provide eastbound right-turn pocket
- 77th Avenue SE and Sunset Highway: Provide eastbound left-turn pocket
- 77th Avenue SE and I-90 eastbound HOV off-ramp: Separate the eastbound off-ramp left and right-turn movements into two separate lanes
- 77th Avenue SE and North Mercer Way: Install traffic signal
- 77th Avenue SE and SE 27th Street: Provide southbound right-turn and modify signal phasing
- 76th Avenue SE/North Mercer Way and I-90 Westbound on-ramp: Modify the westbound channelization to provide left-turn pocket and through/right shared lane

All of these improvements would improve the AM and PM peak hour intersection LOS to the same or better than no-build conditions. Sound Transit would contribute its proportionate share of costs to improve these intersections. Sound Transit's contribution would be determined by the project's ratio of trips at the intersection or another equitable method. Tables D-13 and D-14 in Appendix D show the intersection results with these proposed intersection treatments for the AM and PM peak hours.

6.5.1.2 Segment B Intersections

Two intersections, Bellevue Way at 112th Avenue SE and 118th Avenue SE and SE 8th Street, may require potential intersection improvements.

In the Bellevue Way (B1), 112th SE At-Grade (B2A), and 112th SE Bypass (B3) alternatives, the profile is at-grade through the intersection Bellevue Way at 112th Avenue SE (South Bellevue Park-and-Ride Lot entrance).

Providing a northbound right-turn pocket would improve the flow of northbound traffic to 112th Avenue SE. Table D-14 in Appendix D provides the intersection results with the proposed northbound right-turn pocket. This turn pocket would improve the intersection to LOS C conditions.

In the BNSF Alternative (B7) providing an eastbound right-turn pocket would improve operations at the intersection of 118th Avenue SE and SE 8th Street. In both 2020 and 2030, the intersection with this improvement would still operate at LOS F, but with a delay similar or better to no-build conditions. Table D-14 in Appendix D provides the PM peak hour intersection results with the proposed eastbound right-turn pocket.

6.5.1.3 Segment C Intersections

Segment C potentially has two intersections that may require mitigation, as follows. These are associated with the 110th NE Elevated Alternative (C8E).

- 110th Avenue NE and NE 8th Street: Provide a northbound right-turn pocket.
- 110th Avenue NE and NE 6th Street: Provide a northbound right-turn pocket and modify the signal phasing.

Table D-14 in Appendix D lists the Segment C intersection results during the PM peak hour with proposed mitigation. These intersections would continue to operate at LOS F with these potential improvements, but only 110th Avenue NE at NE 6th Street intersection would operate worse than the No Build Alternative.

6.5.1.4 Segment D Intersections

Segment D potentially has three intersections that may require mitigation. These are associated with the NE 16th Elevated (D2E), NE 16th At-Grade (D2A), and NE 20th (D3) Alternatives.

D2E and D2A may require mitigation at the intersections of 151st Avenue NE and 152nd Avenue NE on NE 24th Street. The increase in delay is due to the two intersections being closely spaced and the intersection phasing and timing needed so that the light rail vehicle can safely travel across NE 24th Street. Prior to the light rail vehicle arriving at this street crossing, both of the adjacent traffic signals would only serve the westbound approach at 151st Avenue NE and the eastbound approach at 152nd Avenue NE to release any stopped or queued vehicles in this section of roadway. Once the section is clear, the light rail vehicle could then proceed. While this may not create substantial delay for the light rail vehicle, it may create unacceptable vehicle operations on NE 24th Street. An alternative route could be further explored that aligns the track through either intersection, thus removing the need to provide a vehicle clearance phase prior to the train arriving.

D3 may require mitigation at the intersection of 148th Avenue NE at NE 20th Street in the years 2020 and 2030. The impact in the build condition would be relatively minor, but potential mitigation may include providing a southbound right-turn lane.

6.5.1.5 Segment E Intersections

Segment E potentially has five intersections that may require mitigation. Two intersections are associated with all the Segment E alternatives; two intersections are associated only with the Marymoor Alternative (E2); and one intersection is associated only with E4.

- NE Leary Way and Bear Creek Parkway: Provide an eastbound right-turn pocket (the Leary Way Alternative (E4) only).
- Redmond Way and 161st Avenue NE: Provide a westbound right-turn pocket (E2 only). This improvement may be included as part of the city’s future roadway improvements, but has yet to be designed.
- NE 83rd Street and 161st Avenue NE: Provide a northbound right-turn pocket (E2 only).
- SR 202 and NE 70th Street: Provide an eastbound (SR 202) right-turn pocket (all Segment E alternatives).
- NE 70th Street and 176th Avenue NE: Install a traffic signal (all Segment E alternatives).

For potential mitigation measures in the City of Redmond, Sound Transit and the City would continue to coordinate so the city’s long-range plans are considered along with intersection operations.

Table D-14 in Appendix D lists the Segment E intersection results for the PM peak hour with the proposed mitigation.

6.5.1.6 Parking

Mitigation may be required where there are potential impacts on parking around stations. The potential for hide-and-ride activities near stations and the best ways to mitigate such activities is specific to each area surrounding a station. Stations that may generate hide-and-ride users are locations where the auto forecast is higher than the available parking at the station, and there is a substantial amount on-street unrestricted parking available surrounding the station. Situations where this could occur are the Rainier Station, Mercer Island Station (with only the BNSF Alternative [B7] connection), 124th Station, and the Redmond Town Center station. Prior to implementing any parking mitigation measures, Sound Transit would inventory on-street parking around each of these stations up to 1 year prior to the start of light rail revenue service. These inventories would document the current on-street parking supply within a one-quarter mile radius of the stations. Based on the inventory results, Sound Transit and the local jurisdiction would work with the affected stakeholders to identify and implement appropriate mitigation measures.

Parking control measures could consist of parking meters, restricted parking signage, passenger and truck load zones, and RPZ signage. Other parking mitigation strategies could include promotion of alternative transportation services (e.g., encourage use of vanpool or carpool services, walking, or bicycling).

If the City of Mercer Island and the City of Redmond do not implement their planned time-limited parking, parking control measures such as restricted parking could be implemented to mitigate hide-and-ride activity at the Mercer Island and Redmond Town Center stations. For parking controls agreed to with the local jurisdiction and community, Sound Transit would be responsible for the cost of installing the signage or other parking controls and any expansion of the parking controls for 1 year after opening the light rail system. The local jurisdictions would be responsible for monitoring the parking controls and providing all enforcement and maintenance of the parking controls. The local residents would be responsible for any RPZ-related costs imposed by the local jurisdiction.

Surrounding the Mercer Island Station, mitigation measures may include time-limit signs and RPZs to minimize potential impacts on the residential and the Town Center area. Spill-over parking would be controlled similarly to Mercer Island’s enforcement of the RPZ that already surrounds the site. This zone limits on-street parking to residents only, as indicated by a sticker placed in the resident’s vehicle.

6.5.2 Potential Construction Impact Mitigation

All mitigation measures associated with the construction of the East Link Project would comply with local regulations governing construction traffic control and construction truck routing. Sound Transit would finalize detailed construction mitigation plans in coordination with local jurisdictions, WSDOT, King County Metro, and other affected agencies and organizations. Mitigation measures for traffic impacts due to light rail construction could include the following:

- Follow standard construction safety measures, such as installation of advance warning signs, highly visible construction barriers, and the use of flaggers.
- Post advance notice signs prior to construction in areas where surface construction activities would affect access to surrounding businesses.
- Provide regular, written updates to assist public school officials in giving notice to students and parents concerning construction activity near schools.
- Use lighted or reflective signage to direct drivers to truck haul routes, and enhance visibility during nighttime work hours.
- Use temporary reflective truck prohibition signs on streets with a high likelihood of cut-through truck traffic.
- Schedule traffic lane closures and high volumes of construction traffic during off-peak hours to minimize delays during periods of higher traffic volumes as much as possible.

- Provide public information through tools such as print, radio, posted signs, and electronic Web pages to provide information regarding street closures, hours of construction, business access, and parking impacts.
- Provide construction workers with designated parking on- or off-site, as possible. Where construction worker parking could adversely affect on-street parking in adjacent neighborhoods, the contractor could be restricted from parking on-street. Where necessary, the contractor could also be responsible for providing parking areas for construction workers.

For potential transit (and associated park-and-ride) and regional highway (I-90, I-405 and SR 520) mitigation during East Link Project construction, refer to Sections 4.5 and 5.4, respectively.

7.0 Nonmotorized Facilities

7.1 Section Overview

This section describes the existing conditions and any identified future impacts with the project on nonmotorized facilities within the study area. Nonmotorized facilities—including sidewalks, designated bicycle routes, marked bicycle lanes, and regional multi-use trails—were inventoried and analyzed for impacts. Sidewalk inventory extended one-half mile from potential stations; bicycle-route inventory extended 1 mile from potential stations. Regional multi-use trails were also inventoried within one mile of potential stations. These trails provide regional mobility for nonmotorized users and allowing East Link riders to transfer to nonmotorized modes. School walk routes that were recommended by local agencies were also inventoried and analyzed for potential impacts based on their proximity to station alternatives. The evaluation of nonmotorized facilities indicates that the East Link Project would generally increase the pedestrian activity in and around the proposed stations compared to existing conditions.

The East Link Project proposes a number of improvements in and around stations to minimize impacts on pedestrian and bicycle circulation during both construction and operation. Sound Transit would provide enhancements, if needed, to the sidewalk adjacent to East Link stations. These enhancements would provide comfortable and safe pedestrian and bicycle access to and from the stations and areas surrounding the stations. Treatments for safe and effective pedestrian access may include crosswalks, signals, street lighting, safety gates, warning lights, signage, and other elements that may provide standard features to facilitate smooth and accessible transfers for transit customers from one type of public transportation to another. In addition to pedestrian- and bicycle-circulation improvements, the project would also provide station amenities such as bicycle racks and lockers.

There are crosswalks at all of the arterial study intersections within the corridor, and street-crossing access would generally remain similar to existing conditions or improve with light rail. Along light rail alternatives that are within the roadway (either elevated or at-grade), existing crosswalks would be maintained but potentially with slightly longer pedestrian walking distances across the roadway. Elevated alternatives outside the roadway and tunnel alternatives do not impact pedestrian crosswalks. For a safe pedestrian crossing, the pedestrian signal crossing times would be increased as appropriate. For at-grade stations (either on the side of the roadway or in the median), crosswalks would be provided to connect pedestrians and bicyclists with the station platform. For tunnel and elevated stations, elevator and escalator access would be provided to connect pedestrians and bicyclists with the station platform. In areas of the study area where at-grade alternatives would connect the light rail track with a maintenance facility, safety gates and warning signals would be provided for pedestrians and vehicles. Currently, there are few mid-block pedestrian crosswalks within the study area and the East Link Project is not expected to directly impact existing crossings or create a need for new mid-block crossings.

Because the East Link Project would be located near local and regional trails, nonmotorized regional mobility would be enhanced by the proposed East Link transit facilities in the study area. The East Link Project would provide access and mobility to transit facilities and improved connections to the regional nonmotorized networks. Without the project, pedestrian and bicycle facilities located where stations are proposed may remain disconnected, with little or no improvements and lacking amenities. Without light rail, some nonmotorized connections would continue to lack access to surrounding neighborhoods and urban centers.

7.2 Affected Environment

Pedestrian circulation and sidewalks within one-half mile of proposed stations were inventoried and evaluated for level of service (LOS) performance. Gaps in the sidewalk network surrounding stations were identified to determine the general location of pedestrian circulation paths leading to and from the stations. Missing sidewalk areas were identified on either one or both sides of the street in consideration of the local agency comprehensive plan and transportation element policies. Bicycle facilities within a 1-mile radius of stations were identified to determine bicycle-circulation patterns and the location of any impacts. Regional multi-use trails were identified, as well as school walk routes recommended by local agencies. Appendix A provides greater detail on the analysis methods.

7.2.1 Pedestrian Activity, Sidewalks, and School Walk Routes

Sidewalks are available along most arterial streets within the study area, providing sufficient pedestrian connections. Generally, there are only a few sections in each alternative that do not have sidewalk on one ore both sides of the street. Streets that lack sidewalks are typically in residential neighborhoods, on local access streets, or on streets with low pedestrian volumes. The following subsections describe the pedestrian activity, sidewalks, and crosswalks in each segment of the East Link Project. Bicycle routes and facilities, and regional multi-use trails are discussed in Section 7.2.2.

7.2.1.1 Segment A

Sound Transit inventoried nonmotorized facilities located in Segment A within the City of Seattle and City of Mercer Island. Generally, there are sidewalks surrounding the Rainier Station and Mercer Island Station. A few small segments with missing sidewalks, less than one-quarter mile, were identified along Rainier Avenue S and along Island Crest Way. Table 7-1 and Exhibits 7-1 and 7-2 show missing sidewalk facilities identified within one-half mile of stations.

The Rainier Station in Segment A is located between the Central Area and North Rainier Valley neighborhoods in Seattle. Pedestrians using bus facilities in this area mostly originate from or are destined for the surrounding neighborhoods, including the International District. A few small segments with missing sidewalks, less than one-quarter mile, were identified along Rainier Avenue S. Crosswalks are present at most arterial intersections in this area. Sidewalks are present along both sides of Rainier Avenue S, south of I-90. North of I-90, sidewalks are present along the western side of Rainier Avenue S. On the east side of Rainier Avenue S, under I-90, the sidewalk terminates and connects to a paved trail that continues into Judkins Park and Playfield. Sidewalk and crosswalk configuration in this area is discontinuous and creates slightly longer walking distances for pedestrians to navigate through. Additionally, there is a midblock crossing on 23rd Avenue S connecting S Day Street to the western portion of the I-90 Lid Park and the Rainier Station.

In Mercer Island, recent mixed-use developments at the Mercer Island Town Center, completion of the new Mercer Island Park-and-Ride Lot, and improvements in pedestrian connectivity have resulted in a more walkable area between the Town Center and North Mercer Island. Nearly all of the commercial activity in Mercer Island is centralized at the Mercer Island Town Center, making it a common destination for residents and pedestrians. The Mercer Island I-90 Lid Park provides multiple connection points across I-90 between North Mercer Island and the Town Center. Specifically, sidewalks located along 76th Avenue SE, 77th Avenue SE, and 80th Avenue SE provide pedestrian and bicycle connectivity across I-90. Crosswalks and wider sidewalks are present throughout most of the commercial area in Mercer Island, in addition to some pedestrian-friendly roadway elements such as bulb-outs and street trees.

There are school walk routes for Beacon Hill Elementary School and Thurgood Marshall Elementary School within one-half mile of Rainier Station. However, these walk routes are located on collector and local streets and are not present on arterial streets within the Seattle area of Segment A. There are no school walk routes in Mercer Island within one-half mile of the Mercer Island Station.

7.2.1.2 Segment B

Generally, there is less pedestrian activity in Segment B than in the other segments due to limited east-west arterial connectivity among the Enatai, South Bellevue, and Wilburton neighborhoods. High traffic volumes on 112th Avenue SE, Bellevue Way, and near the SE 8th Street/I-405 interchange tend to discourage high volumes of pedestrians on these streets. Other than the areas around park-and-ride lots, there are generally sidewalks along arterial and residential collector streets within Segment B. There are missing sidewalk facilities, located on one side, both sides, or scattered portions of the roadway on all arterials within one-half mile of the potential stations. Table 7-2 and Exhibit 7-3 list these missing facilities.

TABLE 7-1
Missing Arterial Sidewalk Segments within Segment A

Map ID[a]	Roadway	From	To	Missing Side[b]
SWG1	Martin Luther King Jr. Way S	S Dearborn Street	S Norman Street	Both
SWG2	Martin Luther King Jr. Way S	Irving Street	Sam Smith Park Entrance	Both
SWG3	Rainier Avenue S	S State Street	S Grand Street	Both
SWG4	Rainier Avenue S	S Holgate Street	S Plum Street	Both
SWG5	17th Avenue S	S Massachusetts Street	S College Street	One
SWG6	S Massachusetts Street	19th Avenue S	20th Avenue S	One
SWG7	SE 24th Street	72nd Avenue SE	76th Avenue SE	One
SWG8	SE 26th Street	Island Crest Way	N Mercer Way	One
SWG9	N Mercer Way	76th Avenue SE	SE 26th Street	One
SWG10	Island Crest Way	N Mercer Way	SE 34th Place	Irregular

[a] Corresponds to ID numbers in Exhibits 7-1 and 7-2.

[b] Irregular portions may occur on one or both sides of street.

The entrance to the South Bellevue Park-and-Ride Lot is located approximately one-fifth of a mile north of the I-90 exit/entrance ramps, and much of the surrounding land use consists of larger office parks and open recreational spaces. As a result, high pedestrian volumes are relatively uncommon in this area. Crosswalks are located at the signalized intersections nearest to the park-and-ride lot. There is no sidewalk along the western side of Bellevue Way, south of 112th Avenue SE, due to right-of-way constraints associated with the topography. Common walking origins or destinations in this area include the Enatai Neighborhood, nearby office parks, and the Mercer Slough recreational area. The South Bellevue Park-and-Ride Lot's proximity to the I-90 entrance ramps and long walking distance to Downtown Bellevue may discourage pedestrians from using Bellevue Way and 112th Avenue SE. However, pedestrian circulation occurs more commonly within the Mercer Slough Nature Park among recreational users.

The existing sidewalks surrounding the 118th and SE 8th stations are generally sidewalks located along arterial streets in this area, although sidewalks are absent the east side of 114th Avenue NE (along I-405) and 118th Avenue SE due to right-of-way constraints. At the interchange of SE 8th Street andI-405, crosswalks are marked along the north side of SE 8th Street, although they are absent along the south side of SE 8th Street. Within 1 mile of the stations in Segment B there are few local or collector east-west streets that connect the arterial streets to each other. Lake Hills Connector Road and SE 8th Street are the main east-west arterials providing connection between the South Bellevue and Wilburton neighborhoods. Small segments of sidewalk are missing on one side of these arterials, as seen in Table 7-2, due to topographical and drainage constraints. Generally, high levels of pedestrian volumes are uncommon in this area due to the nature of the surrounding land-use types, topography, and street configuration.

A missing sidewalk was also identified on SE 25th Street, which serves the school walk route for Enatai Elementary School. Most of the school walk routes for this school are located on collector and local residential streets. Other than this elementary school, there are no other school walk routes located in Segment B.

Source: Data from City of Seattle (2002), King County (2005 and 2006) modified by CH2M HILL, and Sound Transit (2007).

- Sidewalk Gap (SWG)/ Bike Route Gap (BRG)
- Sidewalk Study Area (1/2 mile)
- Bicycle Study Area (1 mile)
- Arterial Street
- Proposed Station
- Central Link Alignment and Station
- SR 519 Improvements

NOTE:
Phase II SR 519 nonmotorized improvements include S Royal Brougham Way only.

N

0 0.25 Mile

Exhibit 7-1 **Existing and Future No Build Nonmotorized Facilities Segment A - Seattle**
East Link Project

Source: Data from King County (2005 and 2006) modified by CH2M HILL.

Sidewalk Gap (SWG)/ Bike Route Gap (BRG)
Arterial Street
Sidewalk Study Area (1/2 mile)
Bicycle Study Area (1 mile)
Proposed Station

N

0 0.25 Mile

Exhibit 7-2 **Existing and Future No Build Nonmotorized Facilities Segment A - Mercer Island**
East Link Project

TABLE 7-2
Missing Arterial Sidewalk Segments within Segment B

Map ID[a]	Roadway	From	To	Missing Side[b]
SWG11	106th Avenue SE	SE 30th Street	108th Avenue SE	Both
SWG12	108th Avenue SE	SE 3rd Street	SE 17th Street	Irregular
SWG13	SE 25th Street	104th Avenue SE	Bellevue Way SE	Irregular
SWG14	SE 34th Street	108th Avenue SE	111th Avenue SE	Both
SWG15	Bellevue Way SE	112th Avenue SE	113th Avenue SE	One
BRG1	113th Avenue SE	111th Avenue SE	Bellevue Way SE	Not applicable
SWG16	118th Avenue SE	SE 8th Street	I-90 Entrance	One
SWG17	SE 8th Street	114th Avenue SE	Lake Hills Connector	One
SWG19	Lake Hill Connector Road	SE 6th Street	Kelsey Creek Park	One
SWG20	121st Avenue SE	SE 8th Street	SE 20th Place	One

[a] Corresponds to ID numbers in Exhibit 7-2.

[b] Irregular portions may occur on one or both sides of street.

7.2.1.3 Segment C

Downtown Bellevue is a major destination in the eastern Puget Sound region, and pedestrian circulation is generally well supported by sidewalks and crossing signals. Sidewalks are available on both sides of all arterials immediately surrounding the Bellevue Transit Center. Within Segment C, there is one mid-block crosswalk on NE 10th Street between 110th Avenue NE and 108th Avenue NE providing connectivity between the King County Library and nearby mixed-use buildings. The highest pedestrian activity in Segment C and in the study area is focused around the Bellevue Transit Center. There are major pedestrian crossings at the Bellevue Transit Center, where there is dense pedestrian activity during the PM peak periods when commuters are traveling to bus loading areas. Currently, almost 700 pedestrians during the PM peak hour use the pedestrian crosswalk at the intersection of 108th Avenue NE and NE 6th Street (adjacent to the Bellevue Transit Center). Many pedestrians using this transit center originate from or are destined to nearby employers throughout downtown. An east-west pedestrian pathway provides connectivity between the Bellevue Transit Center and the Bellevue Square Mall and surrounding retail uses. Generally, within the downtown area, pedestrian activity is denser between Bellevue Way and 110th Avenue NE and between NE 8th Street and NE 4th Street, where retail and business office destinations are predominant.

There are generally sidewalks on both sides of the roadway on the arterial street network in Segment C, as listed in Table 7-3 and shown on Exhibit 7-3. Full sidewalks are present at locations nearest to the proposed stations, indicating that pedestrian circulation would be generally well-supported by existing nonmotorized infrastructure. Sidewalks are also provided on the arterials that connect Downtown Bellevue with Segment B and D.

There are missing sidewalk sections on a portion of 108th Avenue SE, which serves a school walk route. Similar to the other segments, much of the school walk routes are located on collector and local streets. These missing sidewalk areas are within a one-half mile walking distance from proposed stations; however, they are not located immediately adjacent to the station sites. Sidewalks are also provided on the arterials that connect Downtown Bellevue with Segment B and D.

Sidewalk Gap (SWG)/ Bike Route Gap (BRG)
Sidewalk Study Area (1/2 mile)
Bicycle Study Area (1 mile)
Arterial Street

Proposed Station
New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2003, 2004, 2005 and 2007) and King County (2005 and 2006).

N
0 0.25 Mile

Exhibit 7-3 **Existing and Future No Build Nonmotorized Facilities Segments B and C**
East Link Project

TABLE 7-3
Missing Arterial Sidewalk Segments within Segment C

Map ID[a]	Roadway	From	To	Missing Side[b]
SWG21	102nd Avenue NE	NE 10th Street	NE 8th Street	One
SWG22	NE 6th Street	106th Avenue NE	105th Avenue NE	One
SWG23	114th Avenue NE	NE 6th Street	SE 8th Street	One
SWG24	Main Street	1st Street	124th Avenue NE	Both
SWG25	Main Street	106th Avenue NE	108th Avenue NE	One
SWG26	NE Lake Washington Boulevard	97th Avenue NE	100th Avenue NE	One
SWG27	108th Avenue NE	NE 12th Street	NE 24th Street	Irregular

[a] Corresponds to ID numbers in Exhibit 7-3.

[b] Irregular portions may occur on one or both sides of street.

7.2.1.4 Segment D

Much of the existing land use within Segment D consists of commercial and light warehousing facilities. Only a few local streets provide connectivity between the arterials; therefore, pedestrians generally walk along these arterials even though they have high traffic volumes. Pedestrian activity in Segment D mostly occurs near Overlake Hospital and the area surrounding Overlake Village. A mid-block crosswalk across 116th Avenue NE allows pedestrian access to smaller retail areas across from the hospital. Minimal pedestrian activity north of Bel-Red Road is composed of employees and patrons using on- and off-street parking nearby the commercial and light-warehouse land uses. Pedestrians who access the Overlake Transit Center are typically transferring from bus to another mode; as a result, high volumes of pedestrian activity outside the transit center is uncommon.

Generally, pedestrian activity in Segment D is not as substantial as it is in other segments. Large portions of missing sidewalk facilities on north-south arterial streets and long walking distances between Bel-Red Road and NE 20th Street discourage pedestrian activity in this area. Crosswalks are located at all signalized intersections in Segment D. There are generally no sidewalk facilities on north-south arterial streets, or these sidewalks are located in scattered portions along the roadway as listed in Table 7-4 and shown in Exhibit 7-4. These arterials include 120th, 124th, 130th, and 136th avenues NE. However, there are sidewalk facilities in the east-west direction on both sides of NE Bel-Red Road and NE 20th Street.

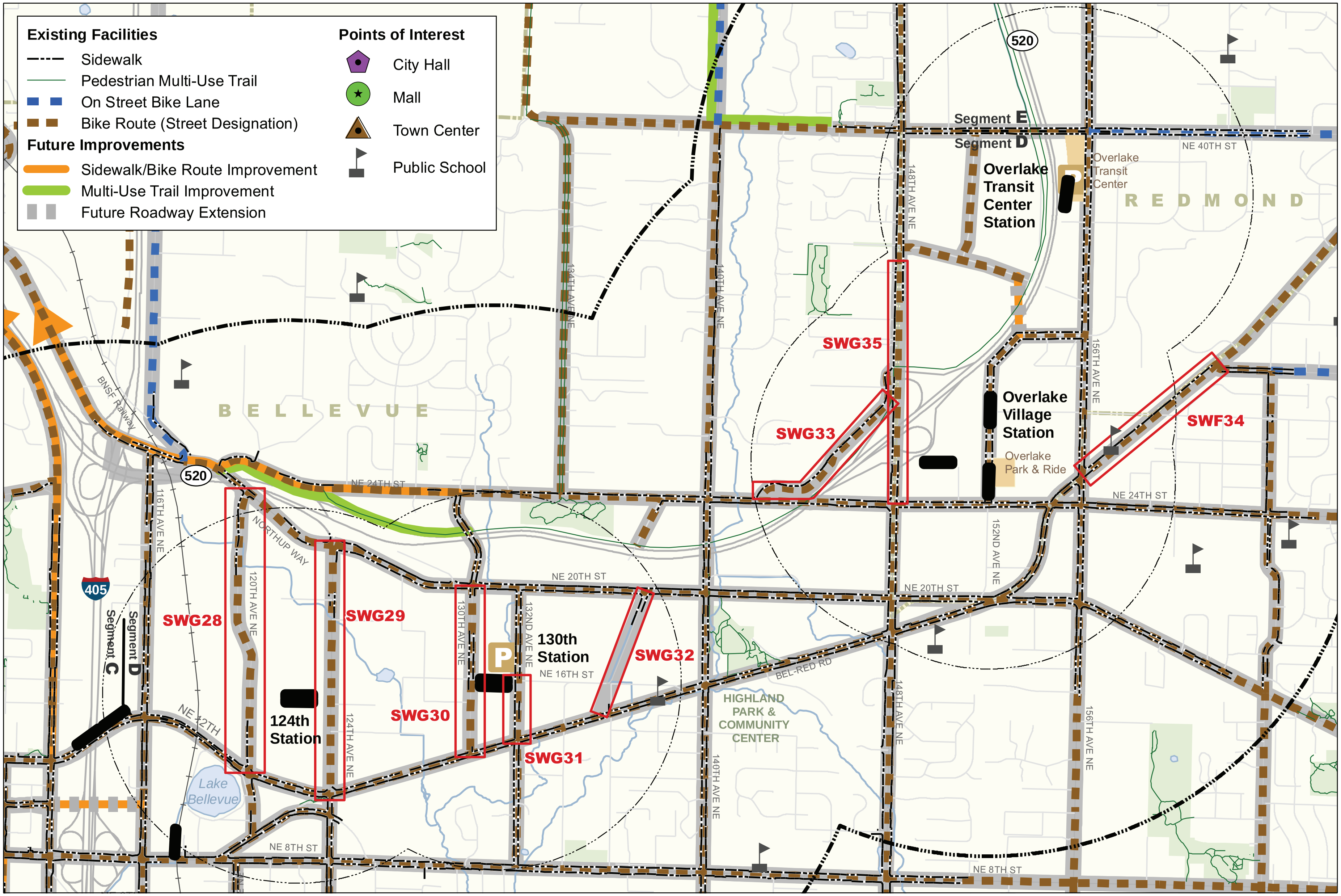
There are no school walk routes on arterial streets within Segment D.

TABLE 7-4
Missing Arterial Sidewalk Segments within Segment D

Map ID[a]	Roadway	From	To	Missing Side[b]
SWG28	120th Avenue NE	NE Bel-Red Road	Northup Way	Irregular
SWG29	124th Avenue NE	NE Bel-Red Road	Northup Way	Irregular
SWG30	130th Avenue NE	NE Bel-Red Road	Northup Way	Irregular
SWG31	132nd Avenue NE	NE Bel-Red Road	NE 16th Street	Irregular
SWG32	136th Place NE	NE Bel-Red Road	NE 20th Street	Both
SWG33	NE 29th Place	NE 24th Street	148th Avenue NE	One
SWG34	NE Bel-Red Road	156th Avenue NE	NE 30th Street	One
SWG35	148th Avenue NE	NE 24th Street	NE 35th Place	One

[a] Corresponds to ID numbers in Exhibit 7-4.

[b] Irregular portions may occur on one or both sides of street.



Sidewalk Gap (SWG)/ Bike Route Gap (BRG)
Sidewalk Study Area (1/2 mile)
Bicycle Study Area (1 mile)
Arterial Street
Proposed Station
New and/or Expanded Park-and-Ride Lot

Source: Data from City of Bellevue (2003, 2004, 2005, and 2007) and King County (2005 and 2006) modified by CH2M HILL.

N

0 0.25 Mile

Exhibit 7-4 **Existing and Future No Build Nonmotorized Facilities Segment D**
East Link Project

7.2.1.5 Segment E

In Segment E, pedestrian activity is more common within the Redmond Town Center and Marymoor Park because sidewalks, bicycle lanes, and recreational facilities have contributed to a more walkable area near the Town Center.

There are sidewalks on most arterial streets in Segment E, but a few sidewalks are missing on one side of the street, such as on Bear Creek Parkway and 166th Avenue NE, as listed in Table 7-5 and shown in Exhibit 7-5. Although Redmond Town Center and Marymoor Park are popular pedestrian destinations, they are separated by SR 520, which presents a barrier for pedestrians wishing to cross between the two areas. There are crosswalks at all signalized intersections in Segment E, with the exception of the SR 520 entrance/exit ramps along NE 76th Street and NE Redmond Way.

A school walk route for Redmond Elementary School is located within a one-half-mile radius of the Redmond Town Center Station.

TABLE 7-5
Missing Arterial Sidewalk Segments within Segment E

Map ID[a]	Roadway	From	To	Missing Side
SWG36	166th Avenue NE	Redmond Way	Avondale Road	One
SWG37	154th Avenue NE	West Lake Way	NE 85th Street	One
SWG38	Bear Creek Parkway	Leary Way	168th Avenue NE	One
SWG39	West Lake Sammamish Parkway	154th Avenue NE	Redmond Way	One

[a] Corresponds to ID numbers in Exhibit 7-5.

7.2.2 Bicycle Routes and Lanes and Multi-Use Trails

7.2.2.1 Bicycle Routes and Lanes

Within the East Link corridor, biking activity tends to occur most commonly along regional multi-use trails. This is largely due to these facilities being separated from the arterial street network, allowing bicyclists to avoid travel on arterial streets that have high traffic volumes.

There are bicycle lanes on some arterials throughout the study area and designated and signed bicycle routes are located on most arterial or collector streets throughout the corridor. Some arterials in the study area also have a wide shoulder that allows bicycle activity. Designated bicycle routes do not necessarily have marked lanes, although signage is typically present along these routes as an indicator to motorists that bicyclists are likely to share the roadway with vehicles on such specified streets. Designated bicycle routes, marked bicycle lanes, and regional multi-use trails in the study area include 12th Avenue S in Seattle; I-90 Trail (includes North Mercer Way); Bellevue Way, 112th Avenue, 118th Avenue, Bel-Red Road, NE 20th Street, NE 24th Street, 140th Avenue NE, and 148th Avenue NE in Bellevue; and 156th Avenue, West and East Lake Sammamish Parkway, and SR 202/Redmond Way in Redmond.

In Seattle, 12th Avenue S is a designated bicycle route, and there are marked bicycle lanes on S Dearborn Street and Martin Luther King Jr. Way S. East-west bicycle connectivity to these streets is achieved primarily through routes on collector and local streets. There are bicycle facilities and sidewalk facilities on both sides of most arterial streets in the Mercer Island portion of Segment A, including on North Mercer Way, Island Crest Way, and 78th Avenue SE. There are designated routes on all arterial streets in Segment C, allowing for bicycle connectivity between the Bellevue central business district and beyond, although bicycle circulation through Downtown Bellevue is less common than in other segments of the project corridor.

Refer to Exhibits 7-1 through 7-5 for arterials within the study area that are designated as a bicycle route or provide a bicycle lane.

Source: Data from City of Redmond (2007) and King County (2005 and 2006) modified by CH2M HILL.

Sidewalk Gap (SWG)/ Bike Route Gap (BRG)
Sidewalk Study Area (1/2 mile)
Bicycle Study Area (1 mile)
Arterial Street
Proposed Station
New and/or Expanded Park-and-Ride Lot

N

0 0.25 Mile

Exhibit 7-5 **Existing and Future No Build Nonmotorized Facilities Segment E**
East Link Project

7.2.2.2 Multi-Use Trails

Trails that are used only for recreation are not addressed in this section. (For information about recreational facilities, see Section 4.17, Parkland and Open Space, of the Draft EIS.)

Regional multi-use trails provide regional mobility for nonmotorized users. There are several regional multi-use trails within the study area, and some of the access points to these trails are located within close walking or bicycling distance to the proposed stations, providing transit riders with a location to easily transfer to and from nonmotorized modes. Regional multi-use trails located in the project vicinity include the I-90 Multi-Use Regional Trail (i.e., Mountains to Sound Greenway), Mercer Slough Nature Park and multi-use trails, SR 520 Regional Trail, Bridle Crest Trail, Sammamish River Trail, East Lake Sammamish River Trail, and Bear Creek Trail. These trails are connected to one another by local designated bicycle routes. Trail access to the SR 520 Regional Trail is limited to recreational parks that are not within direct walking distance of the proposed stations in Segment D or Segment E.

The I-90 Trail originates at Sturgus Park in Seattle, crosses Lake Washington along the westbound side of I-90. A portion of the trail terminates at the Mercer Slough Nature Park in south Bellevue. Trail users can also follow a paved portion of the trail that continues east of I-405, adjacent to I-90. An internal trail network within the Mercer Slough Nature Park provides trail connectivity to the 118th Trail and other nonmotorized facilities that are beyond the 1-mile radius of the proposed South Bellevue Station. The I-90 Trail is a popular bicycle facility among recreational users and bicycle commuters, and it is the only nonmotorized facility that provides pedestrian and bicycle access across Lake Washington and to Mercer Island.

As part of the data collected for this project, in 2007, 17 bicycle users were counted during the morning peak hour and 37 bicycle users were counted during the PM peak hour at the intersection of the I-90 Trail entrance with the East Mercer Way and the I-90 westbound ramps. This is the highest number of bicyclists observed at any of the other study area intersections within one-half mile of the proposed Mercer Island Station. The City of Bellevue 2006-2017 Transportation Facility Plan identifies future connections between the I-90 Trail and other existing regional and local trails that may increase the number of trail users (City of Bellevue, 2005).

The SR 520 Regional Trail is a major multi-use trail facility that follows SR 520 to the Redmond Town Center. The trail is primarily accessible through public park areas, although there are few access points along the trail from designated bicycle routes on arterial streets.

The proposed BNSF Railway Trail, a facility that is anticipated to be developed as a major multi-use trail, would follow the existing BNSF Railway corridor located along the easternmost boundary of Segment B, proceed through Segments C and D, and terminate in Segment E where it would connect with the East Lake Sammamish Trail. Sound Transit is currently coordinating with the Port of Seattle and King County to cooperatively plan the future trail, possibly including passenger rail and light rail in the same right-of-way while maintaining the ability to provide future freight use.

7.3 Environmental Impacts

This section describes the impacts on nonmotorized facilities and pedestrian access surrounding the stations. Discussion of crosswalk impacts related to the alternative routes and maintenance facilities for each segment is also included. Impacts on recommended school walk routes and missing sidewalk sections near stations are also presented. Impacts during construction and mitigation are also addressed in this section.

Pedestrian and bicycle facilities were analyzed within the respective one-half-mile and one-mile radius surrounding the proposed East Link stations. Pedestrian LOS was analyzed within 300 feet of station entrances (as described in Appendix A). Pedestrian LOS for sidewalks and intersection crossings near station entrances was evaluated using methodology from the *Highway Capacity Manual* (Transportation Research Board, 2000) and TCQSM. The pedestrian LOS analysis assumed the minimum sidewalk widths as regulated by local agencies. Pedestrian LOS is a measure of the walking conditions on a sidewalk, route, or path. LOS A represents ample spacing between pedestrians on a sidewalk or path allowing for free-flow walk speeds. LOS F represents unavoidable crowding between pedestrians on a sidewalk or path, preventing free-flow walking speed and movement.

The number of pedestrians using sidewalks that lead to or from an intersection assume the same number of pedestrians that cross each of the crosswalks that connect to these sidewalks. However, since pedestrians disperse in different directions, the sidewalk LOS results represent a conservatively high estimate of pedestrian s on each sidewalk. Table B-9 in Appendix B contains the LOS definitions, criteria, and descriptions for walkways and sidewalks.

Existing pedestrian data was obtained from intersection volume counts collected for the project and evaluated for 15-minute flow rates. To analyze year 2020 and 2030 no-build pedestrian volumes, existing pedestrian volumes were increased by the forecasted annual traffic growth rates expected for each segment.

The PM peak period ridership forecasts were used to develop the build condition pedestrian forecasts, and station walk trips were assumed to represent a conservative high estimate of pedestrian trips. Pedestrians were distributed to intersection crossings based on existing and future land uses (pedestrian LOS is summarized for each segment in Tables F-1 to F-5 in Appendix F). Throughout the study area, sidewalks and intersection crossings were shown to operate at LOS C or better in the no-build and build conditions. This indicates that there is sufficient spacing between pedestrians on the sidewalk to walk freely at their own speed, with the ability to cross paths with other pedestrians without causing conflicts in most instances.

The East Link Project would substantially increase the number of pedestrians in and around the stations. The project proposes a number of improvements in and around stations to minimize impacts on pedestrian and bicycle circulation, both during construction and during light rail operation.

Transit facility designs would be flexible, allowing each station to reflect and fit into the community it serves, while providing standard features to facilitate smooth and accessible transfers for transit customers from one type of public transportation to another. Standard design features would include the following:

- Security and safety design standards
- Easy-to-read and consistent signs
- Pedestrian-friendly design and full access for people with disabilities
- Bicycle access and secure storage
- Provide sidewalks immediately adjacent to stations (as shown on the conceptual design drawings in Appendix G1 of the East Link DEIS

Proposed bicycle facilities at the light rail stations would include bicycle racks for 20 to 30 bicycles and lockers for up to 10 bicycles. Station area plans would include room to accommodate additional racks. Due to the proximity of some stations to existing regional trails, such as the I-90 Trail, BNSF Trail, and East Lake Sammamish Trail, these stations would include wayfinding signage for nearby regional trails and other local destinations.

7.3.1 Segment A

7.3.1.1 Pedestrian Circulation

With light rail, approximately 40 percent of the person trips at the Rainier Station are estimated to occur during the PM peak period (3-hour) in 2020 and 2030 and would be a result of trip transfers between buses and East Link. Such transferring activity is consistent with routing and headways that distribute and feed riders to and from light rail to bus transit. Most of these trips are likely to be destined for the surrounding residential neighborhoods during the PM peak period. Some trips may also be destined for the surrounding commercial land uses along Rainier Avenue S.

The mid-block crosswalk on 23rd Avenue S would be maintained so pedestrians and bicyclists could continue to access the I-90 Lid Park and I-90 Trail from Rainier Station. Crosswalks at Rainier Station and the I-90 exit/entrance ramp areas would be maintained and walking distances surrounding the station would not change from existing conditions. The addition of pedestrian wayfinding signage along Rainier Avenue S would help pedestrians navigate through the I-90 ramp area more quickly. Other existing pedestrian access points to the I-90 Trail from S Irving Street would not be impacted.

At the Mercer Island Station, many of the trips during the PM peak period would likely be people destined for the surrounding residential and commercial land uses at Mercer Island Town Center, which is within close walking distance, immediately south of the station. Overall, during the PM peak period, pedestrian circulation at the Mercer Island Station would be consistent with transit commuting patterns where transit users would transfer modes to finish their commute or end their commute at surrounding neighborhoods and commercial center(s). About 25 percent of the person trips at the station would be people walking or biking to or from the surrounding residential and commercial land uses. Table 7-6 shows the estimated walk and bicycle trips generated by the Rainier and Mercer Island stations.

TABLE 7-6
PM Peak-Period (3-hour) Walk and Bicycle Trips Generated by Segment A Stations

Station (Associated Alternatives)	2020			2030		
	Boarding	Alighting	Total	Boarding	Alighting	Total
Rainier Station (A1)	240	270	510	320	290	620
Mercer Island Station (A1)	130	110	240	130	140	270

[a] Person trips for alternative with highest ridership

Note: Due to rounding, in and out walk and bicycle trips may not sum exactly to total walk and bicycle trips.

The access to the Mercer Island Station would be located along 80th Avenue SE. If the passenger drop-off/pick-up area is located along 77th Avenue SE, station access would also be provided along this street. If the passenger drop-off/pick-up area is not located along 77th Avenue SE, then it would remain in the Mercer Island Park-and-Ride Lot. An additional station access is being evaluated that would provide a pedestrian bridge extending over eastbound I-90. This bridge would accommodate about 25 percent (or approximately 250) of the riders at the station during the 3-hour peak period. Because Alternative A1 is located on I-90, walking distances, sidewalks, and crosswalks on the arterial streets are expected to remain similar to no-build conditions.

Nearby school walk routes along local and collector streets near the Rainier Station would not likely be affected because bus routes servicing the Rainier Station would not use these residential local and collector streets. There are no school walk routes within walking distance of the Mercer Island Station.

Table F-1 in Appendix F shows pedestrian LOS within Segment A. Sidewalks and crosswalks would operate at LOS B or better in the no-build and build conditions in 2020 and 2030, indicating no pedestrian crowding on sidewalks. The need for new mid-block pedestrian crossings is not foreseen within Segment A because the alternatives would allow pedestrian crossing at nearby signalized intersections and station entrances.

7.3.1.2 Bicycle Circulation

Bicycle circulation on arterial streets surrounding the Rainier Station would remain similar to existing and no-build conditions. There would be bicycle connections from the Rainier Station to the I-90 Trail at the 23rd Avenue S station entrance, where bicyclists could use the I-90 Lid Park and follow the I-90 Multi-Use Regional Trail to the Mt. Baker bike and pedestrian tunnel. The addition of bicycle capital improvements on local and collector streets may enhance circulation near the station by providing greater connectivity among arterial routes.

Because there are locally designated bicycle routes on N Mercer Way, 77th Avenue SE, and 80th Avenue SE, bicycle circulation surrounding the Mercer Island Station would remain similar to the existing and no-build conditions.

There is no expected change in bicycle circulation along I-90 with the East Link Project, although an increased number of bicycle commuters transferring to and from light rail can be expected as both stations would be located close to the I-90 Multi-Use Regional Trail. Wayfinding signage to and from the trail is recommended for both stations. Table 7-7 lists proposed bicycle facility improvements at the Rainier and Mercer Island stations.

TABLE 7-7
Proposed Bicycle Facilities in Segment A

Station (Associated Alternatives)	Existing Bicycle Facility	Proposed Quantity (Number of Bicycles)[a]	Proposed Bicycle Storage Area (square feet)[b]
Rainier Station (A1)	Not Applicable	Racks for 30, Lockers for 10	480
Mercer Island Station (A1)	12 Lockers	Racks for 30, Lockers for 10	575

[a] Station area plans include room to accommodate additional racks.

[b] Storage area measurements are approximate and taken from station design plans.

7.3.2 Segment B

7.3.2.1 Pedestrian Circulation

With light rail, about 95 percent of riders at the South Bellevue Station would consist of people making transfers among different modes (i.e., automobile or bus). Most pedestrian activity at the South Bellevue Station would occur within the station and park-and-ride lot areas. As much of the land use surrounding the station is residential, the pedestrian trips are expected to come from or go to the surrounding neighborhoods, mainly the Enatai Neighborhood. Generally, pedestrian circulation between the South Bellevue Station and surrounding neighborhoods would continue to be disconnected due to the terrain west of the park-and-ride lot and to limited direct connections from the Enatai Neighborhood, although there are a few connections between the southern Enatai Neighborhood and the park-and-ride lot. Surrounding the South Bellevue Station, sidewalks and crosswalks on Bellevue Way would be maintained to provide circulation. An elevated or at-grade alternative (i.e., Bellevue Way [B1], 112th SE At-Grade [B2A], 112th SE Elevated [B2E] and 112th SE Bypass [B3]) would serve the South Bellevue Station.

Most of the estimated PM peak-period person trips (about 80 percent) at the SE 8th Station would consist of pedestrians accessing the station headed to and from surrounding office parks or the South Bellevue Neighborhood. More pedestrians would board light rail during the PM peak period than would during the AM peak period, reflecting heavier pedestrian activity at the station during the evening commute period. Table 7-8 shows the number of estimated pedestrian and bicycle trips generated by the SE 8th Station in Segment B during the PM peak period. Alternatives that serve the SE 8th Station include B2A and B2E.

At the 118th Station, approximately 70 percent of the estimated future PM peak period person trips would be riders transferring between East Link and other modes (Table 7-8). Therefore, substantial pedestrian activity beyond the station area is not expected. There are no midblock crossings near the station area. Many of the trips destined for 118th Station during the PM peak hour would likely originate from the surrounding office park and commercial land uses. The elevated portion of the BNSF Alternative (B7) would serve the 118th Station.

Pedestrian circulation surrounding the SE 8th and 118th stations would improve compared to existing conditions, due to sidewalk improvements on SE 8th Street, 114th Avenue SE, and 118th Avenue SE in locations surrounding the stations. Improving sidewalk segments on arterials that surround the station would provide safer pedestrian connectivity to the stations.

The at-grade and elevated profiles associated with Alternatives B1, B2A, B2E, and B3 would result in slightly increased walking distances at crosswalks due to the roadway widening at the intersections of SE Bellevue Way and South Bellevue Park-and-Ride (for Alternative B1), SE Bellevue Way and 112th Avenue SE (for Alternatives B1, B2A, B3) and 112th Avenue SE and SE 8th Street (for B2A). Slightly increased walking distances at crosswalk on Bellevue Way north of 112th Avenue SE would also occur for Alternative B1.However, any increases in walking distances at these crosswalks would be accommodated by increasing the pedestrian signal times to keep the crossings safe. B7 would not have any impact to pedestrian crossings as most of this alternative is outside the roadway right-of-way. The existing crosswalk locations would not change with any of these alternatives.

The at-grade South Bellevue Station in B1 would be accessed by crosswalks at the two signalized intersections that provide access to the park-and-ride lot. Placement of the existing crosswalk on the north leg of the intersection at 112th Avenue NE and South Bellevue Way Park-and-Ride Lot would remain intact so that left-turning vehicles out of the park-and-ride would do not conflict with crossing pedestrians. The at-grade SE 8th Street Station in B2A would be accessed by the crosswalk on the north leg of SE 8th Street. The stations for the Segment B routes with elevated platforms (B2A, B2E, B3 and B7) would be accessed by elevator and escalator.

The missing sidewalk segment on SE 25th Street in the Enatai Neighborhood is part of a school walk route to Enatai Elementary School. East Link is not expected to impact this school walk route because it would be located west of the project alternatives, and few pedestrians associated with the project are expected to use this street.

Table F-2 in Appendix F shows that pedestrian LOS at the Segment B station entrances is expected to operate at LOS A by 2020 and LOS B or better by 2030 in the no-build and build conditions. Crosswalks would be provided at signalized intersections with at-grade alternatives therefore new mid-block pedestrian crossings should not be needed within Segment B.

TABLE 7-8
PM Peak-Period (3-hour) Walk and Bicycle Trips Generated by Segment B Stations

Station (Associated Alternatives)	2020			2030		
	Boarding	Alighting	Total	Boarding	Alighting	Total
South Bellevue (B1, B2A, B2E, B3)	10	60	80	20	80	100
SE 8th (B2A, B2E)	140	60	200	200	70	270
118th (B7)	130	50	170	180	50	230

[a] Person trips for alternative with highest ridership.

Note: Due to rounding, in and out walk and bicycle trips may not sum exactly to total walk and bicycle trips.

7.3.2.2 Bicycle Circulation

Bicycle circulation within Segment B is likely to remain similar to existing and no-build conditions. There would be bicycle improvements (bicycle lanes) on 108th Avenue SE by 2020 and 2030 under both no-build and build conditions, resulting in safer connectivity between the proposed stations and the I-90 Regional Multi-Use Trail; 108th Avenue SE is a regularly used bicycle route connecting with the I-90 Trail. Designated bicycle routes located on 112th Avenue SE and S Bellevue Way are expected to remain designated routes in the future. All proposed stations in Segment B would be close to the I-90 and 118th Avenue SE Regional Multi-Use trails, and increased volumes on these trails would likely occur. Bicycle storage facilities and wayfinding signage at these stations are recommended. Table 7-9 lists the proposed bicycle facilities at Segment B stations.

Direct operational impacts on trails in Segment B would include acquiring right-of-way along 112th Avenue SE for the Bellevue Way (B1), 112th SE At-Grade (B2A), 112th SE Elevated, and 112th SE Bypass (B3) alternatives. These alternatives would require the use of narrow portions of the Mercer Slough Park's western boundary, necessitating relocation of a portion of the Heritage Farm Trail that is within the Mercer Slough trail network. The BNSF Alternative (B7) would provide new access to the east end of the Mercer Slough Nature Park and would not require relocations of the Mercer Slough trail network or I-90 Regional Trail. Impacts on the I-90 Trail at the I-405 interchange are not expected.

TABLE 7-9
Proposed Bicycle Facilities in Segment B

Station (Associated Alternatives)	Existing Bicycle Facility	Proposed Quantity (Number of Bicycles)[a]	Proposed Bicycle Storage Area (square feet)[b]
South Bellevue (B1, B2A, B2E, B3)	None	Racks for 20, Lockers for 10	450
SE 8th (B2A, B2E))	Not applicable	Racks for 20, Lockers for 10	430
118th Avenue SE (B7)	Not applicable	Racks for 20, Lockers for 10	560

[a] Station area plans include room to accommodate additional racks.

[b] Storage area measurements are approximate and taken from station design plans.

7.3.3 Segment C

7.3.3.1 Pedestrian Circulation

Downtown Bellevue is one of the primary destinations that the East Link Project would serve because it is a major central business district in the Puget Sound region. To provide adequate sidewalk circulation in the future, development projects or planned city capital improvements are expected to fill in the identified missing sidewalk segments within the downtown area, although nearly all the streets in Downtown Bellevue already provide continuous sidewalks on both sides of the street. Table 7-10 provides the pedestrian and bicycle activity for each of the Segment C stations in years 2020 and 2030.

Among all parts of in the study area, pedestrian activity is greatest at the Bellevue Transit Center. Within the central business district, major employers such as the Bellevue Square Mall and other employers in the surrounding retail and commercial businesses, as well as the existing and planned residential areas, will continue to create dense pedestrian circulation activity in the future. A pedestrian walkway located on NE 6th Street between 108th Avenue NE and Bellevue Way is a major east-west pedestrian corridor that connects the Bellevue Transit Center to the Bellevue Square Mall and other commercial and retail areas.

The Bellevue Transit Center Station area would have the highest estimated PM peak-period pedestrian trips compared to other East Link station areas; close to 5,000 pedestrians and bicyclists would use this Bellevue Transit Center Station in 2030. With light rail, it is estimated that in 2020, slightly more than 60 percent of the total estimated PM peak-period person trips at the Bellevue Transit Center Station would be pedestrians coming to or from the surrounding area. In 2030, this pedestrian activity would slightly increase, to about 70 percent of the total PM peak-period person trips estimated at this station. Most pedestrian trips expected at this station would be people boarding light rail in the PM peak period, indicating people walking from the surrounding office and commercial land uses. This degree of activity would be consistent with an urban downtown environment that is expected to become denser and continue to grow by years 2020 and 2030, even without light rail. All of the Segment C alternatives would serve the Bellevue Transit Center.

It is estimated that pedestrian trips would comprise approximately 85 percent of future PM peak-period person trips at the Old Bellevue Station. Much of the pedestrian activity at Old Bellevue Station would be well served with sidewalks and pedestrian-oriented shopping in the historic Downtown Bellevue area of Main Street. The location of this station is also expected to capture a portion of pedestrian activity on the fringe of Downtown Bellevue that would otherwise require farther walking distance to the Bellevue Transit Center. The Bellevue Way Tunnel Alternative (C1T) is the only alternative that would include the underground Old Bellevue Station.

It is estimated that pedestrian trips would comprise more than 55 percent of the future PM peak-period person trips at the East Main Station, indicating a slightly lower percentage of people being dropped-off, picked-up, or transferring between buses at the station. These pedestrians are expected to originate from the adjacent residential and commercial areas. Similar to the Old Bellevue Station, the level of pedestrian activity near the station indicates that a portion of the pedestrian trips that require farther walking distance to the Bellevue Transit Center would be captured by the East Main Station. The 106th NE Tunnel (C2T), 108th NE Tunnel (C3T), Couplet (C4A), 112th NE Elevated (C7E), and 110th NE Elevated (C8E) alternatives would serve the elevated East Main Station when they connect to the 112th SE Bypass (B3) and BNSF (B7) alternatives.

It is estimated that pedestrian trips would comprise about 75 percent of the future PM peak-period person trips at the Ashwood/Hospital Station, composed primarily of people leaving Overlake Hospital and the surrounding office and commercial areas, as well as people heading to the surrounding Ashwood Neighborhood. The Hospital Station would have less pedestrian activity than the Ashwood/Hospital Station because it would not capture some of the office and residential neighborhoods west of I-405 that the Ashwood/Hospital Station would attract. C3T, C4A, C7E, and C8E would serve the Ashwood/Hospital Station located north of NE 12th Street across I-405. Pedestrian access to this station would be provided on both sides of I-405. C1T and C2T would serve the Hospital Station located north of NE 8th Street, east of 116th Avenue NE.

Although most of C4A and C8E would be within the roadway right-of-way, they would not increase the pedestrian walking times at crosswalks because roadway widening is not proposed. Crossing times across or under these alternatives would be incorporated into the signal phasing so that pedestrians would have adequate time to cross the streets. Crosswalk locations along 108th and 110th Avenues NE would not be affected by the

Couplet Alternative (C4A) but would require signal adjustments to coordinate safe east-west pedestrian crossings. Impacts to crosswalks are not expected with the tunnel alternatives (C1T, C2T, and C3T) through most of Segment C because the alternatives would be mainly underground. C1T and C2T would become elevated on NE 6th Street, east of 110th Avenue NE, but similar to the other Segment C alternatives, roadway widening is not proposed. C7E would not have any impact to pedestrian crossings because most of this alternative would be outside the roadway right-of-way.

Elevator and escalator facilities would provide access to the elevated or underground station platform with the elevated and tunnel routes (i.e., C1T, C2T, C3T, C7E, and C8E). Because crosswalks are provided at all the signalized intersections within the Segment C study area and distances between blocks in downtown Bellevue are less than one-quarter mile, a need for new pedestrian crossings is not foreseen with any of the Segment C alternatives.

As shown in Exhibit 7-6, among the proposed stations in Segment C, the light rail stations located closer to the existing Bellevue Transit Center would be expected to attract more riders because they would better serve Downtown Bellevue as a result of their proximity to denser employment and residential areas. The farther east that the stations are located from Downtown Bellevue, the less pedestrian activity would be expected. Because the Ashwood/Hospital Station would be within walking distance from Overlake Hospital and Downtown Bellevue (i.e., dense employment and residential areas), it would have a greater increase in pedestrian activity by 2030 than the Hospital Station would because the Hospital Station is farther away from downtown Bellevue. Section 4.3.3, Light Rail Ridership, of this report further describes these trends.

As shown in Table F-3 in Appendix F, the sidewalks near the Bellevue Transit Center currently operate at LOS B or better during the PM peak hour, indicating that sidewalks near the transit center generally operate well and that pedestrian activity near the transit center moves freely. Without light rail, in the future, major pedestrian crossings and sidewalks adjacent to the Bellevue Transit Center at the 108th Avenue NE and NE 6th Street intersection would degrade from LOS B to LOS C, which still represents sufficient pedestrian spacing for free-flow movement on the sidewalks, with any crowding resulting only in an increased potential for minor pedestrian conflicts near the station or at the station platform. In the build condition for years 2020 and 2030, the pedestrian LOS at this intersection would remain at LOS C. Sidewalks and pedestrian crossings within Downtown Bellevue would not operate below LOS C with any of the light rail alternatives, indicating that impacts on pedestrian circulation are not anticipated.

The school walk route along 108th Avenue SE is not expected to be affected by any of the Segment C alternatives because it is located south of Main Street.

7.3.3.2 Bicycle Circulation

Bicycle circulation through Downtown Bellevue would remain similar to existing and no-build conditions because nearly all arterial streets in the downtown area are designated bicycle routes. A future no-build City of Bellevue project is to provide bicycle improvements north of NE 12th Street on 112th Avenue NE, and on 108th

TABLE 7-10
PM Peak-Period (3-hour) Walk and Bicycle Trips Generated by Segment C Stations

Station (Associated Alternatives)	2020			2030		
	Boarding	Alighting	Total	Boarding	Alighting	Total
East Main (C2T, C3T, C4A, C7E, C8E)	350	270	610	730	320	1,050
Old Bellevue (C1T)	400	310	710	800	380	1,180
Bellevue Transit Center (C1T, C2T, C3T, C4A, C7E, C8E)	2,100	880	2,970	3,810	1,100	4,910
Ashwood/ Hospital (C3T, C4A, C7E, C8E)	190	60	250	530	180	710
Hospital (C1T, C2T)	180	50	230	240	80	330

[a] Person trips for alternative with highest ridership.

Note: Due to rounding, in and out walk and bicycle trips may not sum exactly to total walk and bicycle trips.

Avenue NE as part of the vehicle one-way couplet project, which would provide additional bicycle lane connections to the downtown area by 2020. Currently, 106th and 108th avenues NE operate as two-way streets for vehicles and bicyclists. In the future no-build condition, bicycle circulation would likely be affected by City of Bellevue plans to convert this pair of streets into a one-way vehicle couplet. The Couplet Alternative (C4A) would change circulation patterns for bicyclists traveling on 106th, 108th and 110th avenues NE by converting 106th Avenue NE to two-way vehicle operations and converting 108th and 110th Avenue NE to the one-way vehicle couplet. However, no overall bicycle circulation impact is expected, because C4A would maintain the same number of two-way and one-way streets in Downtown Bellevue. The side-track alignment of C4A would create the potential for bicyclists to turn across the light rail tracks. The remaining Segment C alternatives are mainly elevated and tunnel profiles that would have minimal impacts on downtown bicycle circulation. Crosswalk access for bicyclists would operate under the same pedestrian access conditions previously described.

Although NE 12th Street is designated as a bicycle route, bicycle circulation from or to downtown using the Ashwood/Hospital Station may be affected at the nearby intersections in order to reach the station entrance located on the north side of NE 12th Street. Approaching from the west, bicyclists would need to cross both NE 12th Street and 112th Avenue NE to reach the northeast sidewalk where the station entrance would be located. Table 7-11 lists recommended bicycle storage facilities at the stations.

TABLE 7-11
Proposed Bicycle Facilities in Segment C

Station (Associated Alternatives)	Existing Bicycle Facility	Proposed Quantity (Number of Bicycles)[a]	Proposed Bicycle Storage Area (square feet)[b]
East Main (C2T, C3T, C4A, C7E, C8E)	Not applicable	Racks for 20, Lockers for 10	640
Old Bellevue (C1T)	Not applicable	Racks for 20, Lockers for 10	450
Bellevue Transit Center (C1T, C2T, C3T, C4A, C7E, C8E)	Racks	Racks for 30, Lockers for 10	500
Ashwood/ Hospital (C3T, C4A, C7E, C8E)	Not applicable	Racks for 20	108
Hospital (C1T, C2T)	Not applicable	Racks for 20, Lockers for 10	450

[a] Station area plans include room to accommodate additional racks.

[b] Storage area measurements are approximate and taken from station design plans.

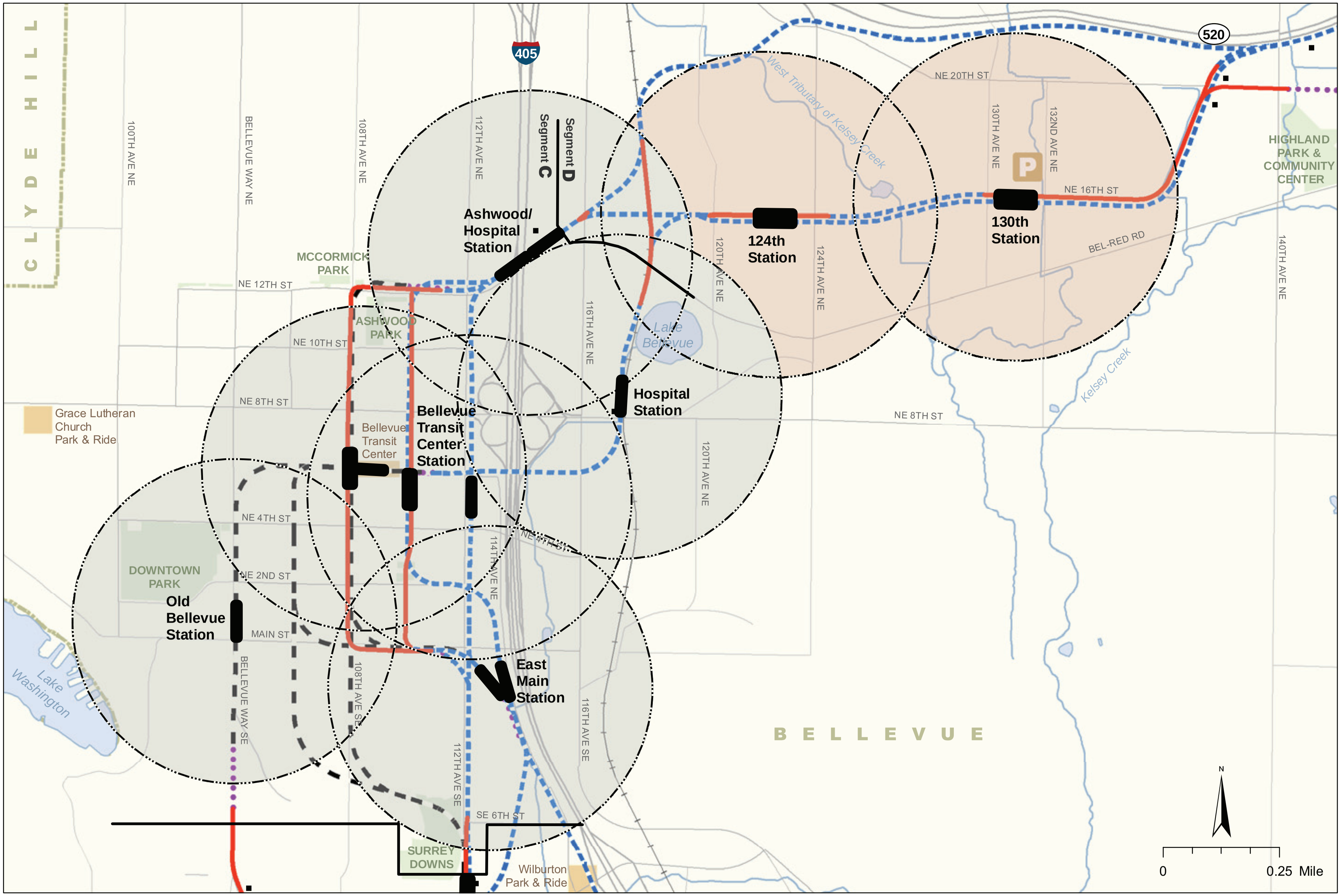
7.3.4 Segment D

7.3.4.1 Pedestrian Circulation

With light rail, approximately 50 percent of the PM peak-period person trips generated at the 124th Station would be walk and bicycle trips that would likely originate at surrounding commercial land uses destined for the station to board light rail. Generally, a lower level of pedestrian activity would occur at this station, probably as a result of the surrounding land uses, substantial block lengths without sidewalks that disconnect the area and higher traffic volumes on NE 20th Street and Bel-Red Road that may not create a walkable environment around the station. The NE 16th At-Grade (D2A), NE 16th Elevated (D2E), and NE 20th (D3) alternatives would serve the 124th Station.

At the 130th Station, slightly more than half of the people using the station during the PM peak period would transfer between light rail and auto and most of the other people at the station would be either a pedestrian or a bicyclist. During the PM peak period, many of the light rail boarding trips would likely originate from nearby commercial office parks, and light rail alighting trips would likely be destined for nearby residential neighborhoods south of the station. D2A, D2E, and D3 would serve the 130th Station.

The 124th Station and 130th Station are within moderately close walking distance of each other, as illustrated in Exhibit 7-6. Pedestrians would access the station that is closer to their walk route. The western edge of the



Source: Data from City of Bellevue (2005), City of Redmond (2005), and King County (2006).

Pedestrian Walking Area Segment C (0.35 mile)
Pedestrian Walking Area Segment D (0.35 mile)
At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Traction Power Substation
Proposed Station
Maintenance Facility and Access Track
New and/or Expanded Park-and-Ride Lot

NOTE: To account for a street grid system, a radius of 0.35 mile was used in place of a radius of 0.50 mile.

Exhibit 7-6 **Pedestrian Walking Areas by Stations in Downtown Bellevue and Bel-Red Area Segments C and D**
East Link Project

124th Station service area would also be constrained by terrain that would be a barrier to effectively connecting potential pedestrians from the west with this station.

Slightly more than 40 percent of the PM peak-period person trips at the Overlake Village Station would be pedestrians or bicyclists coming to or heading out of the station. Many of these pedestrians destined for the Overlake Village Station would likely originate from the nearby office park campus, commercial, and mixed land uses. Pedestrian circulation to and from the private properties west of 152nd Avenue NE, near the Overlake Village Station, would be modified with D2A, D2E, and the SR 520 Alternative (D5) to prohibit pedestrians from crossing the tracks. This could create some out-of-direction travel for pedestrians. D2A, D2E, D3, and D5 would serve the Overlake Village Station.

At the Overlake Transit Center Station, about 35 percent of the PM peak-period person trips are expected to be composed of people walking between the surrounding large employment centers and the station. Most of these people would be boarding light rail during the PM peak period, indicating they would be commuters leaving these office and commercial areas. Some of these trips may be destined to nearby residential areas, although SR 520 and the surrounding arterials with higher traffic volumes and vehicle speeds present barriers to pedestrians destined to these areas. Table 7-12 shows the estimated number of pedestrian and bicycle trips generated by each station during the PM peak period. D2A, D2E, D3, and D5 would serve the Overlake Village Station.

Currently, there are limited sidewalks and crosswalks along NE 16th Street and 136th Place NE near the 130th Station. Sidewalks would be provided on both streets, and crosswalks would be located at the NE 16th Street and 132nd Avenue NE and at the NE 16th Street and 136th Place NE intersections as part of the D2A and D3 alternatives. Increases in the crosswalk distance across arterials are expected in areas where roadway widening occurs to accommodate the light rail tracks; however, increases in the pedestrian signal time would be provided for safety at pedestrian crossings. Increases in the pedestrian crossing times at signalized intersections would occur along NE 16th Street and 136th Avenue NE (associated with D2A and D3) and along NE 20th Street between 136th Avenue NE and 152nd Avenue NE and at the NE 24th Street and 152nd Avenue NE intersection (D3). Pedestrian circulation to and from the private properties west of 152nd Avenue NE, near the Overlake Village Station, would be modified with Alternatives D2A, D2E, and D5 to prohibit pedestrians from crossing the tracks. This could create some out-of-direction travel for pedestrians. D3 would provide an additional crosswalk north of the Overlake Village Station at NE 26th Street to accommodate pedestrian movements to and from the station platform. All other at-grade stations in Segment D would not be in roadway travel lanes, so additional crosswalks to provide access to the station platforms would not be necessary. Elevator and escalator facilities would be provided for the 124th and 130th stations under D2E to provide access to the elevated station platforms.

Sidewalks at the intersections nearest to all the Segment D station entrances would operate at LOS A in the no-build and build conditions, indicating that pedestrian flows to and from the station would occur without crowding (see Table F-4 in Appendix F).

There would be no impacts on any school walk routes in this segment.

TABLE 7-12
PM Peak-Period (3-hour) Walk and Bicycle Trips Generated by Segment D Stations

Station (Associated Alternatives)	2020			2030		
	Boarding	Alighting	Total	Boarding	Alighting	Total
124th (D2A, D2E, D3)	30	10	40	60	10	70
130th (D2A, D2E, D3)	130	150	280	180	210	390
Overlake Village (D2A, D2E, D3, D5)	180	90	270	400	200	600
Overlake Transit Center (D2A, D2E, D3, D5)	480	220	710	670	340	1,010

* Person trips for alternative with highest ridership

Note: Due to rounding, in and out walk and bicycle trips may not sum exactly to total walk and bicycle trips.

7.3.4.2 Bicycle Circulation

The stations in Segment D would have few or no impacts on existing bicycle circulation. All arterial streets are part of a designated bicycle route network; however, bicycle circulation is limited because there are no marked bicycle lanes on arterial streets. Bicycle circulation in Segment D would also be limited by the presence of higher traffic volumes on wider arterials such as Bel-Red Road and NE 20th Street. The 124th and 130th stations would be located close to the SR 520 Multi-Use Regional Trail; however, trail access would be limited to public park areas, and direct access from arterial streets would be constrained by terrain and property access. Due to smaller bicycle storage expansion area and bicycle circulation conditions at both stations, fewer bike storage facilities are proposed (Table 7-13). Bicycle circulation conditions near the Overlake Village Station and Overlake Transit Center Station would be similar to existing conditions. Although these stations are located close to the SR 520 Regional Multi-Use Trail, access between the trail and these stations would be indirect as trail users would need to cross SR 520; thus, wayfinding signage is proposed.

TABLE 7-13
Proposed Bicycle Facilities in Segment D

Station (Associated Alternatives)	Existing Bicycle Facility	Proposed Quantity (Number of Bicycles)[a]	Proposed Bicycle Storage Area (square feet)[b]
124th (D2A, D2E, D3)	Not applicable	Racks for 20	360
130th (D2A, D2E, D3)	Not applicable	Racks for 20	200
Overlake Village (D2A, D2E, D3, D5)	Racks for 25	Racks for 25, Lockers for 10	450
Overlake Transit Center (D2A, D2E, D3, D5)	Racks for 42, Lockers for 6, Bike Center	Racks for 20, Lockers for 10	360

[a] Station area plans include room to accommodate additional racks.

[b] Storage area measurements are approximate and taken from station design plans.

7.3.5 Segment E

7.3.5.1 Pedestrian Circulation

Redmond Town Center is a major commercial destination within the East Link Project corridor and generates the highest pedestrian activity among the proposed Segment E stations, as indicated in Table 7-14. Most light rail riders at the Redmond Town Center Station are expected to make bus transfers or walk to and from the surrounding commercial and retail areas. Slightly more than 35 percent of the riders at the Redmond Town Center Station would likely be destined to or coming from the Redmond Town Center or surrounding commercial and mixed land uses. The Redmond Way (E1), Marymoor (E2), and Leary Way (E4) alternatives would serve the at-grade Redmond Town Center Station.

At the Redmond Transit Center Station, about 35 percent of the future PM peak-period person trips would be pedestrians or bicyclists. The pedestrian activity at the Redmond Transit Center Station would occur at the between the station and the park-and-ride lot, as many riders would be transferring between modes. This indicates a lower degree of circulation extending beyond the station area to the residential and commercial areas. High park-and-ride usage indicates that many riders' commutes would continue beyond the station. E2 would serve the at-grade Redmond Transit Center Station. If E2 is truncated at the Redmond Town Center, then Redmond Transit Center Station would be eliminated.

The pedestrian activity at the SE Redmond Station would primarily occur at park-and-ride areas as a result of many people transferring from light rail to autos. This travel pattern would be expected because the surrounding land uses include industrial and commercial buildings and a public park area that is not within close walking distance to the station. Pedestrian circulation near this station would also be limited by wide multilane arterials with heavy traffic volumes and by the proximity to SR 520, which is a physical barrier to and from Downtown Redmond. The three Segment E alternatives would serve the at-grade SE Redmond Station.

In terms of pedestrian crosswalk conditions, increases in walking times across arterials are expected only with E2, across the tracks on 161st Avenue NE from Cleveland Street to NE 85th Street. Increases in the pedestrian crossing times would be incorporated into the signal phasing to provide safe crossing times for pedestrians. If E2 is truncated at the Redmond Town Center station, the roadway widening on 161st Avenue NE and the associated increases in the pedestrian crossing times would not occur. With the exception of the Redmond Transit Center Station, stations along the proposed alternatives in Segment E would use the existing BNSF rail tracks. The future BNSF regional multi-use trail would provide pedestrian access to and from the stations. Crossings at 161st, 164th, 166th, 170th avenues NE and NE Leary Way would be maintained with all Segment E alternatives. At the Redmond Transit Center Station, the existing crosswalks would be maintained and pedestrian access to the station platform would occur at the crosswalks at NE 80th and 83rd streets. All other at-grade stations in Segment E would not be in roadway travel lanes, so additional crosswalks to provide access to the station platforms would not be necessary.

To provide safe vehicle and pedestrian movements across the BNSF railroad tracks used by the Segment E alternatives in downtown Redmond, railroad safety gates would be installed at at-grade intersections and driveways along the existing BNSF railroad through downtown Redmond. Pedestrian crosswalks at these locations would be maintained.

Sidewalks at the intersections near entrances of the three Segment E stations would operate at LOS A, as seen in Table F-5 in Appendix F, indicating that pedestrian crowding on sidewalks is not expected.

The recommended walk route for the Redmond Elementary School consists of collector and local streets in residential areas, and impacts on the walk route are not expected.

TABLE 7-14
PM Peak-Period (3-hour) Walk and Bicycle Trips Generated by Segment E Stations

Station (Associated Alternatives)	2020			2030		
	Boarding	Alighting	Total	Boarding	Alighting	Total
Redmond Town Center (E1, E2, E4)	250	130	380	210	170	380
SE Redmond (E1, E2, E4)	30	10	40	40	20	60
Redmond Transit Center (E2)	70	50	120	60	80	140

[a] Person trips for alternative with highest ridership.

Note: Due to rounding, in and out walk and bicycle trips may not sum exactly to total walk and bicycle trips.

7.3.5.2 Bicycle Circulation

Circulation for bicyclists in Segment E with the East Link Project is not expected to differ substantially from the no-build condition. Future bicycle improvement projects would enhance bicycle circulation with or without light rail by improving access to Marymoor Park and the Sammamish Regional Multi-Use Trail system. These bicycle facilities would be close to the proposed stations; however, SR 520 would hinder direct access to them, especially from the Redmond Town Center. There are bicycle lanes on some arterial streets near the Redmond Transit Center, reflecting bicycle-user demand and allowing nonmotorized connectivity between the Redmond Transit Center and the nearby Sammamish Regional Multi-Use Trail. Because of the close location of the regional trail system and circulation conditions surrounding the proposed stations in Segment E, bicycle storage facilities are proposed at the stations, as shown in Table 7-15.

Segment E conceptual design accounted for the potential development of a multi-use trail located along the BNSF Railway tracks parallel to the Redmond Way (E1), Marymoor (E2), and Leary Way (E4) alternatives. Development of a multi-use trail in this corridor would extend pedestrian and bicycle circulation from the southern portion of the SR 520 Trail to Lake Sammamish. The trail would be directly accessible from the SE Redmond Station and allow nonmotorized commuters to transfer to light rail.

TABLE 7-15
Proposed Bicycle Facilities in Segment E

Station (Associated Alternatives)	Existing Bicycle Facility	Proposed Quantity (Number of Bicycles)[a]	Proposed Bicycle Storage Area (square feet)[b]
Redmond Town Center (E1, E2, E4)	Not applicable	Racks for 20, Lockers for 10	280
SE Redmond (E1, E2, E4)	Racks for 25	Racks for 20, Lockers for 10	280
Redmond Transit Center (E2)	Not applicable	Racks for 20, Lockers for 10	280

[a] Station area plans include room to accommodate additional racks.

[b] Storage area measurements are approximate and taken from station design plans.

7.3.6 Construction Impacts

Potential construction impacts for pedestrian and bicycle circulation could occur along streets with partial or full closures because these types of construction areas may restrict or provide detour routes for pedestrians and/or bicyclists. Refer to Section 6.4 for the discussion and list of these streets. Sound Transit would minimize disruptions to the sidewalk or bicycle network and provide detours as practical during construction.

Regional multi-use trails may experience some temporary construction impacts due to their proximity to the alternatives. The portion of the I-90 Multi-Use Regional Trail on the I-90 Bridge, in Segment A, would not be affected because light rail is proposed in the reversible center roadway and therefore would not cross the I-90 trail north of I-90. However, near Bellevue Way, the I-90 Trail could be temporarily affected by construction associated with the Segment B alternatives. Construction impacts on the I-90 Trail near this area may include temporary closures or detours where the trail is close to the I-90 and Bellevue Way ramps, and near the western boundary of the Mercer Slough Nature Park. Also in Segment B, the 118th Trail could be temporarily affected near I-90 by construction associated with the BNSF Alternative (B7).

No regional multi-use trails are located in Segment C. Bicycle facilities in Segment C and bicycle lanes and routes along arterial streets would experience construction impacts similar to those discussed in 6.4.

In Segment D, construction impacts on bicycle lanes and routes located on arterial streets would experience construction impacts similar to those discussed in Section 6.4 and shown in Table 6-44.The SR 520 Multi-Use Regional Trail in Segment D is located along the north side of SR 520, and construction impacts are not foreseen because the alternatives in Segment D would be located on the south side of SR 520. Construction impacts to the SR 520 Trail are not expected because the East Link Project does not require widening or realignment of SR 520 and does not require relocation of the trail.

In Segment E, the potential multi-use trail along the BNSF Railway would be affected if constructed prior to East Link. The elevated alternatives in Segment E would cross the Sammamish River Trail, resulting in minor short-term detours. The Redmond Way Alternative (E1) would also cross the Bridle Crest Trail and the Bear Creek Trail, resulting in minor short-term detours. E1 would also require minor realignment of the East Lake Sammamish Trail in the area along the BNSF Railway. Refer to Section 4.17, Parkland and Open Spaces, of the East Link Draft EIS for further discussion of impacts to parklands and related recreational trails within the study area.

7.4 Potential Mitigation

No mitigation would be necessary beyond the design improvements that Sound Transit would provide immediately adjacent to East Link stations. Sound Transit would work with the local agencies regarding alternatives and stations located within the median of roadways so that the most appropriate treatments would be provided for safe and effective pedestrian crossings and access. This could include painted crosswalks or signals, street lighting, warning lights, or signage.

Sound Transit would minimize potential construction impacts on pedestrian and bicycle facilities by providing detours within construction areas.

Multi-use trails that may be affected by construction would generally be kept open for use, but detours would be provided when trails are closed, unless they are closed for short durations or in areas where a detour option is not feasible. Any closures to regional multi-use trails would be temporary. Public notification efforts would be conducted for temporary trail closures during construction.

8.0 Freight Mobility and Access

8.1 Section Overview

This section describes the affected environment for freight during construction and light rail operation within the study area. Freeways, arterials, and local streets throughout the East Link Project vicinity are vital to the movement of freight and goods between major transportation hubs such as the Port of Seattle, Seattle-Tacoma International Airport (Sea-Tac Airport), and other business and consumer destinations. Within the East Link study area, only roadways are used in the transport of freight.

About 140,000 vehicles travel on the I-90 bridge across Lake Washington every day. Of this number, about 6,300 are trucks, or 4.5 percent of the total vehicles on the bridge. About two-thirds of these trucks travel outside of the AM and PM peak periods to avoid the more heavily congested times of the day. Due to weight and access restrictions, slightly more than 1 percent of the total traffic on the reversible center roadway of I-90 is considered to be trucks.

The East Link Project would have an overall beneficial impact on trucks traveling on I-90. As people choose to use light rail, the travel time of trucks during peak hours would improve by an average of 2 minutes in the morning and 4 minutes in the afternoon compared to the No Build Alternative and the ability for trucks volumes to cross Lake Washington on I-90 would be maintained.

On the arterial and local street system, the East Link alternatives are not anticipated to negatively impact truck circulation or truck routes. The light rail at-grade profiles that cross or travel along designated truck routes are not expected to impact trucks because intersection operations with East Link would be similar or improved compared to the No Build Alternative. On the regional highway and arterial street systems, truck travel outside of the peak periods is expected to remain similar between the No Build Alternative and East Link Project because congestion would be substantially reduced and therefore the roadways would operate below their capacity.

8.2 Affected Environment

Truck mobility within the Puget Sound region is largely supported by a network of designated truck routes consisting of freeways and arterial streets that connect major freight destinations. Within the East Link study area there are key freight corridors that serve not only the Puget Sound region but also national and international markets. These corridors include I-90 and I-405, as well as many local truck routes with a primary purpose of facilitating the flow of deliveries to local businesses. To prioritize these truck routes, WSDOT adopted the Freight Goods Transportation System (FGTS), which classifies roadways according to the amount of annual tonnage transported. The classifications range from roadways that carry more than 20,000 tons in 60 days to more than 10,000,000 tons annually (Table 8-1). Jurisdictions determine their designated truck route network on arterial streets in accordance with the FGTS classifications. Exhibits 8-1 to 8-3 show the location of truck routes in each jurisdiction within the study area. Within the East Link study area, only roadways are used in the transport of freight, although some of this freight is associated with rail and marine facilities such as the Port of Tacoma and Port of Seattle.

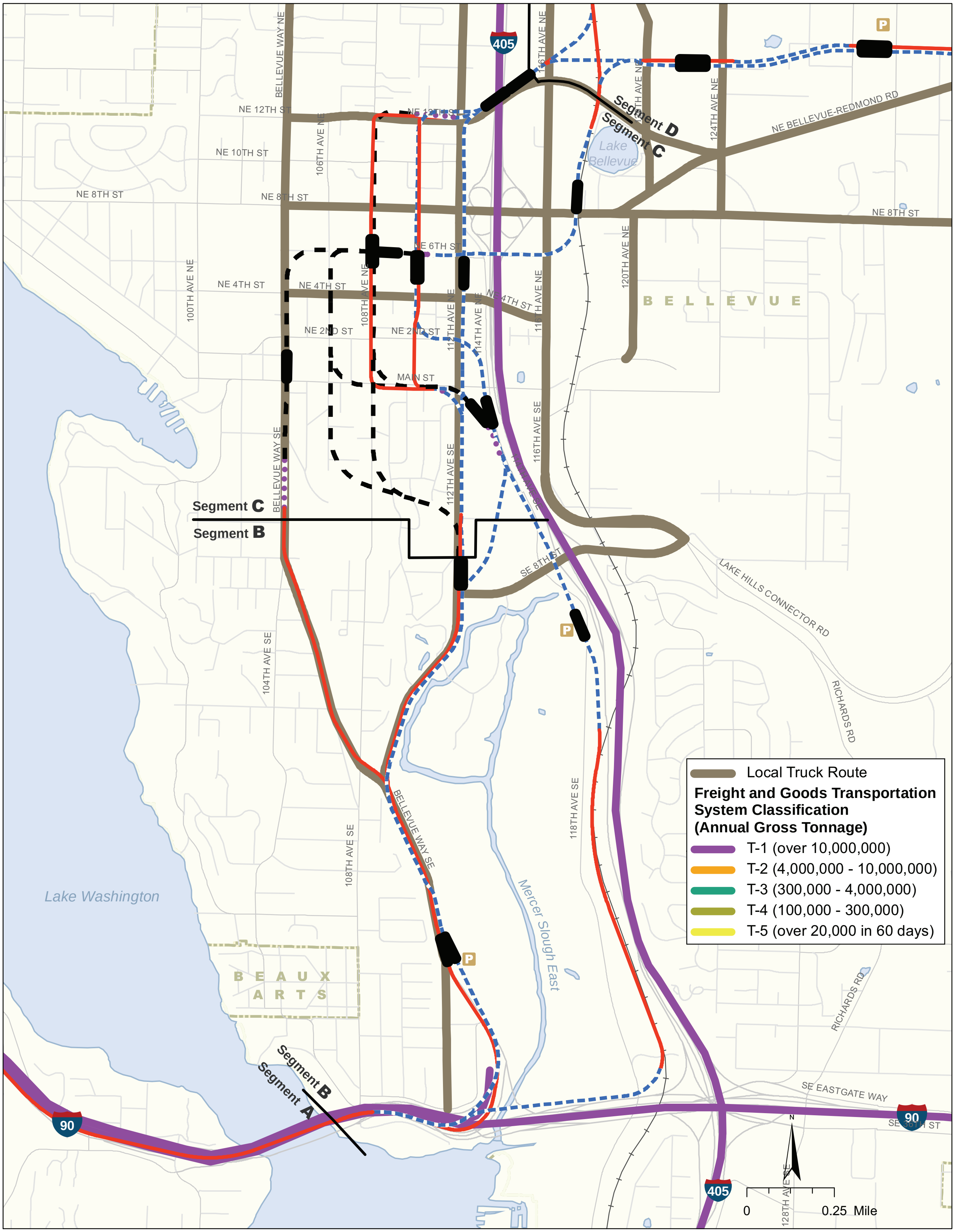
8.2.1 Regional Highways

In Segment A, I-90 is a key truck route connecting interstate and regional freight activity with the Port of Seattle and surrounding industrial areas across Lake Washington. It serves the international and national markets and is the second most heavily used highway for truck movement in Washington (WSDOT, 2005). As shown in Table 8-2, over 6,000 truck trips per day (based on traffic counts conducted on May 1 and 2, 2007) occur on I-90, many of which travel over the I-90 bridge en route to the Port of Seattle or other major transportation hubs such as Sea-Tac Airport and to other business and consumer destinations. Over the course of a year, more than 31 million tons of freight is hauled across I-90, thereby designating it a T-1 FGTS Classification. Many of the trucks on I-90 move goods to eastern Washington and beyond, indicating that many trucks traveling on I-90 are

Source: Data from WSDOT (2007), City of Seattle (2002), King County (2006), and Sound Transit (2007).

Exhibit 8-1 **Existing Freight Routes and Classifications Segment A**

East Link Project

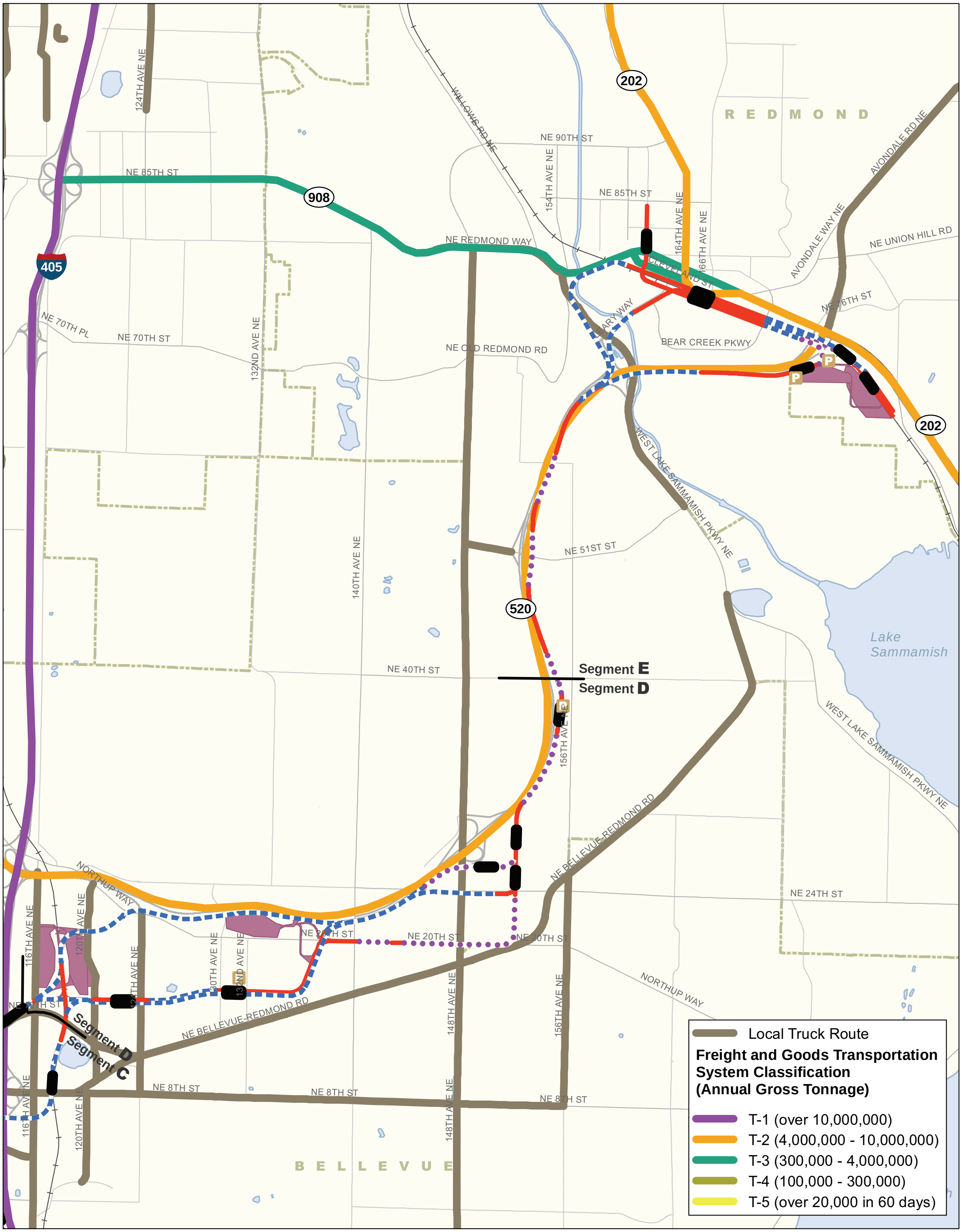


Source: Data from WSDOT (2007), City of Bellevue (2005), and King County (2006).

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route

Proposed Station
New and/or Expanded Park-and-Ride Lot

Exhibit 8-2 **Existing Freight Routes and Classifications Segments B and C**
East Link Project



Source: Data from WSDOT (2007), City of Bellevue (2005), and King County (2006).

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
Proposed Station
Maintenance Facility and Access Track
New and/or Expanded Park-and-Ride Lot

N
0 0.5 Mile

Exhibit 8-3 **Existing Freight Routes and Classifications Segments D and E**
East Link Project

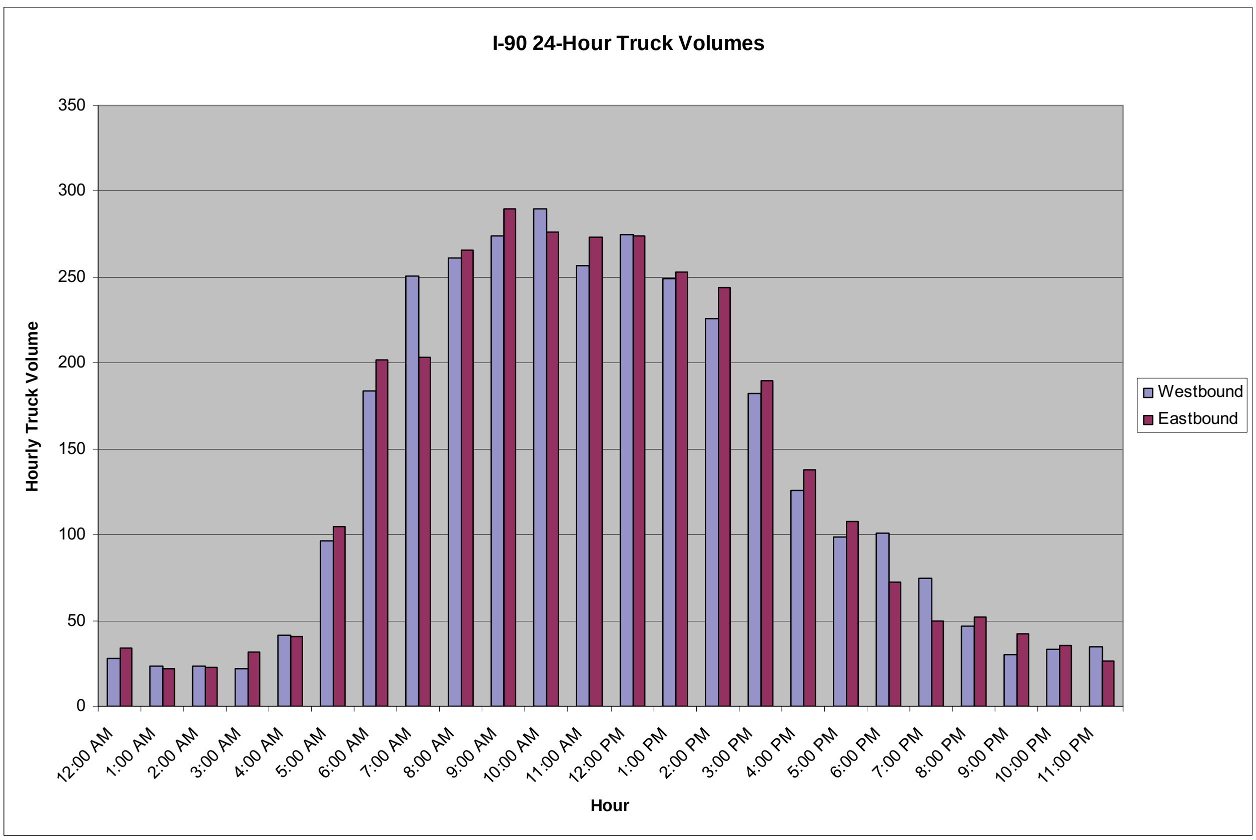
long- haul trips across Snoqualmie Pass (WSDOT, 2005). Within the study area, I-405 is also designated as T-1 freight route and SR 520 is classified as a T-2 freight route.

Of the approximate 140,000 daily vehicles that cross Lake Washington on I-90, 4.5 percent of the total vehicles are trucks (about 6,300). About half of all trucks that cross Lake Washington on I-90 are considered smaller-sized trucks, which include delivery vehicles and recreational vehicles. About 750 trucks (about 12 percent of the total daily trucks) are large-sized tractor-trailer trucks. Because much of the truck travel avoids the more heavily congested times of the day, about two-thirds of the trucks travel during nonpeak hours. Truck volumes are highest on I-90 crossing Lake Washington from the end of the AM peak period through the mid-day period (from 9 a.m. to 1 p.m.). During the early afternoon truck volumes dramatically decrease to avoid the congestion during the PM peak period. Only about 3 percent of total traffic during the PM peak period is considered to be trucks. Exhibit 8-4 is a chart that provides truck volumes throughout the day, and Table 8-2 shows truck volumes during the AM and PM peak periods, along with off-peak and daily totals.

TABLE 8-1
Freight and Goods Transportation System (FGTS) Classification

FGTS Classification	Annual Gross Tonnage
T-1	Over 10,000,000
T-2	4,000,000 to 10,000,000
T-3	300,000 to 4,000,000
T-4	100,000 to 300,000
T-5	Over 20,000 in 60 days

Source: Washington State Legislative Transportation Committee, Resolution 516, March 16, 1995.



Source: Sound Transit, 2007
Note: I-90 total daily volume is approximately 140,000.

EXHIBIT 8-4
I-90 Existing 24-Hour Truck Volumes

TABLE 8-2
Current Peak-Period and Daily Truck Volumes on I-90 Bridge

Time Period	Small Trucks			Medium Trucks			Large Trucks			Total Trucks[a]	Total Vehicles
	Count	% of Trucks	% of Vehicles	Count	% of Trucks	% of Vehicles	Count	% of Trucks	% of Vehicles		
Eastbound											
AM Peak (6-9)	330	49.4%	2.3%	252	37.5%	1.8%	89	13.1%	0.6%	671 (4.7%)	14,150
PM Peak (3-6)	241	59.2%	1.6%	149	36.4%	1.0%	18	4.4%	0.1%	408 (2.7%)	14,850
Off Peak	1,125	53.1%	2.8%	732	34.5%	1.8%	263	12.4%	0.7%	2,120 (5.3%)	39,900
Daily	1,696	53.0%	2.5%	1,132	35.4%	1.6%	369	11.5%	0.5%	3,197 (4.6%)	68,900
Westbound											
AM Peak (6-9)	323	48.8%	2.0%	256	38.8%	1.6%	82	12.4%	0.5%	661 (4.1%)	15,950
PM Peak (3-6)	219	53.9%	1.5%	164	40.3%	1.1%	24	5.8%	0.2%	407 (2.8%)	14,350
Off Peak	972	46.3%	2.5%	848	40.5%	2.2%	279	13.3%	0.7%	2,099 (5.4%)	39,100
Daily	1,514	47.3%	2.2%	1,268	39.7%	1.8%	384	12.0%	0.6%	3,166 (4.6%)	69,400

[a] Values in parentheses are percentage of total vehicles that are trucks.

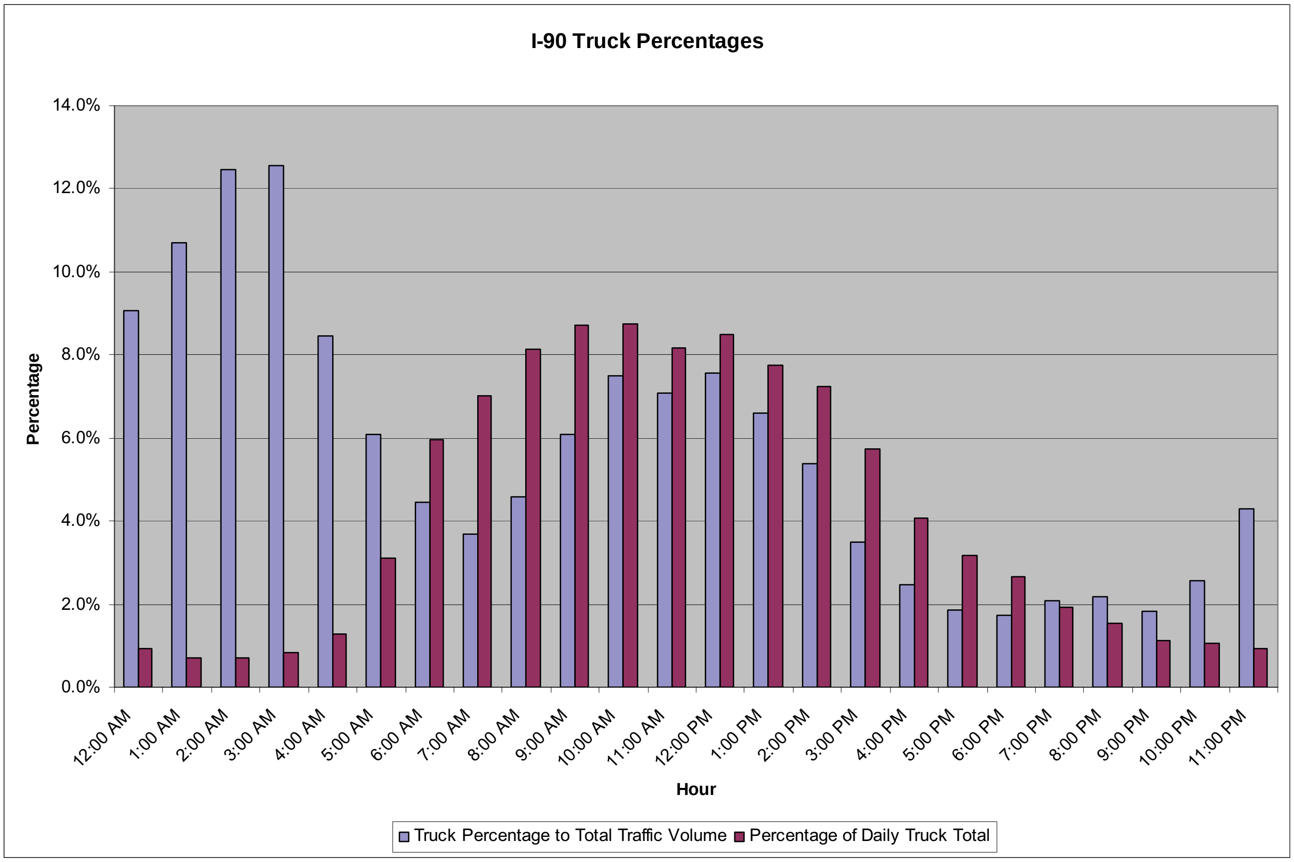
Data compiled from 2-day vehicle classification count in Mercer Island (May 1 and May 2, 2007).

Exhibit 8-5 provides the percentage of trucks compared to the total volumes on I-90 as well as the truck volume as a percentage of the total daily trucks crossing I-90, further indicating that trucks shift their travel patterns to avoid the typical morning and afternoon congested periods of the day. This Exhibit shows that the percentage trucks, compared to the total number of vehicles, on I-90 is the lowest during the AM peak period and the PM peak period through the evening. Truck volumes are less than 5 percent of the total traffic from 6 a.m. through 9 a.m. and from 3 p.m. through the rest of the day. The truck volume, as a percent of all traffic, falls below 4 percent beginning at 3 p.m., as trucks avoid travel during the most congested periods of the day. Truck volumes are more than 7 percent of the total traffic from midnight to 4 a.m. and from 10 a.m. to 1 p.m.

Additional truck data was collected in July 2008 to identify the number of trucks that cross Lake Washington on I-90 heading to or from east of I-405 compared to the total number of trucks heading to or from I-405 (Table 8-3). During the AM peak period about 40 percent of the trucks crossing Lake Washington on I-90 are heading to or from east of I-405, likely over Snoqualmie Pass. This percentage of trucks continuing east on I-90 increases in the PM peak period to just over 50 percent, but the total number of trucks decreases dramatically in this period as truck drivers avoid this congested travel period. Overall, about 800 trucks travel on I-90 during the AM two-hour peak period and 400 trucks travel in the PM two-hour peak period.

Exhibit 8-5 also shows that most trucks travel on I-90 from 8 a.m. to 2 p.m.; approximately half of the total number of daily truck travel on I-90. During the typical AM and PM peak periods (6 a.m. to 9 a.m. and 3 p.m. to 6 p.m., respectively) about 30 percent of the daily number of trucks travel on I-90. This differs from general volume peaking patterns on I-90, where 50 percent of the total daily volume occurs during the AM and PM peak periods.

Vehicle weight restrictions established for I-90 require vehicles over 10,000 pounds (e.g., tractor-trailers) to only travel on the outer I-90 mainline roadways—vehicles over 10,000 pounds are prohibited from using the reversible center lanes. In addition, trucks under 10,000 pounds (e.g., delivery and recreation vehicles) are only allowed to use the center roadway if they are either an HOV or heading to or from Mercer Island. Therefore, only a small percentage of trucks travel in the reversible center roadway. Throughout the two days the traffic count was conducted (May 1st and 2nd, 2007), slightly more than 100 smaller-sized trucks used the center roadway. This is slightly more than 1 percent of all the vehicles in this roadway. Table 8-4 shows truck use of the reversible center roadway.



Source: Sound Transit, 2007.

EXHIBIT 8-5
I-90 Existing 24-Hour Truck Percentages (of daily traffic total and truck volumes)

TABLE 8-3
Existing Two-Hour Peak-Period Long Haul Truck Volume on I-90

Peak/Direction	Trucks on I-90 Mainline	Trucks To and From I-405	Truck Percent, East of I-405
AM Peak Period			
Eastbound	450	235	48%
Westbound	370	255	31%
AM Peak Period Total	820	490	40%
PM Peak Period			
Eastbound	195	115	41%
Westbound	200	70	65%
PM Peak Period Total	395	185	53%

Data compiled from 2-day vehicle classification count on I-90 (July 2008).

TABLE 8-4
Current Peak-Period and Daily Truck Volumes on I-90 Reversible Center Roadway

Reversible Center Roadway Direction	AM Peak Period[a]			PM Peak Period[a]			Daily		
	Trucks	Total Vehicles	% of Total Vehicles	Trucks	Total Vehicles	% of Total Vehicles	Trucks	Total Vehicles	% of Total Vehicles
Westbound	36	2,390	1.5 %	N/A	N/A	N/A	61	3,350	1.8 %
Eastbound	N/A	N/A	N/A	27	3,260	0.8 %	50	5,900	0.9 %

[a] AM peak period is from 6 a.m. to 9 a.m., and PM peak period is from 3 p.m. to 6 p.m.

N/A = not applicable

Data compiled from 2-day vehicle classification count on I-90 (May 1 and May 2, 2007).

8.2.2 Arterials and Local Streets

In the City of Seattle, most of the arterial streets within the study area (such as Rainier Avenue S, 4th Avenue S, and S Dearborn Street) are designated as major truck streets where standards for design provide for higher volume truck travel. In Mercer Island, no roadways are designated as truck routes.

Many of the truck routes on arterial roadways in Segment B have access to and from either I-90 or I-405. Bellevue Way SE, 112th Avenue SE, and SE 8th Street are all designated truck routes in the City of Bellevue. In Segment C, key truck routes connect with I-405 at NE 8th Street and NE 4th Street in Bellevue. In addition, NE 12th Street is a truck route connecting Bellevue Way, 112th Avenue NE, and 116th Avenue NE, which are also truck routes in the City of Bellevue. Within Segment C, trucks mainly serve the commercial, office, and retail areas for delivery trips.

Segment D truck routes connect with the Bel-Red commercial and industrial land uses along 116th Avenue NE, 120th Avenue NE and 124th Avenue NE and have access to and from SR 520 along 148th Avenue NE. Bel-Red Road is also identified as a truck route by the City of Bellevue and City of Redmond. In Segment E, SR 520 is identified as a T-2 route by the state, and the City of Redmond designates 148th Avenue NE and a small section of NE 51st Street as truck routes. Closer to Downtown Redmond, West Lake Sammamish Road and SR 202 are designated truck routes that serve the commercial, retail, and office land uses. SR 202 is further defined as either a T-2 or T-3 route depending on the section of road.

8.2.3 Rail Freight

Within the study area, the only rail line is the BNSF Railway that travels through Segments B, C, and D. There are no rail freight operations within Segments A and E. The Port of Seattle is in the process of acquiring the BNSF right-of-way from Snohomish to north Renton, including a spur from Woodinville to Redmond. The acquisition process is anticipated to be complete by late 2008. The Port of Seattle intends to secure the corridor for potential future freight rail use and is also interested in optimizing the use of this corridor for other transportation modes compatible with freight rail (Port of Seattle, 2008). In the near term, the BNSF Railway will no longer be used for freight movements, because the Wilburton Tunnel, which crosses over southbound I-405, was removed in August 2008 and the rail corridor is no longer continuous.

8.3 Environmental Impacts

Future truck travel was evaluated as part of this study to understand future conditions with and without the project on I-90. With the East Link Project, trucks would continue to use the eastbound and westbound outer roadways similar to the No Build Alternative. Truck access to and from these roadways would be unchanged because none of the general-purpose ramps to and from I-90 would be modified with the project.

8.3.1 Impacts During Operation

As described in this section, the East Link Project would have an overall beneficial impact on trucks traveling on I-90. As people choose to use light rail, truck travel times during peak hours would improve overall and the ability for trucks to cross Lake Washington on I-90 would be maintained.

In the future, a higher percentage of trucks is expected to cross the bridge during off-peak periods of the day to avoid worsening traffic congestion in the peak periods. PSRC forecasts show that the average annual growth of truck traffic during the AM and PM peak periods on the I-90 bridge will slow for the decade after 2020, compared to years before 2020 (PSRC, 2007). This is because, by 2030, traffic congestion on I-90 will be much worse than it is today, and, therefore, a higher percentage of trucks are expected to cross Lake Washington during off-peak times. Subsequently, with more congestion in the future, there will be fewer uncongested off-peak hours available for truck travel in the no-build condition. Table 8-5 presents expected annual growth rates for the AM and PM peak periods for trucks. The truck forecasts between the No Build Alternative and East Link Project are similar.

TABLE 8-5
Forecast Peak-Period Annual Truck Growth Rates on I-90

Condition	Average Annual Growth Rate (%)			
	2007 - 2020 AM	2007 - 2030 AM	2007 - 2020 PM	2007 - 2030 PM
No Build	1.8	1.4	3.2	2.2
Build	1.8	1.6	3.1	2.3

Source: PSRC, 2007.

The result of increasing future congestion in the no-build condition will be an increase in future truck travel times on I-90, as shown in Table 8-6. Under either no-build condition, travel times are expected to be 35 to 115 percent longer than the existing PM and AM conditions due to increasing congestion in the future. Truck travel times with East Link are expected to either remain similar or improve compared to either of the No Build Alternatives. With the East Link Project, travel times would be less than the 2030 no-build condition in all situations except for the AM westbound direction, where travel time would be 1 minute longer when compared to the no-build with Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project completed because the reversible center roadway is closed to vehicle access for East Link operations. With the project, the average truck travel time in the morning and afternoon peak periods would be between 23 and 24 minutes between I-405 and I-5, compared to 25 to 30 minutes in the morning peak and 27 to 29 minutes in the afternoon peak with either of the No Build Alternatives. This is a 2- to 7-minute travel time savings in the morning peak and a 3- to 5-minute travel time savings in the afternoon peak. Most of this travel-time improvement is in the reverse peak direction (i.e., eastbound in the morning and westbound in the afternoon). The improved travel times are due to people shifting to light rail as their transportation mode, combined with the fact that truck access and circulation on the outer roadways would not be affected by East Link.

In addition to truck travel times, Table 8-6 provides information on how many trucks are expected to travel on I-90 during the year 2030 peak periods. Fewer trucks would cross Lake Washington on I-90 during the peak directions with the closure of the reversible center roadway to vehicles as part of the East Link Project compared to the No Build Alternative. In the reverse peak direction (eastbound AM and westbound PM), as people shift to use light rail there would be slightly less congestion and therefore more trucks are expected to cross Lake Washington than with the No Build Alternative. Overall, the number of trucks traveling on I-90 in the AM and PM periods would be similar for the No Build Alternative and East Link Project.

During nonpeak periods, auto congestion on I-90 is substantially reduced, even though truck traffic on I-90 is at much higher levels than during the peak periods, as shown in Exhibit 8-4. Because there is less congestion during these nonpeak periods, the East Link Project, compared to the No Build Alternative, is not expected to have any impact on truck travel during these periods. Thus, most trucks would remain unaffected by the project.

TABLE 8-6
Existing and Forecast 2030 AM and PM 2-Hour Peak-Period I-90 Bridge Truck Volumes and Travel Times

Period	Direction	Existing		No Build[a]		No Build[b]		Build	
		Number of Trucks[c]	Travel Time[d] (minutes)	Number of Trucks[c]	Travel Time[d] (minutes)	Number of Trucks[c]	Travel Time[d] (minutes)	Number of Trucks[c]	Travel Time (minutes)[d]
AM Peak	Westbound	480	13	480	35	520	24	500	25
	Eastbound	470	16	540	25	540	26	650	21
AM Peak Total		**950**	**14**	**1,020**	**30**	**1,060**	**25**	**1,150**	**23**
PM Peak	Westbound	430	20	360	31	440	33	490	29
	Eastbound	360	19	420	24	440	24	310	16
PM Peak Total		**790**	**20**	**780**	**27**	**880**	**29**	**800**	**24**

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.

[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.

[c] Screenline 2 data from the VISSIM analysis. Based on I-90 throughput at the I-90 Lake Washington bridge.

[d] Travel times are between I-405 and I-5 (Seattle).

The closure of the eastbound HOV direct-access off-ramp to Bellevue Way and the potential closure of the westbound HOV direct-access on-ramp from Bellevue Way (for the Bellevue Way Alternative [B1]) with East Link are not expected to cause impacts or circulation changes for trucks because these ramps are restricted to HOV usage. Similarly, the closure of the Mercer Island ramps to and from the reversible center roadway is not expected to cause truck-circulation impacts because similar access would be provided on the westbound and eastbound mainline roadways.

8.3.1.1 Freight on Arterials and Local Streets

The East Link Project alternatives are not anticipated to negatively affect truck circulation or truck routes on the local street network. In some locations, local designated truck routes cross or travel alongside at-grade light rail profiles. At these locations, intersection conditions with East Link would be similar to or better than the No Build Alternative. Some intersection operations may improve through mitigation for the East Link Project. Many of the at-grade profiles that travel through intersections would be accommodated within an existing signal phase. Therefore, disturbances caused by signal pre-emption would be minimized, although slight delays could occur on side-streets when light rail travels through an intersection. Intersections adjacent to stations that would have new or expanded park-and-ride lots (South Bellevue Station, 118th Station, 130th Station, SE Redmond Station) would experience additional traffic volume that may cause slight increases in travel times for trucks. However, these increases would not be substantial because the LOS at these intersections would at least be maintained with the project.

No truck routes are expected to be changed with the project.

8.3.1.2 Rail Freight

No rail freight impacts are expected in Segment A, and no rail freight impacts are anticipated in the near-term future along the BNSF Railway in Segments B, C, and D due to the I-405 expansion in August 2008 that removed a segment of rail line. There are no rail freight operations within Segment E.

8.3.2 Impacts During Construction

The following subsections document the activities that could potentially occur during East Link construction and the relative impacts on freight. These impacts would mainly consist of changes in access to businesses for deliveries and other freight-associated activities. Rail freight would not be affected in any segment during construction.

8.3.2.1 Interstate 90

On I-90, the I-90 Two Way Transit and HOV Operations Project would be completed before the construction of East Link on I-90, and Mercer Island drivers would be permitted in the HOV lanes to compensate for the closure of the reversible center roadway. Because of these changes to the I-90 operations, truck travel times during the East Link construction period for the AM and PM peak periods would generally be similar to or better than truck travel times in the No Build Alternative when only Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project are constructed.

Comparing the East Link construction period to the No Build Alternative when Stages 1 through 3 of the I-90 Two-Way Transit and HOV Operations Project are constructed, truck travel times during East Link construction would be similar or would improve in the reverse-peak directions (i.e., eastbound in the AM period and westbound in the PM period). In the westbound direction during the AM peak period, truck travel times would slightly increase (by 3 minutes), because closure of the center roadway would reduce the vehicle capacity in this direction. In the eastbound PM peak direction, truck travel times during East Link construction would improve because with the closure of the center roadway ramp, less lane changing would occur between I-5 and the Mount Baker Tunnel. Overall, a similar number of trucks would cross Lake Washington during East Link construction compared to the No Build Alternative. The truck travel times and volumes for the No Build Alternative and East Link construction period are provided in Table 8-7.

TABLE 8-7
2020 AM and PM Peak-Hour Truck Volumes and Travel Times on I-90 During Construction

Hour	Direction	No Build[a]		No Build[b]		Construction	
		Number of Trucks[c]	Travel Time[d] (minutes)	Number of Trucks[c]	Travel Time[d] (minutes)	Number of Trucks[c]	Travel Time[d] (minutes)
AM Peak	Westbound	260	24	280	23	250	26
	Eastbound	260	16	300	13	350	14
AM Peak-Hour Total		**520**	**20**	**580**	**18**	**600**	**19**
PM Peak	Westbound	210	24	260	22	290	18
	Eastbound	200	20	190	20	160	13
PM Peak-Hour Total		**410**	**22**	**450**	**21**	**450**	**16**

[a] With Stages 1 and 2 of the I-90 Two Way Transit and HOV Operations Project.
[b] With Stages 1 through 3 of the I-90 Two Way Transit and HOV Operations Project.
[c] Screenline 2 data from the VISSIM analysis. Based on 1 hour of I-90 throughput at the I-90 Lake Washington bridge.
[d] Travel times are between I-405 and I-5 (Seattle).

The majority of truck trips cross I-90 during nonpeak periods, when congestion is substantially reduced. Because congestion is less during these periods, project construction is not expected to have an impact on travel times for most truck traffic.

The D2 Roadway is expected also to be closed for light rail construction. This closure would not cause any impacts on trucks because they are prohibited from using the D2 Roadway. The I-90 westbound mainline would experience short-term partial nighttime closures for construction of the elevated structures for the 112th SE At Grade (B2A), 112th SE Elevated (B2E), 12 SE Bypass (B3), and BNSF (B7) alternatives. The Bellevue Way Alternative (B1) would not require these closures because it would be at-grade and therefore beneath the mainline roadway. I-90 ramps to and from Bellevue Way could potentially experience short-term nighttime closures for construction of the elevated light rail structures. These closures are not expected to cause impacts on trucks because alternative routes are available and because nighttime truck traffic using these ramps is low.

8.3.2.2 Other Regional Freeways

Elevated portions of the Segment C alternatives over I-405 would likely result in each direction (not concurrently) of I-405 being closed at night, causing trucks to detour and potentially delaying them. Likewise, elevated portions of the Redmond Way (E1) and Leary Way (E4) alternatives that cross over SR 520 near the Lake Sammamish Parkway interchange and the elevated portion of E1 that crosses over SR 520 near the SR 202 interchange would result in each direction of SR 520 being closed at night, causing trucks to detour and potentially delaying them.

8.3.2.3 Arterials and Local Streets

In Segment A, no truck impacts are expected on arterial and local streets because light rail construction would be on the D2 Roadway and the I-90 reversible center roadway. Closure of ramps to and from the I-90 reversible center roadway and construction of the Rainier Station and Mercer Island Station is not expected to impact trucks along arterials and local streets.

Construction of all Segment B alternatives except the BNSF Alternative (B7) would require temporary detours and lane closures on arterials and local streets, which would cause delays to truck traffic on Bellevue Way and 112th Avenue NE. However, most of the businesses along each alternative are professional offices that do not rely heavily on trucks.

Segment C alternatives that require cut-and-cover tunnel construction would result in the most truck impacts because cut-and-cover construction typically requires access restrictions in its vicinity until covers can be installed over the construction area. Construction for the Bellevue Way Tunnel Alternative (C1T) along Bellevue Way and NE 6th Street and for the 106th NE Tunnel Alternative (C2T) along Main Street, 106th Avenue NE, and NE 6th Street would require the largest amount of cut-and-cover tunnel construction.

Along elevated routes in Segment C, such as the 112th NE Elevated Alternative (C7E), some impacts are anticipated as a result of lane closures and access restrictions needed for construction of the elevated structures. For the 110th NE Elevated Alternative (C8E) slight impacts could occur along 110th Avenue NE due to lane closures. The at-grade portion of the Couplet Alternative (C4A) would have a shorter construction period, and truck impacts would likely be less than those for other sections and other alternatives. Converting 110th Avenue NE to a one-way couplet and switching the direction of the 108th Avenue NE couplet would require short-term traffic detours and lane closures that may affect trucks and could require temporary alternative business access.

In Segment D, loss of parking, construction traffic, and lane closures could affect trucks along portions of NE 16th Street, 136th Place NE, NE 20th Street, 152nd Avenue NE, and NE 24th Street. Construction of the Segment D alternatives would cause temporary detours and lane closures for relatively short periods of time, except for the NE 20th Alternative (D3). Because D3 includes retained cut construction in the median of NE 20th Street, the at-grade and retained cut construction would cause longer impacts on trucks than the other alternatives since the other alternatives do not travel along NE 20th Street. The SR 520 Alternative (D5) would be constructed adjacent to SR 520 and behind retail businesses; therefore, the impacts on access, parking, and circulation would be minor compared to the other Segment D alternatives. For portions of the Segment D and E alternatives adjacent to SR 520, streets that currently provide access to properties would be rebuilt, as appropriate.

In Segment E, the potential loss of lanes on Leary Way with the Leary Way Alternative (E4) and 161st Avenue NE between Redmond Way and NE 85th Street with the Marymoor Alternative (E2) could have a slight impact on trucks.

8.3.2.4 Maintenance Facilities

Each maintenance facility alternative is located within current industrial areas in Segments D and E, except for the SR 520 Maintenance Facility (MF3), which would be located on a mix of retail and industrial property north of Northup Way. Businesses in this area require vehicular, truck, and rail freight access. The SE Redmond Maintenance Facility (MF5) would probably have the least freight-related impacts because it would be surrounded by fewer businesses and located near regional transportation facilities. Even with potential roadway closures, detours, and lane closures, the impacts of the maintenance facility alternatives are considered minimal because the associated construction activities that could potentially affect freight are expected to be about 1 year or less.

8.3.2.5 Rail Freight

Rail freight would not be affected in any segment during construction because the only rail line near East Link construction—the BNSF Railway line in Segments B, C, and D has been closed for the near-term future.

8.4 Potential Mitigation

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

During East Link construction, adverse truck impacts would likely be associated with business deliveries on arterials and with local streets near surface construction activities. The cut-and-cover tunnels and stations in Segment C would likely have the greatest impact on nearby businesses in terms of restricted access. To minimize or limit these impacts, Sound Transit would work with affected businesses throughout construction to maintain business access as much as practical. Sound Transit would coordinate with businesses during times of limited access. Sound Transit and WSDOT would coordinate with freight stakeholder groups during project development. Additional information on major truck generators and origin and destination patterns would be collected by Sound Transit and WSDOT in the general study area.

During East Link construction associated with I-90, SR 520, or I-405, Sound Transit would provide construction information to WSDOT for use in the state's freight notification system in a format required by WSDOT. Sound Transit would compensate WSDOT for any direct costs associated with use of the freight notification system for East Link construction.

9.0 Navigable Waterways

9.1 Section Overview

This section describes the potential impacts on navigable waterways within the study area. The East Link Project would use the existing reversible center roadway on I-90, a portion of which crosses Lake Washington, the largest navigable waterway within the study area. Other water bodies located within the study area include smaller lakes, streams, and rivers, which, except for the Mercer Slough and Sammamish River, are not navigable. The East Link impact analysis indicates that, under both build and no-build conditions, the portion of I-90 that crosses Lake Washington would not affect the navigability on Lake Washington. Alternatives crossing the Mercer Slough and Sammamish River would be elevated profiles and would not impact navigability except during construction.

9.2 Affected Environment

Lake Washington is the largest navigable waterway in the study area, specifically in Segment A. Much of the surrounding waterfront land use is residential and not for commercial use. Navigability on Lake Washington is restricted to recreational users, and commercial activity is prohibited. However, the Muckleshoot Tribe, as part of the tribe's Usual and Accustomed Treaty Rights, conducts a fishing event in July after consultation with the Washington Department of Fish and Wildlife. Public boat launch access is limited to several public parks along the east and west sides of the lake. The King County Sheriff's Office and the Mercer Island Marine Patrol regulate navigability among recreational users. Boaters can cross under I-90 at two locations on Lake Washington: the east side of the I-90 floating bridge between Seattle and Mercer Island and at the East Channel Bridge between Mercer Island and Bellevue.

Other water bodies located in the study area include smaller lakes, streams, and river bodies, including Mercer Slough, Mercer Slough East Creek, East Lake Bellevue, Sturtevant Creek, Kelsey Creek, Goff Creek, Sears Creek, Bear Creek, and the Sammamish River. The Mercer Slough Nature Park, located in the south Bellevue area of Segment B, is a protected recreational nature park where nonmotorized boating is permitted along the Mercer Slough within the park. An I-90 overpass crosses the Mercer Slough East Creek at the southern end of the park. East Lake Bellevue, located near the Overlake Hospital in Segment C, is a small, man-made water pond entirely surrounded by residential and commercial land uses, where boating is prohibited. Kelsey Creek, Sturtevant Creek, and several smaller tributary creeks located in Segment D are not navigable to any recreational boating types. Within Segment E, parts of the Sammamish River and Bear Creek are located adjacent to SR 520 and in urbanized and recreational areas in the City of Redmond. The Sammamish River is navigable to nonmotorized boating types. Table 9-1 lists water bodies in the study area and their navigability.

9.3 Environmental Impacts

9.3.1 Operational Impacts

Under both the build and no-build conditions, the changes that would occur to the portion of I-90 that crosses Lake Washington would not affect navigability on Lake Washington. Without the project, other future improvements and changes to the roadway operations on I-90 would not affect the navigability on Lake Washington.

Impacts on navigability in Segment B are not anticipated, because the Segment B alternatives that travel along Bellevue Way SE (Bellevue Way [B1], 112th SE At-Grade [B2A], 112th SE Elevated [B2E], and 112th SE Bypass [B3] alternatives) are located outside the navigable waterways of the Mercer Slough Nature Park. Thus, recreational nonmotorized navigability on Mercer Slough would continue to be accessible from its existing location. The BNSF Alternative [B7] would cross Mercer Slough East at an elevated profile adjacent to the existing I-90 overpass, however, recreational navigability on the Mercer Slough under I-90 would not be blocked by this alternative.

TABLE 9-1
Navigability of Water Bodies within the Study Area

Name	Segment	Navigability
Lake Washington	Segment A, Segment B	Navigable to motorized and nonmotorized boating types
Mercer Slough	Segment B	Navigable to nonmotorized boating types
East Bellevue Lake	Segment C	Non-navigable
Sturtevant Creek	Segment C	Non-navigable
Kelsey Creek	Segment D	Non-navigable
West Tributary of Kelsey Creek	Segment D	Non-navigable
Goff Creek	Segment D	Non-navigable
Sears Creek	Segment D	Non-navigable
Sammamish River	Segment E	Navigable to nonmotorized boating types
Bear Creek	Segment E	Non-navigable

The project alternatives are not expected to impact navigability on water bodies in Segment D because water bodies crossed by the alternatives are non-navigable. In addition, the project alternatives are not expected to affect water bodies in Segment E because Bear Creek is not navigable, and alternatives that cross the Sammamish River would be elevated crossings, thus maintaining recreational navigability.

9.3.2 Construction Impacts

Some in-water work is anticipated to occur in Lake Washington along I-90, and there is a possibility of construction work from a barge. Neither of these activities would affect navigability of the lake.

Over-water construction of the BNSF Alternative (B7) may result in short durations of restricting recreational boating inside Mercer Slough near and under the B7 crossing.

Similarly, the construction of the Redmond Way (E1), Marymoor (E2), and Leary Way (E4) alternatives may restrict nonmotorized boating on Sammamish River crossings.

A tribal fishery event occurs in July, and if any barging of equipment or materials is required, Sound Transit would consult with the Muckleshoot tribe to avoid conflict with a tribal fishing event.

9.4 Potential Mitigation

During the operation of East Link, no mitigation of navigable waterways would be required.

The East Link construction at the Mercer Slough (BNSF Alternative [B7]) and Sammamish River (all Segment E alternatives) crossings would remain consistent with Washington State Department of Ecology regulations and practices. Appropriate construction methods would be employed to maintain minimal impacts to navigability during construction.

10.0 References

City of Bellevue. 2003. *Downtown Implementation Plan*.

City of Bellevue. 2005. *2006-2017 Transportation Facility Plan*.

City of Bellevue. 2007. *Bel-Red Corridor Project Final Environmental Impact Statement.* Bellevue, Washington. July 2007.

City of Redmond. 2006. *City of Redmond Machine Count Report.* www.redmond.gov/connectingredmond/resources/pdfs/redmondmachinecounts.pdf. June 2006. Accessed 2007.

City of Redmond. 2007. *Overlake Neighborhood Plan Final Supplemental Environmental Impact Statement.*

King County Metro (Metro). 2007a. *King County Metro Transit Park-and-Ride Utilization Report, Second Quarter 2007.* July 2007.

King County Metro (Metro). 2007b. Transit bus routes and schedules. Available at: www.kingcounty.gov. Accessed September 2006 and February 2007.

King County Metro (Metro). 2008a. Automatic Passenger Counter Data: Average weekday daily passenger loads across Lake Washington February 9 through May 30, 2008. February, 2008.

King County Metro (Metro). 2008b. Personal Communication. E-mail from Robin Anderson, Senior Transportation Planner at King County Metro, to CH2M HILL staff regarding Mercer Island Park-and-Ride utilization. February 25, 2008.

King County Metro (Metro) and Sound Transit. 2007. *2020 and 2030 East Link Transit Service Integration Plan*.

Korve, H. W., J. I. Farran, D. M. Mansel, H. S. Levinson, T. Chira-Chavala, and D. R. Ragland. 1996. *TCRP Report 17: Integration of Light Rail Transit into City Streets*. Transportation Research Board of the National Academies. Washington, D.C.

Port of Seattle. 2008. Eastside Rail Corridor. http://www.portseattle.org/business/realestate/eastsiderail.shtml. Last accessed September 5, 2008.

Puget Sound Regional Council (PSRC). 2007. *Destination 2030: Metropolitan Transportation Plan for the Central Puget Sound Region*.

Puget Sound Regional Council (PSRC). 2007. *VISION 2040 Final Environmental Impact Statement*. April 2008.

Sound Transit. 2002. *Central Link Light Rail Transit Initial Segment Project Environmental Assessment*. February 2002

Sound Transit. 2006. *North Link Final Supplemental EIS*. March, 2006

Sound Transit. 2007a. Transit bus routes and schedules. Available at: www.soundtransit.org. Accessed September 2006 and February 2007.

Sound Transit. 2007b. *Sound Transit 2: The Regional Transit System Plan.* May 2007.

Sound Transit. 2007c. *East Link Transit Integration Plan*.

Sound Transit. 2007d. Personal Communication. E-mail to CH2M HILL staff transmitting King County Metro passenger load data from 2006. May 15, 2007.

Transportation Research Board (TRB). 1999. "Light Rail Service, Vehicular and Pedestrian Safety." *TCRP Research Results Digest 34*. Transportation Research Board of the National Academies. Washington DC. July 1999

Transportation Research Board (TRB). 2000. *Highway Capacity Manual*.

Transportation Research Board (TRB). 2003. *Transit Capacity and Quality of Service Manual* (TCQSM). 2nd Edition. Report 100. Transit Cooperative Research Program (TRCP). Washington, DC.

Tri-Met. 1996. *Banfield LRT Station Mode of Access Survey*.

U.S. Department of Transportation, Federal Transit Administration, and Sound Transit. *Central Link Light Rail Transit Project Environmental Assessment Initial Segment.* February 2002.

Washington State Department of Transportation (WSDOT) and Sound Transit. 2004. *I-90 Two Way Transit and HOV Operations Project Final Environmental Impact Statement*. May 21, 2004.

Washington State Department of Transportation (WSDOT). 2002. *I-90 Two Way Transit and HOV Operations Project Transportation Discipline Report*. Prepared by HNTB Corporation and Mirai Associates. November 2002.

Washington State Department of Transportation (WSDOT). 2005. *Washington Transportation Plan Update: Freight Movement*. December 2005.

Washington State Department of Transportation (WSDOT). 2007a. Accident data (2004-2006).

Washington State Department of Transportation (WSDOT). 2007b. Roadway average daily traffic volume data, 2006. http://www.wsdot.wa.gov/Northwest/TrafficVolume/RampAndRoadway2006.htm Accessed 2007.

Washington State Department of Transportation (WSDOT). 2008. WSDOT 95% Reliable Travel Times. www.wsdot.wa.gov/Traffic/Seattle/TravelTimes/ reliability. Last accessed September 5, 2008.

Washington State Legislative Transportation Committee. 1995. Resolution 516. March 16, 1995.

Appendix A
Transportation Methodology and Assumptions Report

SOUNDTRANSIT

Transportation Methods and Assumptions Report

Sound Transit East Link Project

Prepared by CH2M HILL Team

April 16, 2007

Table of Contents

Appendix A Transportation Methodology and Assumptions Report

1.0 Introduction

This methodology report describes the methods and assumptions for analyzing the local, regional and systemwide transportation impacts associated with Sound Transit's Eastside High Capacity Transit project for the Environmental Impact Statement (EIS). An Interchange Justification Report (IJR), required by FHWA, will be prepared in parallel to the EIS analysis focusing on the I-90 corridor and using the same analysis methodology described in this report. The analysis of local transportation impacts will identify and evaluate the impacts of the light rail alternatives on the following:

- Year of opening and design year traffic service levels at key intersections affected by light rail alternatives;
- Year of opening and design year traffic analysis along I-90;
- Short-term impacts to vehicular, bicycle and pedestrian traffic resulting from construction activities;
- Parking near stations and at park-and-ride lots along the light rail alignments;
- Property access and local traffic flow changes caused by street closures and/or rail alignment;
- Safety;
- Freight movement within the corridor including trucking and freight rail;
- Bicycle and pedestrian circulation; and
- Transit service and the integration of transit service plans.

2.0 Agency Guidelines and Regulations

Relevant laws and regulations that govern or influence the local and systemwide transportation impact analysis include the following:

- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. (SAFETEA-LU, Public Law 109-59)
- CFR 23 Part 450 (implementing United States Code [USC] 23 Section 111; requiring the U.S. Secretary of Transportation to approve access revisions to the Interstate System)
- Washington State Growth Management Act RCW 36,70A.070; and
- King County and Cities of Seattle, Mercer Island, Bellevue and Redmond's Comprehensive and/or Transportation Plans and Concurrency Management Systems require the preparation of a transportation impact study and consideration of mitigation strategies for development generating Peak-Hour trips above a specified threshold.

In addition to the laws and regulations identified above, analysis of local transportation impacts will be guided by the policy direction established in the numerous plans or policy documents adopted within the East Link corridor. These include, but are not limited to:

- Sound Transit Long-Range Plan; adopted June 7, 2005
- WSDOT Transportation Plan 2007-2026 (WSDOT November, 2006)
- WSDOT Design Manual
- WSDOT Development Service Manual. M.3007.00
- Puget Sound Regional Council (PSRC)'s Destination 2030 Plan
- Comprehensive and/or Transportation Plans for the Cities of Seattle, Mercer Island, Bellevue, Redmond and King County

- 6-Year Capital Improvement Program for the Cities of Seattle, Mercer Island, Bellevue, Redmond and King County.

3.0 Transportation Analysis Methodology

The analysis of transportation impacts will be based on a full-length East Link system from the International District/Chinatown Station in Seattle to downtown Redmond and shorter length systems with interim termini at the Overlake Hospital Station and all proposed stations east of Overlake Hospital prior to downtown Redmond (122nd Ave NE, 132nd Ave NE, Overlake Village, Overlake Transit Center, SE Redmond, and Redmond Town Center). The analysis described in the subsequent sections of this report is focused on three areas:

a) Regional transportation impact analysis (including data such as systemwide ridership and daily vehicle miles and hours of travel)
b) Corridor and operational transportation impact analysis includes a comparison of screenline transportation impacts (such as ridership, volume to capacity, person-carrying demand and capacity) and an operational and safety analysis of the local streets, freeway system and intermodal network(s).
c) Construction impact analysis includes a qualitative analysis on the arterials and an operational assessment of I-90 when the center reversible roadway is closed for construction of light rail.

The various transportation networks and modes will be analyzed strategically to assess the overall transportation conditions. Analysis of various transportation modes is generally categorized by three assessment levels which are supported by various measures listed in Table 1. These measures will vary among the transportation modes being analyzed. The purpose of categorizing assessment levels is to determine the appropriate data/information used in analyzing the transportation impacts.

TABLE 1
East Link Transportation Assessment/Measures

Assessment Level	Analysis Type	Measure
Regional Level	Ridership	- Systemwide boardings
	VMT/VHT	- VMT/VHT
Corridor Level	Screenline Analysis	- Transit ridership
		- Volumes/Capacity (V/C ratios)
		- Person and vehicle carrying demand and capacity
		- Mode share/split
Operational Level	Intersection Analysis	- LOS/delay
		- Vehicle queue length
	Freeway Analysis	- LOS/density
		- Person and vehicle carrying throughput
		- Travel Times (GP, HOV (& transit), rail and freight
		- Access modifications
	Ridership	- Station ridership
	Freeway Safety	- Predictive assessment with reversible center roadway conversion
	Alignment Safety	- Predictive assessment of at-grade or elevated alignments within or adjacent to surface streets
	Transit	- Service frequency, hours of service, passenger loads and reliability LOSs
	Non-Motorized	- Station area pedestrian LOS
		- Sidewalk, trail and bike inventory, access and circulation
	Parking	- On-street supply/demand - Direct alignment impacts

3.1 Transportation Analysis Years

Based on the project's schedule and available traffic forecasting data, the transportation analysis will focus on four distinct periods:

- 2007 - Existing
- 2020 - Year of Opening. This year has been identified as an appropriate year to provide a conservative opening year analysis.
- 2030 - Design Year. This year has been identified as the design year for analysis as it is consistent with the future planning horizon used by PSRC and local agencies. This design year has been agreed to by the local agencies and FTA, WSDOT and FHWA.
- A 2020 construction period assessment.

3.2 Regional Transportation Analysis

While both the Puget Sound Regional Council (PSRC) and the Bellevue-Kirkland-Redmond (BKR) travel demand models will be used to produce forecasts for the transportation impact analysis only output from the PSRC travel demand model will be used as the data source for the regional analysis. Daily and peak period systemwide boardings, vehicle miles and hours of travel for the project study area will be provided to gauge the impact of light rail on the region.

- Systemwide boardings – ridership throughout the entire Link network
- Vehicle Miles of Travel (VMT) - Trip table matrices will be multiplied by trip distance to determine the number of total vehicle miles on the highway system.
- Vehicle Hours of Travel (VHT) - Matrices of vehicle trips and travel time per trip will be used to quantify vehicle hours traveled (VHT).

Information from the PSRC travel demand model will be used to generate both the No-Build and Build alternative VMT/VHT data. Included in the Build alternative travel demand modeling will be a prototypical light rail alternative to reflect its mode share.

This prototypical light rail alternative will be determined once light rail ridership data is available from the Sound Transit model. Sound Transit uses an incremental model to isolate outside influences (i.e. population growth, highway congestion, parking costs) and transit service influences on transit ridership. For a summary of Sound Transit's ridership model, see Attachment 3. Depending on the selected ridership data used for creating the travel demand forecasts, a post-processing exercise will be conducted to bracket the range of VMT/VHT information between the high/low ridership light rail alternatives.

3.3 Corridor and Operational Transportation Analysis

The corridor analysis will focus on two sets of analyses;

1. A screenline analysis to provide a snapshot of vehicle and person information
2. A local street and freeway traffic analysis

This analysis will provide detailed information on ridership and traffic operations along the light rail alternatives and operations surrounding the proposed stations.

Screenline Analysis

The analysis of transportation impacts in various segments of the corridor will involve comparing ridership forecasts and projected traffic volumes on the highway and local street system at selected screenlines between the No-Build and the Build alternative. A map and table will be used to present Daily, AM and PM Peak-Hour vehicle trips at the six identified screenline locations. Refer to Attachment 2 for a graphic representation of these screenlines. The preliminary screenlines are:

1. City of Seattle Screenline 10.11: A north-south screenline south of South Jackson Street that extends between and includes Alaskan Way and 4th Avenue South and also includes the Downtown Seattle Transit Tunnel);

2. Lake Washington (including SR 520 and I-90): An east-west screenline between the I-90 Mount Baker Tunnel and Mercer Island;
3. Interstate-90: An east-west screenline between Bellevue Way and I-405 Interchanges;
4. South Bellevue: A north-south screenline that extends between and includes Bellevue Way and I-405;
5. 140th Avenue: An east-west screenline that extends between and includes SR 520 and NE 8th Street in the City of Bellevue; and
6. Grasslawn: A north-south screenline that includes 140th Avenue NE and extends to Marymoor Park (City of Redmond #6 screenline in the Redmond Transportation Master Plan)

These screenlines provide a snapshot of ridership, traffic operations and traffic shifts/modal splits along each corridor. Information from the PSRC and Sound Transit models that will be presented for each screenline includes:

- Transit ridership;
- Person-carrying demand and capacity;
- Volume-to-capacity (V/C) ratio;
- Mode share and split.

For each screenline, the person-carrying demand and capacity will be separated by mode. The V/C ratios may also be separated by key arterials and highways.

Local Street System and Freeway Transportation Analysis
The methodology proposed for the local street and freeway analysis is intended to be applied as consistently as possible throughout the corridor. The local street system focuses on intersection operations and safety analysis while the freeway analysis will include measures such as density, travel time and person-throughput.

Impacts to parking, non-motorized facilities, safety, transit and freight movement will be addressed. The methodologies proposed to analyze the local street system and freeway impacts are described in detail following this section.

3.4 Construction Analysis

A qualitative assessment will be performed of short-term construction impacts on local traffic circulation. The methodologies to be used for this analysis are discussed more fully in Section 7.8.

Along I-90, a quantitative operational analysis of the construction period will be performed and is further discussed in Section 7.10. This analysis will assess the I-90 outer roadway operations with the closure of the inside roadway for light rail construction.

4.0 Alternative Definitions

Within the EIS, the No-Build and light rail (Build) alternatives will be evaluated to document the change in transportation conditions and operations within the affected study area.

Table 2 provides a summary of the alternatives that will be analyzed for the EIS. While only one No-Build alternative will be analyzed for the majority of the study area; along I-90 two No-Build alternatives will be analyzed to reflect with and without Stage 3 of the I-90 Two Way Transit and HOV Operations Project (Alternative R-8A). For the Build alternative, full-length and interim termini station alternatives will be analyzed. The full-length Build alternative assumes light rail is provided between Seattle to downtown Redmond. The Build analysis will also evaluate interim termini at the proposed Overlake Hospital Station and all station locations east to downtown Redmond. The interim termini analysis will focus on the local traffic impacts near interim termini stations with a substantial change in ridership.

The construction period, while planned to be completed prior to 2020, will be analyzed based on a 2020 horizon year to provide a conservative analysis.

TABLE 2
Alternative Conditions

Alternatives	Horizon Years		Comments
	2020	2030	
No-Build[a]	X	X	Includes the projects listed in Table 3 and Attachment 1
Build – Seattle to downtown Redmond Alternative	X	X	
Build – Seattle to Interim Station Termini	X	X	Interim station termini are located between Overlake Hospital Station and downtown Redmond including 122nd, 132nd, Overlake Village, Overlake Transit Center, SE Redmond, and Redmond Town Center stations)
Construction	X		Assumes I-90 R8A Stages 1 through 3 are constructed.

[a] Two separate 2020 and 2030 No-Build forecasts and operational analysis will be performed along I-90 with and without Stage 3 of the I-90 Two-Way Transit Lanes and HOV project.

No-Build Alternative

The No-Build alternative includes a variety of projects, funding packages and proposals in the Central Puget Sound Region. The projects primarily consist of funded or committed actions by the State, regional and local agencies combined with other projects that are considered likely to be implemented. Separate No-Build project lists are prepared for the 2020 year of opening and 2030 design year.

The following sections define the basic components of the Roadway and Transit portions of the No-Build alternative. Table 3 summarizes the time horizon appropriate for each of these components. Attachment 1 provides the list of assumed major projects as part of the No-Build alternative.

Roadway

The roadway component of the No Build Alternative includes projects funded through the 2003 Transportation Nickel Package, 2005 Transportation Partnership Account (TPA) package, and projects included in the PSRC's Destination 2030 plan. Within King County these funding packages include major regional projects such as the Alaska Way Viaduct and Seawall Replacement Project, SR 520 Bridge Replacement and HOV Project and I-405 Program.

A component of the No-Build alternative is the completion of all three stages of the I-90 Two Way Transit and HOV Operations Project. This joint Sound Transit/WSDOT project would add HOV lanes to the I-90 outer roadway between Seattle and Bellevue. This project also includes new I-90 HOV on and off-ramps on Mercer Island and improving the I-90 HOV access at the Bellevue Way interchange. Two separate 2020 and 2030 No-Build forecasts and operational analysis will also be performed along I-90 that would not include Stage 3 of the I-90 Two-Way Transit and HOV Operations Project. Stage 3 is the construction of new HOV lanes on the outer roadway between Mercer Island and Seattle. The two no-build conditions are proposed due to the uncertainty of when Stage 3 would be constructed as it has not been determined whether Stage 3 will operate with vehicular traffic in the reversible center roadway as it does today, or if the reversible center roadway may close for light rail construction immediately after completion of Stage 3.

In addition to the programs and packages discussed above are roadway projects listed in the State and local agency comprehensive plan lists. For the most part, the 2020 local agency lists only include adopted CIP projects (6-year funding programs), while the 2030 list includes unfunded projects that are part of the agencies' Transportation Plans which cover a 15-20 year time frame. The exceptions are the City of Redmond's 2022 Transportation Facilities Plan and City of Bellevue's 2017 Transportation Facilities Plan. These projects have been included as part of the 2020 list given the close proximity of the two horizon years.

TABLE 3
No-Build Alternative Components

Projects/Programs	Horizon Years		Comments
	2020	2030	
Roadway			
Nickel Package	X	X	Approved 2003
Transportation Partnership Account	X	X	Approved 2005
I-90 Two Way Transit and HOV Project	X	X	Stage 1 through 3 and also without Stage 3
Local Agencies			
Capital Improvement Programs/Transportation Facilities Plans	X	X	Typically 6-year (or near term) funding commitments
Comprehensive/Transportation Plans	X	X	Typically 15 to 20-year list of funded and unfunded projects. Funded projects included as part of CIP/TFP lists.
Puget Sound Regional Council			
Destination 2030		X	Selected projects included (refer to Attachment 1)
Transit			
Sound Transit			
Sound Move Program	X	X	Approved 1996
ST2 Program	X[a]	X	Approved November 2008.
King County Metro			
6-year Service Implementation Plans	X	X	
Transit Service Integration Plan	X	X	Prepared for East Link project
Transit Now Plan	X	X	Approved 2006

[a] Not all projects identified in these programs are expected to be built by 2020. Refer to Attachment 1 for the project list by horizon year.

Table 3 indicates the 2020 No-Build list would only include projects that are considered to be fully funded within the 2020 time-frame. The 2030 No-Build list expands the list to include the State, Regional, and Local projects that are anticipated to be funded within the 2030 timeframe. Finally, some projects are included that are part of the PSRC's Destination 2030 program. These projects are not currently funded but have been reviewed through an environmental process and would likely influence the travel patterns and operations along the study corridors.

Transit

The transit No-Build component follows similar guidelines to those used to select the roadway projects. The main component for future transit service is the joint effort by King County Metro and Sound Transit to develop a Transit Service Integration Plan for both 2020 and 2030 No-Build conditions. Included as part of the 2020 No-Build integration plans will be the currently adopted transit service plans by Sound Transit and King County Metro. This will include the completion of the Sound Move program and King County's 'Transit Now' plan adopted by voters in 2006. Only a portion of the transit components of the ST2 program will be included in the 2020 No-Build integration plan since some of the ST2 projects will not be fully implemented until after 2020. The exception will be the East Link corridor portion of ST2 program. This project will be analyzed as the Build alternative.

Build Alternative - East Link Light Rail Alternatives

The Build alternative consists of the light rail alternatives identified by Sound Transit for study in the East Link EIS. Refer to Attachment 2 for maps of the light rail alternatives. For the Build alternative, full-length and interim termini station alternatives will be analyzed. The full-length Build alternative assumes light rail is provided from Seattle to downtown Redmond. The Build alternative will also evaluate interim termini which are located at the proposed Overlake Hospital Station and other stations east prior to downtown Redmond (122nd Ave NE, 132nd Avenue NE, Overlake Village, Overlake Transit Center, SE Redmond, and Redmond Town Center stations). The interim station terminus analyses assume the western terminus in Seattle at the IDS remains unchanged.

All the projects, programs and packages listed in Table 3 and Attachment 1 as part of the No-Build alternative are also assumed in the Build alternative. Sound Transit will develop a light rail operations plan for services in the East Link corridor including preliminary train frequencies and train consists (vehicles per train). In addition to the light rail alternatives, King County Metro and Sound Transit will develop a 2020 and 2030 Transit Service Integration Plan to reflect potential changes in transit service with a representative light rail alternative.

5.0 Definition of Study Area

A preliminary list of intersections has been identified for analysis. These intersections are assumed to be those potentially impacted by the light rail alternatives. Intersections directly impacted, such as a change in the channelization or signal control, will be analyzed. Additionally intersections that are indirectly affected, such as a significant change in volume, will be analyzed. Refer to Section 5.1 for the screening procedures. These locations also include intersections surrounding park-and-ride lots and station areas. This list may be modified as appropriate to reflect public and/or agency comments received during the EIS process.

5.1 Intersection Screening Procedures

Screening procedures are presented in this section to improve the efficiency of the traffic impact analysis to minimize the number of analysis iterations on a previously analyzed intersection. The existing conditions at all study area intersections identified in Section 5.2 will be evaluated using traffic data collected at the outset of the project. Additionally, the 2020 and 2030 PM Peak-Hour analysis for the No-Build alternative will be developed for the same set of study area intersections. For the Build alternative, a screening process will be applied to each of the study area intersections, using threshold values, to pinpoint conditions that could result in a change in the level of service at the intersection. Additional intersections or revision of the study area will be reviewed once future 2020 and 2030 forecasts have been developed. At that time, it will be determined where changes in volume demand and patterns occur within the Build alternative to warrant a change in the study area limits. No further analysis beyond the No-Build conditions will be conducted at study area intersections where changes in traffic volumes or other conditions in the Build alternatives are expected to be below the threshold values identified in Table 4.

The methodology is to conduct the Build alternative intersection analysis for only the worst-case traffic impact condition. Any light rail alignment that has direct (physical) geometry impacts to an intersection will also be analyzed.

TABLE 4
Intersection Analysis Screening Process

Parameter	Threshold Value	Description
Critical Volumes	5%	Forecasts indicate that a critical volume comparison between a Build and No-Build alternative would exceed the threshold value.
Change in Intersection Geometry	Changes in the number of lanes in any approach.	Changes in intersection geometry resulting in the addition or deletion of a lane in any approach would change the capacity of the intersection and could affect LOS.
Change in Intersection Control	Traffic Signal Installation	The addition of a traffic control device such as a signal would affect the capacity for some traffic movements, and could change the overall level of service.
Crosswalk Lengths Across Major Streets	Increased crossing distance	Side street green time would be extended and pedestrian clearances would be longer.
Intersection Level of Service	If the intersection operates with a delay value within 10 percent of the agency's LOS threshold.	Locations meeting the threshold criterion with the No-Build Alternative would likely require further analysis. For example: if an intersection operates at LOS E/75 seconds in No-Build and the LOS threshold is LOS E (80 seconds) the intersection is then included in the Build analysis.

5.2 Individual Segment Study Areas

Segment A

The light rail alternative in Segment A travels along I-90. Within the Cities of Seattle and Mercer Island there are no direct alignment impacts to the local roadway system. Two proposed stations are located along I-90 at Rainier Avenue South and Mercer Island between 77th and 80th Avenues SE interchanges. Intersections surrounding the I-90 HOV ramps terminus at Dearborn Street are included as the proposed alternatives will use the I-90 D2 roadway. Additionally, all interchange ramp terminals and closely spaced intersections from Seattle's IDS to I-405 are included. Refer to Attachment 2 for a map of these intersections.

City of Seattle (11)

- Rainier Avenue South & South Dearborn Street
- Rainier Avenue South & South Massachusetts Street
- Rainier Avenue South & 23rd Avenue South
- Rainier Avenue South & I-90 EB Off-Ramp
- Dearborn Street & I-5 Southbound Ramp
- Dearborn Street & I-5 Northbound Ramp
- I-90 & 4th Avenue South
- South Royal Brougham Way & 4th Avenue South
- Airport Way South & 4th Avenue South
- I-90 HOV Access & South Dearborn Street
- SR 519 & I-90 EB On-Ramp

City of Mercer Island (17)

- West Mercer Way & I-90 Ramps
- West Mercer Way & 24th Avenue SE
- 80th Avenue SE & SE 27th Street
- 80th Avenue SE & I-90 EB Express Lanes Ramp
- 80th Avenue SE & North Mercer Way
- 77th Avenue SE & Sunset Highway
- 77th Avenue SE & I-90 WB Express Lanes Ramp
- 77th Avenue SE & I-90 EB Off-Ramp
- 77th Avenue SE & North Mercer Way
- 77th Avenue SE & 27th Street
- 76th Avenue SE/North Mercer Way & I-90 WB On-Ramp
- 76th Avenue SE & 24th Avenue SE
- Island Crest Way & I-90 EB On-Ramp
- Island Crest Way & I-90 WB Off-Ramp
- East Mercer Way & I-90 EB Off-Ramp
- East Mercer Way & I-90 EB On-Ramp
- East Mercer Way & I-90 WB Ramps

Freeway System

For the EIS, I-90 between the SR 519/I-90 terminus and the Interstate 5 ramps to and from the east and the I-405 ramps to and from the west will be analyzed. This analysis will include the I-90 mainline and merge/diverge areas between the study area endpoints. The analysis will also include:

- The I-90 reversible center roadway;
- The ramps to and from the express lanes located at Rainier Avenue, Mercer Island and Bellevue Way;
- The D2 roadway between Airport Way/5th Avenue and Rainer Avenue; and
- The I-90 collector-distributor system between the Bellevue Way and I-405 interchanges.

I-405 and I-5 mainline and merge/diverge areas will not be analyzed since there are no direct modifications or impacts expected with the project.

Segment B

Within Segment B, 14 intersections are identified for analysis as they either are along the proposed alternatives or expected to experience a change in operating conditions through either change in intersection control, geometry or traffic volume; such as near a station. Five intersections within Bellevue's Mobility Management Area #7 will be analyzed. Refer to Attachment 2 for a map of these intersections.

City of Bellevue (14)

- 112th Avenue SE & Bellevue Way SE (MMA #7)
- 112th Avenue SE & SE 8th Street (MMA #7)
- 118th Avenue SE & SE 8th Street (MMA #7)
- 1-405 NB Ramps & SE 8th Street (MMA #7)
- I-405 SB Ramps & SE 8th Street (MMA #7)
- Bellevue Way SE & SE 30th Street
- Bellevue Way SE & South Bellevue P&R
- 112th Avenue SE & SE 6th Street
- 114th Avenue SE & SE 6th Street
- SE 8th Street & 114th Avenue SE (Bellfield Business Park)
- Bellevue Way SE & 108th Avenue SE
- Bellevue Way SE & SE 16th Street
- Bellevue Way SE & 104th Avenue SE
- Bellevue Way SE & SE 10th Street

Segment C

Within Segment C, 41 intersections are identified for analysis as they either are along the proposed alternatives or expected to experience a change in operating conditions through either change in intersection control, geometry or traffic volume; such as near a station. Nine of the thirteen intersections within Bellevue's Mobility Management Area #3 and three of the fifteen intersections within Bellevue's Mobility Management Area #4 will be analyzed. Refer to Attachment 2 for a map of these intersections.

City of Bellevue (40)

- Bellevue Way SE & SE Wolverine Way
- Bellevue Way & Main Street (MMA #3)
- Bellevue Way NE & NE 2nd Street

- 112th Avenue NE & NE 12th Street (MMA #3)
- 112th Avenue NE & NE 10th Street
- 112th Avenue NE & NE 8th Street/I-405 SB Ramp (MMA #3)
- 112th Avenue NE & NE 6th Street
- 112th Avenue NE & NE 4th Street (MMA #3)
- 112th Avenue NE & NE 2nd Street
- 112th Avenue & Main Street (MMA #3)
- 110th Avenue NE & NE 12th Street
- 110th Avenue NE & NE 10th Street
- 110th Avenue NE & NE 8th Street
- 110th Avenue NE & NE 6th Street
- 110th Avenue NE & NE 4th Street
- 110th Avenue NE & NE 2nd Street
- 110th Avenue & Main Street
- 108th Avenue NE & NE 12th Street (MMA #3)
- 108th Avenue NE & NE 10th Street
- 108th Avenue NE & NE 8th Street (MMA #3)
- 108th Avenue NE & NE 6th Street
- 108th Avenue NE & NE 4th Street (MMA #3)
- 108th Avenue NE & NE 2nd Street
- 108th Avenue & Main Street (MMA #3)
- 106th Avenue NE & NE 12th Street
- 106th Avenue NE & NE 10th Street
- 106th Avenue NE & NE 8th Street
- 106th Avenue NE & NE 6th Street
- 106th Avenue NE & NE 4th Street
- 106th Avenue NE & NE 2nd Street
- 106th Avenue NE & Main Street
- NE 4th Street & I-405 SB Ramp
- NE 4th Street & I-405 NB Ramp
- NE 10th Street & I-405 SB Ramp (future interchange)
- NE 10th Street & I-405 NB Ramp (future interchange)
- NE 2nd Street & I-405 SB Ramp (future interchange)
- NE 2nd Street & I-405 NB Ramp (future interchange)
- 116th Avenue NE & NE 12th Street (MMA #4)
- 116th Avenue NE & NE 10th Street

- 116th Avenue NE & NE 8th Street (MMA #4)
- 116th Avenue NE & NE 4th Street (MMA #4)

Segment D
Within Segment D, 29 intersections in the Cities of Bellevue and Redmond are identified for analysis as they either are along the proposed alignments or expected to experience a change in operating conditions through either change in intersection control, geometry or traffic volume; such as near a station. Five of the fifteen intersections within the City of Bellevue's Mobility Management Area #4 will be analyzed. Some intersections in this segment are also within the City of Redmond's jurisdiction and therefore they would be classified within Redmond's Transportation Management District (TMD) #5 – Overlake area. The access locations to the proposed maintenance bases within Segment D will also be analyzed. These locations are not included in the list below as they have not been identified. Refer to Attachment 2 for a map of these intersections.

City of Bellevue (15)

- 120th Avenue NE & NE 16th Street (future road extension)
- 120th Avenue NE & NE 12th Street (MMA #4)
- 124th Avenue NE & Northup Way (MMA #4)
- 124th Avenue NE & NE 16th Street (future road extension)
- 124th Avenue NE & Bel-Red Road (MMA #4)
- 130th Avenue NE & Bel-Red Road (MMA #4)
- 130th Avenue NE & NE 16th Street
- 130th Avenue NE & NE 20th Street (MMA #4)
- 132nd Avenue NE & Bel-Red Road
- 132nd Avenue NE & NE 16th Street
- 132nd Avenue NE & NE 20th Street
- 136th Avenue NE & NE 16th Street
- 136th Avenue NE & NE 20th Street
- 140th Avenue NE & 20th Avenue
- NE 20th Street & Mall Entrance

City of Redmond (14)

- 148th Avenue NE & SR 520 WB Ramps
- 148th Avenue NE & SR 520 EB Ramps
- NE 24th Street & 148th Avenue NE
- NE 24th Street & 151st Avenue NE
- NE 24th Street & 152nd Avenue NE
- NE 24th Street & Bel-Red Road
- NE 40th Street & 148th Avenue NE
- NE 40th Street & SR 520 WB Ramps
- NE 40th Street & SR 520 EB Ramps
- NE 40th Street & 156th Avenue NE
- Overlake P&R Entrance & 156th Avenue NE

- NE 36th Street & 156th Avenue NE
- NE 31st Street & 156th Avenue NE
- 148th Avenue NE & 20th Avenue

Segment E
Within Segment E, 15 intersections are identified for analysis as they either are along the proposed alignments or expected to experience a change in operating conditions through either change in intersection control, geometry or traffic volume; such as near a station. Intersections in this segment are within the City of Redmond's jurisdiction and therefore they are classified within Redmond's Transportation Management Districts (TMD) #1 – Downtown Redmond and #7 – SE Redmond area. The access locations to the proposed maintenance bases within Segment E will also be analyzed. These locations are not included in the list below as they have not been identified. Refer to Attachment 2 for a map of 20 study area intersections.

City of Redmond (15)

- NE Leary Way & West Lake Sammamish Parkway
- NE Leary Way & 159th Place NE
- NE Leary Way & Bear Creek Parkway
- NE Leary Way & NE 76th Street
- Redmond Way at 161st Avenue NE
- NE 83rd Street at 161st Avenue NE
- 164th Avenue NE & SR 202
- 164th Avenue NE& NE 76th Street
- 166th Avenue NE & SR 202
- 166th Avenue NE & NE 76th Street
- NE 76th Street & Bear Creek Parkway
- SR 202 & SR 520 WB Ramps
- SR 202 & SR 520 EB Ramps
- SR 202 & NE 70th Street
- NE 70th Street & 176th Avenue NE

6.0 Assessment Methods

The intent of the intersection analyses is to identify the potential local traffic operational impacts and to identify potential improvements to mitigate any identified impacts. The *Highway Capacity Manual* (HCM) methodologies will be followed for analysis of the surface streets and the I-90 freeway system. The intersection analysis will be limited to PM Peak-Hour conditions as the PM peak hour is typically the "worst case" for surface street operations in urbanized areas. A sensitivity analysis may be conducted for selected high volume arterials to gauge the volume differences between AM and PM peak hours. If it's determined to be necessary to adequately reflect potential light rail impacts, selected AM Peak-Hour analyses may be conducted.

For the analysis along I-90, both AM and PM peak periods will be analyzed. The reported results for local intersections will be for one hour of analysis, but the freeway analysis will be created for two-hour duration to better simulate peak period conditions. This duration will be verified once traffic count data has been synthesized.

6.1 Data Collection

A variety of data will be collected and assembled to analyze the local and freeway system. This data will include the following:

- Existing Peak-Hour turning movement counts at the intersections identified in Section 5.2. These counts will be collected from the local and state agencies (Cities of Seattle, Mercer Island, Bellevue and Redmond and WSDOT). For I-90, volume data from WSDOT's loop counters will be used to generate existing mainline and ramp volumes. New counts will be taken for a two-hour period during the PM peak hour, if 2005-2007 turning movement counts are not available from the listed agencies above. The new counts will include autos, trucks classified by light, medium and heavy types, buses, pedestrians, and bicyclists. AM Peak-Hour turning movement counts may also be collected where AM Peak-Hour volumes are the highest or the existing/future traffic issues are the most critical during the AM time period (i.e., if an intersection provides access to a regional facility). These locations will be chosen based on area knowledge, a comparison of available AM vs. PM Peak-Hour traffic volumes, or if identified by Sound Transit, local or State agency staff. All Peak-Hour turning movement counts and I-90 mainline and ramp volumes will be factored to a common base analysis year (2007) based on available historical data trends.
- Physical characteristics of the existing street system including functional use, lane geometry, traffic signal timing and phasing patterns, and other parameters necessary to conduct traffic operations analysis (such as the proximity of bus stops, speed limits, presence of on-street parking, etc.). Where available, this data will be obtained from the local agencies (such as paint line sketches developed by the City of Seattle). This data will be field checked as appropriate.
- On- and off-street public parking supply and peak weekday parking utilization survey data will be collected within a 0.25-mile walking distance radius of each station and for all at-grade or elevated alignments that are within the road right-of-way. In general, data will be obtained from the local agencies, and augmented by field visits where appropriate. Private parking will not be collected and only described qualitatively with supplementary information, as available, by the cities, Chamber of Commerce or Downtown Association groups.
- Park and Ride supply and demand will be collected at either proposed stations or locations within a 0.25-mile walking distance radius of each station. Park and Ride information and utilization rates will be gathered from existing information from King County Metro. If unavailable, data will be facilitated by field visits.
- Pedestrian volumes will be collected in areas with high pedestrian activity, such as the I-90 multi-use trail across Mercer Island, and where existing counts have been conducted by local jurisdictions. This data collection effort will be limited to the pedestrian volume data collected for each of the intersections identified in Section 5.2. If pedestrian and bicycle volume data is available from the agencies for major non-motorized facilities near proposed station areas, such as the Sammamish River Trail in Redmond, this will be also included.
- Existing transit route information along the proposed light rail alternatives will be obtained from local transit agencies and compiled. This will include information on selected routes that serve the East Link corridor. The bus route information that will be collected includes service areas, hours of service (including schedule/frequency), reliability and passenger load. Passenger load information will be collected at the six screenline locations. Transit reliability information will be collected at selected transit centers and park-and-ride facilities in the study area.
- Accident data for the most recent three-year period will be obtained for the study area intersections (signalized and unsignalized) and I-90 between I-5 and I-405. Accident data for roadways (between intersections) will be collected only where there are at-grade or elevated light rail alternatives running within or immediately adjacent to a roadway. Accident data will not be collected if the light rail alignment would not directly affect a roadway or access to it such as along SR 520 in the Bel-Red area.
- Existing and planned pedestrian and bicycle facilities within an approximate 0.5-mile radius of each station area (1.0 mile for bicycle facilities) will be inventoried by either field visits or available information from agencies (such as GIS). This will include identification of school walk routes and any barriers to pedestrian or bicycle travel within each station area. The general sidewalk condition will be assessed qualitatively immediately surrounding station areas.
- Existing truck corridors/routes and any truck weight or height restrictions will be identified.

- Local, regional and State agency *Six-Year Transportation Improvement Plans/Capital Improvement Programs or Transportation Facilities Plans* among other planned improvements in close proximity to a light rail alternative will be reviewed and summarized. This will include identification of all "committed" improvements assumed for the No-Build Alternative.

6.2 Travel Demand Forecasting

The study area comprises the jurisdictions of Seattle, Mercer Island, Bellevue and Redmond. As a result, the analysis will require the use of model output from three different models.

Figure 1 shows the overall process of the travel demand methodology. The analysis will utilize two regional models: (1) Sound Transit's (ST) model which provides future transit ridership estimates, and (2) Puget Sound Regional Council (PSRC) model to provide future year modal information. Subsequently, the local traffic impact analyses in Bellevue and Redmond will be based on the higher network resolution found in the Bellevue-Kirkland-Redmond (BKR) model. The PSRC model will be used to develop the regional traffic analysis measures, screenline information, travel demands across I-90 for use in the freeway analysis and for estimating intersection volumes on Mercer Island and Seattle. The assumptions in the latest PSRC model regarding capacities, parking costs, tolling, HOV usage etc. will be assumed for this project unless otherwise noted throughout this document.

The methodology for forecasting transit ridership is discussed in Attachment 3.

Base Year Model

The model's base year will be 2005. The year 2005 land use estimates developed by the PSRC are based on the most recent verified housing and employment data available. Zonal equivalencies will be established for the model structures; Sound Transit to PSRC and PSRC to BKR.

The next step will be to check the consistency in network definition and attributes found in the models. The BKR model contains the highest resolution of network detail. For regional comparisons, we will run the PSRC model using the enhanced network developed for the I-405 corridor program. This network provides a higher network resolution within the study area than the standard PSRC networks. While the BKR model will generally be used for trip assignments in the local areas, to ensure a high-level consistency between the PSRC and BKR models, quantitative performance measures will be compared between both models to ensure a level of consistency between the PSRC and BKR demand models. Potential measures will include cross lake vehicular demand, mode choice and person trip distribution. The PSRC model transit estimates will be modified to reflect the base year estimates developed by Sound Transit (from its transit model) and the vehicle trip tables adjusted accordingly. The vehicle trip tables will then be converted and used in the BKR model.

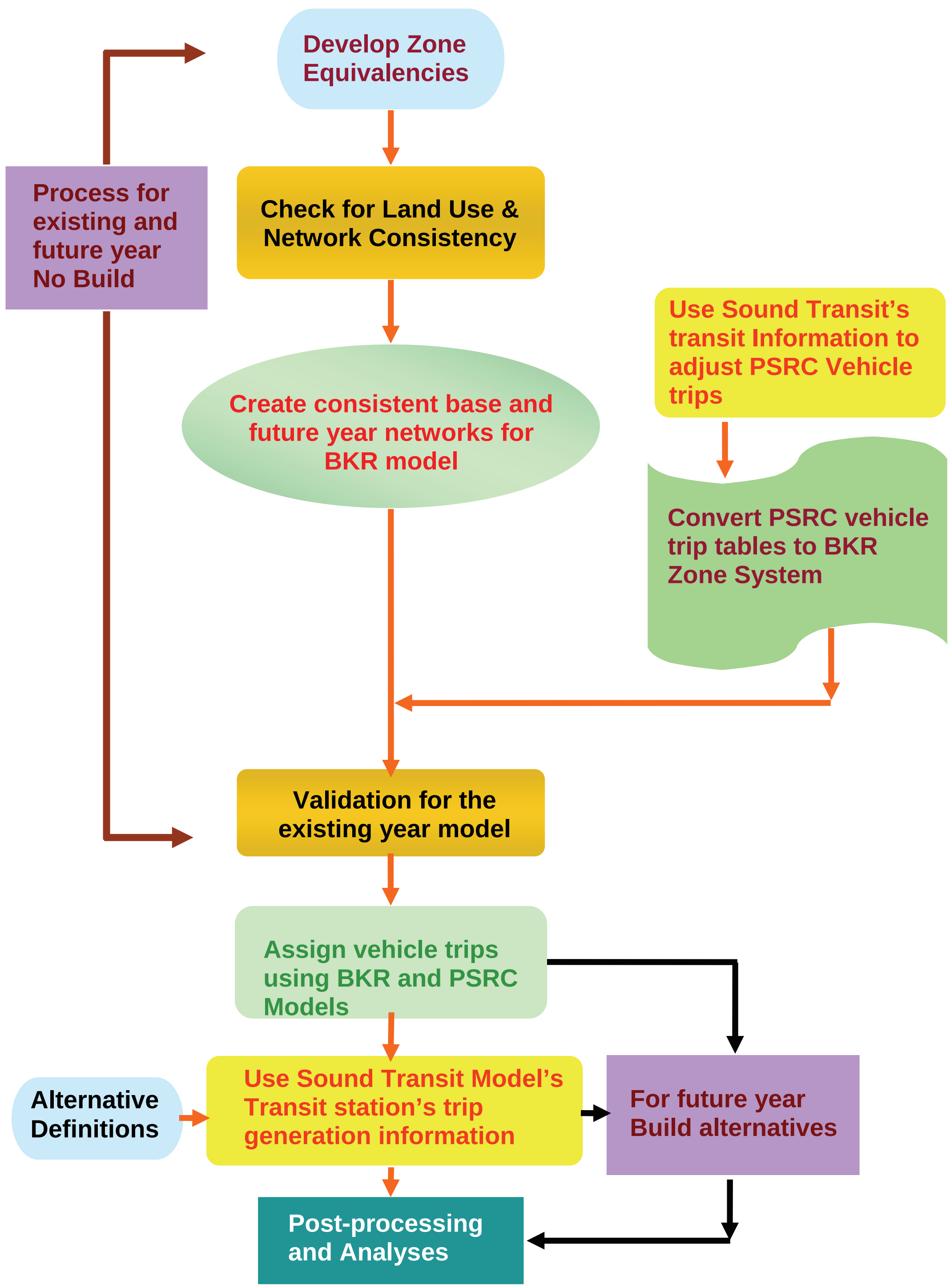
The base year link auto volumes in the BKR model will be validated using 2005-2007 counts in the study area for PM peak hour or period. The PSRC model will be validated for the Seattle, I-90 and Mercer Island study area. Along I-90 and within Mercer Island and Seattle areas, the PSRC model will be used to forecast mainline and ramp volumes and intersection turn movement volumes.

Future Year No-Build Model

Future year analysis will be performed for the years 2020 and 2030 based on the PSRC's current population and land uses forecasts and regional model (Spring 2007). The PSRC's available 2020 and 2030 networks include light rail to the Eastside and other highway and transit enhancements that will not be part of the No-Build alternative. The higher resolution I-405 regional networks (from the I-405 Study) will be used in the PSRC model to develop the regional and screenline performance measures (described in Section 3.2 and 3.3) as they are consistent with the assumed No-Build facility improvements. Both the BKR and PSRC model networks will be modified to reflect the agreed upon No-Build network assumptions. Sound Transit's transit model will also be rerun with the local and regional No-Build transit network assumptions which feed into the PSRC model as an adjustment to the vehicle trip tables.

Each model will be run for each future year to develop demand estimates and performance measures. The PSRC-based 2020 and 2030 No-Build models will serve as the basis to perform the modeling scenarios described earlier. The transit trip table from the Sound Transit model will be used to modify the vehicle person trips in the PSRC model. Similar to the base year analyses, the BKR future No-Build demand forecasts will be consistent with the regional estimates from the PSRC model. Peak period vehicular assignments will be run using the PSRC and BKR models to generate vehicle information for the No-Build alternative intersection and freeway analysis. Two

FIGURE 1 - TRAVEL DEMAND MODEL PROCESS



separate 2020 and 2030 No-Build demand forecasts will be performed along I-90 that would reflect with and without Stage 3 of Alternative R8A of the I-90 Two-Way Transit Lanes and HOV project. Stage 3 is the construction of new HOV lanes on the outer roadway between Mercer Island and Seattle.

Future Year Build Alternatives

Two methods will be used to forecast the future vehicular demand based on the sub areas within the Build condition. Method 1 focuses on the impacts of station area demand in the Seattle, Mercer Island, South Bellevue, Bel-Red and Redmond areas. Method 2 will be applied to I-90 mainline and ramps and downtown Bellevue area (Segment C).

Method 1: Station Area Volumes

2020 and 2030 transit station trip generation information will be developed from the Sound Transit model and will be assigned to various modes of travel based on the Portland *Banfield LRT Station Mode of Access Survey*, or updated information as available. The *Banfield* methodology was a mode of access and egress survey of Portland light rail riders. This survey characterizes the different modes people choose to use to access and egress the stations; such as walk, drive alone, drive with others, drop off, transit transfer or other. This information is presented by each station type; which is based on what station facilities are provided and the surrounding land uses.

The vehicle and pedestrian trips associated with the light rail station ridership forecasts for the highest ridership full length alternative will be assigned to the pedestrian and vehicular networks around the station locations using a spreadsheet or simple trip assignment approach. The auto traffic volumes will be added to the future No-Build auto traffic volumes in the 2020 and 2030 PSRC and BKR models as the basis to analyze the Build alternatives. This approach yields a conservative forecast for the Build alternatives as it does not reflect the shift to transit as people replace their vehicle trip and use light rail. The same methodology will also be used for generating volumes at each interim terminus station. The traffic forecasts and subsequent traffic analysis (Section 7.1) of the interim station alternatives will only be for the local station impacts at that terminus location.

Method 2: I-90 and Downtown Bellevue Volumes

The PSRC model will be coded with a prototypical full length light rail alternatives across I-90 to downtown Redmond. Transit service modifications with the Build alternative will be incorporated based on the 2020 and 2030 Transit Service Integration Plans developed by King County Metro and Sound Transit. The model will be run to estimate regional and screenline changes in modal shares and traffic volumes and estimate the vehicular demand for the I-90 corridor and through downtown Bellevue. For I-90, the PSRC model will be used to develop changes in vehicular demand at the freeway mainline and ramps. These volume adjustments will be post-processed to produce I-90 mainline, ramp and ramp terminal Build traffic volumes. For the I-90 analysis, AM and PM two-hour peak period trip tables will be developed.

For downtown Bellevue, the changes in vehicular demand will be estimated using the PSRC model. These changes in vehicular demand will be coded into the BKR model for detailed intersection and street segment traffic analysis within downtown Bellevue. These volume adjustments will be post-processed to produce Build traffic volumes at the affected downtown Bellevue intersections.

The demand forecasting for the construction and Build alternative conditions along I-90 include the full construction of I-90 Alternative R8A (Stage 1 through 3). For the Build alternative, VISSIM origin/destination matrices will be developed for the I-90 corridor.

Future Year Construction Analysis

For the construction analysis performed for this project, an additional PSRC travel demand forecast will be performed to generate vehicle demand on I-90 during light rail construction. This condition assumes no general/public vehicle access to and from the reversible center roadway system as it is closed during construction. As part of this condition is it assumed that all three stages of the I-90 Alternative R8A project are constructed and operating.

Post-Processing

Standard methodologies from NCHRP 255 will be used to post-process the intersection and link volumes. The difference in the count and the base model volumes will be used along with the growth between the base and the future year model runs. These procedures will be carried out in a spreadsheet model and applied to all of the intersection turning movements and freeway segment volumes. For I-90 area, post-processing at intersections will be done for both AM and PM peak. For all other areas, it will be done for PM only.

Person-Carrying Demand and Capacity

For the screenline analysis (Section 3.3), person-carrying demand and capacity will be provided. This information will be derived from the PSRC demand model. The mode share data from the PSRC model will be used with vehicle occupancy data from the latest WSDOT survey/count information to generate SOV and HOV person-demand. Transit data and occupancies from Sound Transit's transit model will be applied to quantify transit and rail occupancies.

Person-carrying demand is different then person-carrying throughput, as demand is how many people want to use a facility versus how many people are actually able to use it based on the operation analysis and capacity. Person-carrying throughput will be derived from the VISSIM software for only I-90 and is discussed in Section 7.2.

6.3 Intersection and Freeway Level-Of-Service (LOS) Standards

As part of each agency's comprehensive planning efforts, agency transportation goals and LOS standards are developed. While each agency accepts different levels of congestion; a delay-based intersection LOS analysis has been preliminary accepted by each agency. Delay is expressed in terms of average delay per vehicle, in seconds, experienced due to the intersection operations. LOS definitions for signalized and unsignalized intersections and the freeway mainline, merge/diverge, and weave areas are included in Attachment 3. Overall, if the intersection operations better then the LOS standard for each agency in the Build alternative that intersection is considered to meet the agency's standard and does not require any mitigation. In situations were the intersection operates worse then the agency standard (such as LOS F) in the No-Build alternative, the Build alternative would not trigger potential mitigation if the intersection delay and/or LOS does not degrade. Further definition of this approach and the LOS standard(s) for each agency is noted below:

Washington State Department of Transportation

To assess intersection operations, the operating threshold is LOS E. For freeway operations, the operating threshold in urban areas is LOS D.

City of Seattle

The City of Seattle's goal is to maintain intersection operations at LOS D or better.

City of Mercer Island

To assess intersection operations, the operating threshold is LOS C.

City of Bellevue

The City of Bellevue defines its LOS standard through fourteen sub areas; called Mobility Management Areas (MMA). The sub areas that overlap the East Link corridors are listed with their LOS standards in Table 5. All study intersections within each MMA will be individually compared to that MMA's LOS standard listed in Table 5.

TABLE 5
City of Bellevue Mobility targets

MMA No.	MMA	LOS Standard
3	Downtown	LOS E
4	Bel-Red Northup	LOS E
7	South Bellevue	LOS D
14	Overlake	LOS E

City of Redmond

The City of Redmond is currently in the process of redefining its LOS standards. Based on conversations with City staff, a two-tiered methodology is proposed that will examine overall intersection and individual lane group LOS. An overall intersection and lane group LOS standard of LOS E will be used as the LOS standard. Between the No-Build and Build alternatives, intersections that operate better then LOS E and do not degrade to conditions worse then LOS E in the Build alternative are considered to meet standards as long as no lane group

LOS degrades to LOS F conditions. For example, an intersection that degrades from LOS C to D and no lane groups' LOS operates at LOS F, the intersection will not be considered for any improvements other than signal timing adjustments. Although if a lane group degrades from LOS D to LOS F, improvements will be considered to improve that specific LOS. If an intersection or lane group already operates at LOS F in the No-Build alternative, the Build alternative will maintain a similar operating condition where the delay does not significantly degrade.

7.0 Surface Street and Freeway Traffic Analysis

As noted in previous sections, the locations selected for surface street impact analysis are those determined to have the greatest potential for being impacted by light rail. Refer to Section 5.0 for the preliminary intersection and freeway study area. Key parameters will be considered in the determination of impacts to the surface street system; such as reductions in street capacity, changes in vehicular delay and traffic queue lengths at intersections or grade crossings.

7.1 Signalized and Unsignalized Intersection Analysis

Synchro, version 7, software will be used to determine levels of service at signalized and unsignalized intersections. Determining if an intersection meets the agency LOS standards will be based on the conditions at each individual intersection and not by a sub area weighted average. The HCM report from *Synchro* software will be used to summarize average intersection delay, LOS, and critical queue lengths. The level of service at signalized intersections will be defined in terms of average intersection delay. Likewise, the level of service at an unsignalized intersection is also defined in terms of delay, but only for the approach that is stop-controlled, typically the minor-street. For unsignalized intersections that are stop-controlled on each approach, the average intersection delay is reported. LOS definitions for signalized and unsignalized intersections are contained in Attachment 4.

Default values for the analysis will be developed at intersections where actual values are not available. These will include assumptions with respect to saturation flow rates, geometry, traffic, and signalization conditions. Table 6 provides preliminary assumptions for existing input values where data has not been collected. For future input values assumptions are also typically made in terms of how traffic patterns change and traffic signals operate and are listed in Table 6.

TABLE 6

Synchro Parameters/Assumptions

	Condition		
Arterial Intersection Parameters	**Existing**	**2020 - Year of Opening**	**2030 - Design Year**
Peak Hour Factor	From count and by each approach, default provided 0.90	If existing PHF is between 0.70 and 0.85 use 0.90 If existing PHF is > 0.85 ≤ 0.95 use 0.95 If existing PHF is > 0.95 use existing PHF. If existing PHF < 0.70 then increase factor by 0.10	0.95 for all intersections except where existing PHF is greater than 0.95 or less then 0.70. Use existing PHF in the cases were the PHF is greater then 0.95. If existing PHF < 0.70 then increase factor by 0.20
Conflicting Bikes and Pedestrian per Hour	From traffic count, otherwise assume 10 peds/bikes in both AM and PM periods. In Downtown Bellevue assume 50 peds/bikes per approach.	Same as existing in No-Build. For the Build condition, add the number of pedestrians based on the station ridership and Banfield mode of access survey.	Same as existing in No-Build except for Downtown Bellevue; assume 100 peds in both AM and PM periods per approach unless currently higher. If so keep same as existing count. For the Build condition, add the number of pedestrians based on the station ridership and Banfield mode of access survey.
Area Type	"Other" for all areas except Downtown Bellevue which will use CBD.	Same as existing	Same as existing
Ideal Saturation Flow (for all mvmts)	1900	1900	1900

TABLE 6

Synchro Parameters/Assumptions

	Condition		
Arterial Intersection Parameters	**Existing**	**2020 - Year of Opening**	**2030 - Design Year**
Lane Utilization	Default software assumptions unless data/engineering judgment suggests otherwise	Default software assumptions unless data/engineering judgment suggests otherwise	Default software assumptions unless data/engineering judgment suggests otherwise
Lane Width	From field sheets, agency in-house Synchro files or paint line drawings (i.e. SDOT)	Same as existing, unless improvements proposed then use agency standards/plans.	Same as existing, unless improvements proposed then use agency standards/plans.
Percent Heavy Vehicles	From count, otherwise 2%	From count, otherwise 2%	From count, otherwise 2%
Percent Grade[a]	From as-builts, agency in-house Synchro file or field sheets	Same as existing	Same as existing
Parking Maneuvers per Hour	Based on parking regulations. For less than 15 min. parking, assume 4 maneuvers per hour; otherwise assume 1 maneuver per hour, unless data/information gathered or provided from agencies suggest otherwise.	Same as existing. For new parking, assume existing assumptions for maneuvers based on parking durations.	Same as existing. For new parking, assume existing assumptions for maneuvers based on parking durations.
Bus Blockages	Headway information provided by transit agencies	Use future service assumptions developed by Metro and ST as part of the Transit Service Integration Plan.	Use future service assumptions developed by Metro and ST as part of the Transit Service Integration Plan.
Intersection signal phasing and coordination	From agency signal phasing sheets or their existing analysis files.	Same as existing For timing adjustments: Left-turns, if permissive in existing, will be examined for a protected phase based on LOS, access/geometry, safety and agency guidance For Build: any left-turn conflict with at-grade light rail will include a separate lane and have protected phasing. Left-turns will be restricted (or protected with a gate or similar treatment) at unsignalized intersections. For elevated light rail, mid-block left turns will be restricted.	Same as existing For timing adjustments: Left-turns, if permissive in existing, will be examined for a protected phase based on LOS, access/geometry, safety and agency guidance For Build: any left-turn conflict with at-grade light rail will include a separate lane and have protected phasing. Left-turns will be restricted (or protected with a gate or similar treatment) at unsignalized intersections. For elevated light rail, mid-block left turns will be restricted.
Light Rail Signal Phasing	N/A	Train operations are assumed to occur during the parallel through movement signal phase. If this phase is not available then a new signal phase will be coded only for light rail movement. In some instances the train may remove an intersection from being coordinated. In these conditions, the intersection may be allowed to operate uncoordinated "rarely" during Synchro's optimization.	same as 2020 conditions
Intersection signal timing optimization limits	N/A	Between 60 to 120 seconds for all areas except for downtown Bellevue and Redmond. Assume 60 up to 150 seconds for downtown Bellevue & Redmond signals (some in Bellevue may reach up to 180 sec.).	Same as 2020 assumptions
Minimum Green time		Based on pedestrian times (minimum of 4 sec. walk time and 4 feet per second for FDW clearance). If no crosswalk: 10 sec.	Based on pedestrian times (minimum of 4 sec. walk time and 4 feet per second for FDW clearance). If no crosswalk: 10 sec.
Yellow and all-red time		New signals: (Y) = 4 seconds and (R) = 1 second	New signals: (Y) = 4 seconds and (R) = 1 second
Right Turn on Red	Allow	Allow	Allow

TABLE 6
Synchro Parameters/Assumptions

Arterial Intersection Parameters	Condition		
	Existing	**2020 - Year of Opening**	**2030 - Design Year**
Right Turn Overlaps	signal timing plans	Identify if used	Identify if used
50th and 95th percentile vehicle queues	Based on 25 feet per vehicle	Based on 25 feet per vehicle	Based on 25 feet per vehicle

[a] Percent grade assumed for at grade intersections only.

Delay-based LOS results will be reported from Synchro's HCM Reports

7.2 Freeway and Ramp Analysis

The *VISSIM* software, version 4.2, will be used to assess the I-90 freeway operations for the mainline/merge and diverge freeway areas as well as the ramp terminals between I-5 and I-405. Refer to Section 6.0 for the proposed I-90 analysis periods and Section 5.2 for a description of the freeway study area. The extent of the study area will create a comprehensive connected system to better simulate travel patterns and fluctuations. Control devices; such as ramp meters on the on-ramps will also be included in the *VISSIM* network to portray operating conditions onto and from I-90. If joint transit/rail operation on the I-90 D2 roadway is carried into the EIS analysis, this operating plan will be reflected in *VISSIM* network.

The network coding within *VISSIM* software will be built from the *WSDOT I-90 Center Roadway Study* or found on as-built plan sheets or aerial photos. For any design changes as part of the Build alternative, they will be coded into the network to satisfy the design requirements of the State and will be consistent with the latest *WSDOT Design Manual*. Table 7 identifies some of *VISSIM's* additional inputs and assumptions that will be incorporated into the analysis.

While the ramp terminals and ramp control devices will be coded into *VISSIM*, the intersection results (including ramp terminals) will be from the analysis conducted with the *Synchro* software as this software program is more effective in testing and optimizing traffic signals on an arterial network.

TABLE 7
VISSIM Freeway Parameter Methods/Assumptions

Freeway Parameter	Existing	2020 Year of Opening	2030 Design Year
Deceleration Lane Length	From As-builts or aerial	Same as existing or from design plans	Same as existing or from design plans
Acceleration Lane Length	From As-builts or aerial	Same as existing or from design plans	Same as existing or from design plans
Grade	From as-builts, if not assume 0%	Same as existing	Same as existing
Superelevation[a]	Assume 0%	Same as existing	Same as existing
Pavement Type	Assume dry concrete	Assume dry concrete	Assume dry concrete
Desired Free-Flow Speed	70 mph	Same as existing	Same as existing
Car Following Sensitivity Factor[b]	Variable	Same as existing	Same as existing
Truck %	From traffic data	Same as existing	Same as existing
I-90 Carpool/HOV Person Designation	2+ with access for Mercer Island residents in the I-90 reversible center roadway	No-Build based on PSRC's assumption. For Build include Mercer Is. Residents2	No-Build based on PSRC's assumption. For Build include Mercer Is. Residents2
Carpool / HOV %	From field data	From demand modeling information	From demand modeling information
Origin-Destination Patterns	From WSDOT I-90 Study. If not, from calibrated 2005 PSRC demand model	From demand modeling information	From demand modeling information

TABLE 7
VISSIM Freeway Parameter Methods/Assumptions

Freeway Parameter	Existing	2020 Year of Opening	2030 Design Year
Lane Distribution (for entering links)	Assume even distribution over all entering lanes	Assume even distribution over all entering lanes	Assume even distribution over all entering lanes
Vehicle Type Specifications	Assume default vehicle type specifications	Same as existing	Same as existing
Warning Sign Distance (for on-ramps) [b]	From As-builts, variable depending on freeway conditions and geometry	Same as existing	Same as existing
Warning Sign Distance (for off-ramps)[b]	From As-builts, variable depending on freeway conditions and geometry	Same as existing	Same as existing
Ramp Metering	Will be coded as fixed-timed	Will be coded as fixed-timed	Will be coded as fixed-timed
VISSIM Output *(pcphpl - per car; per hour; per lane)*	Segment density (in terms of pcphpl) and corridor travel time	Segment density (in terms of pcphpl) and corridor travel time	Segment density (in terms of pcphpl) and corridor travel time
Number of Simulations	Up to 5 simulations	Same as existing	Same as existing

[a] CFSF and Warning Sign Distances are key inputs and will be used as a calibration technique to match field conditions.

[b] Per the December 22nd, 2006 WSDOT letter to the City of Mercer Island.

Detailed vehicle data along I-90 will be post-processed and presented to identify four mobility measures for the I-90 freeway corridor. These measures described below will be used to identify the potential benefits and impacts of the light rail alternative on I-90. These four mobility measures are:

1) ***Number of access locations.*** The number of access points to and from I-90 will be identified. This will include any access changes or conversions with the Build alternative.

2) ***AM and PM Level of Service (LOS).*** The Highway Capacity Manual defines the freeway LOS in terms of density to quantify the operating conditions on a freeway facility. Density, and its corresponding LOS, for each mainline, merge/diverge and weaving segment will be provided. Density is measured by the number of passenger cars, per hour, per lane (pcphpl). Attachment 3 provides LOS definitions for freeway segments.

3) ***AM and PM Peak Hour Travel Time.*** Eastbound and Westbound No-Build travel times for the outer roadway general purpose (GP) and HOV (including transit) lanes along with the reversible center roadway express lanes on I-90 will be provided between four locations; I-5, 77th Avenue SE/Island Crest Way, Bellevue Way and I-405.

   For the Build alternative, the No-Build alternative center lane travel times will be replaced with the travel time for light-rail between Seattle and the Mercer Island station. The GP and HOV travel times for the outer roadway will also be provided for the Build alternative. Table 8 provides a list of the travel times and their corresponding endpoints.

4) ***AM and PM Peak Hour Person and Vehicle-Throughput.*** Person and vehicle throughput will be determined at the two screenlines locations on I-90 (Section 3.3), west of Mercer Island and between Bellevue Way and I-405 Interchanges. Throughput is a function of the operating condition; therefore vehicle data from *VISSIM* will be post-processed with the latest PSRC occupancy survey data to generate SOV and HOV person-throughput. Transit ridership data from the Sound Transit model will be included as a component of the No Build and Build alternative person-throughput.

   Person and vehicle-throughput statistics will be provided for a range of light rail alternatives through post-processing transit ridership and service information. This assumes GP and HOV vehicles along I-90 will remain constant between the light rail alternatives as latent demand in the peak period will replace any mode shift to transit.

TABLE 8
I-90 Travel Time Endpoints

Mode/Facility	No-Build Alternative	Build Alternative
Outer Roadway GP and HOV lanes	1) I-5 to Bellevue Way (EB) 2) I-5 to I-405 (WB) 3) I-405 to I-5 (EB) 4) Bellevue Way to I-5 (EB) 5) I-5 to Island Crest Way (EB) 6) Island Crest Way to I-5 (WB)	1) I-5 to Bellevue Way (EB) 2) I-5 to I-405 (EB) 3) I-405 to I-5 (WB) 4) Bellevue Way to I-5 (WB) 5) I-5 to Island Crest Way (EB) 6) Island Crest Way to I-5 (WB)
Reversible center roadway	7) I-5 to 77th Avenue SE (EB) 8) 77th Avenue SE to I-5 (WB)	7 & 8) Light rail between the IDS to Mercer Island Station (EB & WB)

7.3 Local Street and Freeway Safety Analysis

A safety (accident/crash) analysis will be used to assess the type, cause, and frequency of accidents currently occurring within the project limits. Accident data from the latest three years will be completed and summarized to identify any current safety deficiencies. Unique accident patterns (e.g. high frequency of a specific pattern) will be noted. The accident data will be collected for the directly affected local intersections, roadways and I-90 mainline and ramps. Only where the light rail alternatives are proposed to be either at-grade in semi-exclusive right-of-way or elevated within or immediately adjacent to the road right-of-way will an intersection and roadway safety analysis be conducted. Along the local streets, a qualitative discussion of how the project may affect accident type and frequency will be developed and presented.

Along I-90, a predictive assessment of how accidents may change in the future related to volume/congestion level changes can be developed using current hourly corridor data. By relating various accident quantities to congestion levels, future accident rates or quantities can be applied to future volume predictions for both Build and No-Build alternatives. If current accident patterns/rates suggest a similar accident history when the safety analysis was conducted for the *I-90 Two-Way Transit and HOV Operations EIS and IJR* then the future predictive analysis for that project will be used as the baseline condition for the I-90 outer roadways. This includes the crash reduction measures proposed in these studies and approved by WSDOT. Assuming some change in congestion may result from the Build alternative can be translated into changes in accident rate. The safety benefit of conversion of the reversible center roadway to light rail will also be disclosed.

No accident analysis or safety conclusions for alternatives proposed to operate outside the roadway right-of-way (exclusive right-of-way) will be conducted. An example of this type of alignment is the light rail alternative that is proposed adjacent to the SR 520 corridor.

7.4 Light Rail Stations/Park-and-Ride

Using the analysis methodology described in previous sections, key access points to the light rail stations and park-and-ride lots will be analyzed to determine the traffic impacts associated with each light rail alternative. The South Bellevue, Wilburton and Redmond Park and Rides and Bellevue, Mercer Island and Overlake Transit Centers are located at or nearby potential light rail alternatives; therefore, the evaluation of traffic impacts due to the East Link alignments will be based on the projected net change in park-and-ride demand for all transit users in each station's vicinity due to the introduction of light rail service or any expansions in park-and-ride capacity. This analysis also pertains to any proposed park-and-ride facilities; such as the SE 8th Street/118th and SR 520/SR 202 facilities that are included in various alternatives.

Other issues to be addressed in the assessment of park-and-ride lot and other transit station impacts will include drop-off needs, pedestrian and bicycle circulation and access, and a qualitative evaluation of the potential for spillover parking within adjacent commercial or residential neighborhoods (hide-and-ride as described in Section 7.5).

Characteristics and locations of proposed transit stations and park-and-ride lots will be provided as part of the definition of each light rail alternative. Light rail ridership data at each station, consisting of average weekday park-and-ride, bus transfer, and walking/bicycle patron volumes, will be obtained from the patronage forecasting.

Park-and-ride trip generation and peaking characteristics for each type of access mode, including both parked vehicles and passenger pick-up/drop-off trips, will be estimated based on information provided in the *Banfield LRT Station Mode of Access Survey* (Tri-Met 1996) or updated information as available for stations in the Portland area that have similar characteristics to proposed Link stations. Parking trip generation will also be sensitive to the project and location-specific characteristics that affect each park-and-ride such as driveway locations.

Traffic impacts at light rail stations will be evaluated using *HCM* methodologies at adjacent key intersections and at the proposed station or parking lot driveway intersections as discussed in Section 7.1. To provide a conservative evaluation of potential traffic impacts, park-and-ride lots will be assumed to be operating at full capacity with all light rail alternatives.

Beyond the vehicle trip generation and subsequent intersection traffic analysis associated with the development of light rail stations and park-and-ride lots, a qualitative assessment will be conducted to assess the likelihood of or potential for other traffic impacts associated with these facilities. These impacts could include:

- Discussion of the potential for off-site and/or commuter parking in the vicinity of each station on local streets or in privately-owned parking lots (this differs from the quantitative impact of physical parking loss or reconfiguration discussed in Section 7.5);
- Estimation of the potential for residential neighborhood traffic intrusion; and
- Identification of existing or potential future barriers to bicycle and pedestrian circulation in the vicinity of light rail stations or caused by light rail trackway development.

Table 9 summarizes the criteria used to assess non-quantifiable station-area traffic impacts as described above. These criteria include definitions for the determination of impact magnitude. Variations in transit station ridership forecasts associated with interim terminus alternatives and station deferrals will also be considered in the assessment of station area traffic impacts.

TABLE 9
Criteria for Evaluation of Station-Area Traffic Impacts

Impact	Factors Considered	Impact Assessment
Potential for Off-site Station Area Parking Impacts (Hide-and-Ride)	• Availability of unrestricted parking within a reasonable walking distance. • Compatible land uses. • Perception of security. • Proximity to other light rail station with available parking.	• Low – Station surrounded by restricted parking, land uses incompatible, security questionable. • Moderate - Parking both restricted and unrestricted, land uses compatible with all day parking, reasonably secure. • High - parking generally unrestricted and convenient. Station may be an access point to large travel shed. These areas already experience high parking utilization.
Potential for Residential Neighborhood Traffic Intrusion	• Existence of through street connections • Character of surrounding land use (is it residential?). • Spatial relationship of access routes to residential area.	• Close correlation with potential for off-site parking impacts. Existence of or lack of traffic calming devices will be taken into consideration.
Pedestrian/ Bicycle Traffic	• Existing facilities available and proposed. • Volume of traffic on adjacent roadways. • Topography and/or gradient differences.	• Qualitative assessment related directly to provision or lack of facilities and/or presence of existing or potential physical barriers.

[a] Restricted parking not available to light rail riders will include on-street parking with meters, residential parking zone (RPZ) signs, or time limit signs, and private off-street parking not available for general public use.

7.5 Parking

Parking supply and costs vary throughout the corridor; large supplies of free private parking are available in both Bellevue and Redmond areas. Many private parking garages are also located in the Bellevue downtown area. Demand for parking spaces also varies depending upon location throughout the corridor, with relatively high demand in downtown Bellevue, more moderate demand in Bellevue-Redmond and Overlake areas and relatively low demand in other locations; such as South Bellevue.

Analysis of the impacts of light rail on existing on and off-street public parking will focus on the loss or reconfiguration of this parking due to light rail station and trackway development.

Inventory of Parking Supply and Utilization

The analysis of light rail impacts on on-street parking supply and demand will generally be limited to one block on either side of the proposed light rail alignments. Refer to Section 6.1 for the parking data collection parameters. A parking inventory and utilization survey will be conducted for all at-grade or elevated alignments that are within the road right-of-way.

At station areas, parking inventory and utilization surveys will be conducted within a 0.25-mile radius of each station. Within this area, an inventory of existing on and off-street public parking spaces will be developed. Inventory data will be stratified by type of parking (i.e., time limited parking, free parking, loading zone, etc.) and location (i.e., block face or other distinguishing feature). Where available, data from the local agencies will be used to initiate the inventories near the station locations. Where data is not available from the local agencies, data will be collected through field surveys. Analysis will focus on locations that may be specifically impacted by the light rail alignments including both available parking and internal site circulation. Data will include a space occupancy count by block face taken once during mid-morning or mid-afternoon hours on a weekday. This time period represents typical conditions for parking demand.

Private off-street parking data will not be collected as part of this project and only if available by the local agencies or other civic groups will the private parking supply and utilization be documented.

Assessment of Parking Impacts

The assessment of public parking impacts will be based on review of the inventory of parking supply and demand coupled with an evaluation of the conceptual drawings for each light rail alternative. These concepts should identify specific locations where changes would be made to the existing parking supply. Comparison between existing demand and the supply remaining after construction of each light rail alternative will form the basis for identification of parking loss associated with the project. The loss of existing public parking spaces will be stratified by both location and type. Private off-street parking will only be analyzed qualitatively since quantitative private parking data is not to be collected.

7.6 Non-Motorized Facilities/Modes

A qualitative assessment of the light rail alignments on existing and future pedestrian and bicycle facilities will be performed. Specific issues to be discussed include the following:

- Pedestrian access and circulation in the vicinity of the proposed station, in relationship to the forecasted ridership.
- Identification of direct (physical) effects on pedestrian and bicycle facilities along each light rail alignment.
- Barriers created to non-motorized (pedestrian and bicycle) traffic movement.
- Intersection crossing issues associated with station layout and connections to major pedestrian routes and destinations.
- Missing sidewalk sections for City arterial streets within a half-mile radius of the proposed light rail stations.
- Impacts to recommended school walk routes.
- Existing regional bike paths, routes and deficiencies within a 1.0-mile radius of the proposed light rail stations with a general qualification of how major multi-use trails/paths are used (i.e. by commuters or recreational use).

A pedestrian LOS analysis will also be conducted for sidewalks at intersections within one block or 300 ft of each proposed station entrance. The *Transit Capacity and Quality of Service Manual* (TCQSM) and *Highway Capacity Manual* (HCM) methodology for determining sidewalk LOS will be used for this analysis. Additional factors such as station layout, adjacent land uses, connections to nearby pedestrian routes and destinations, and potential queue locations will be considered and qualitatively discussed as part of the sidewalk analysis.

7.7 Property Access/Local Circulation

Beyond the analysis of intersection level of service and delay impacts, a qualitative assessment will be made of traffic impacts on local circulation. This assessment will include such factors as:

- Effect of potential street closures on localized traffic movement,
- Potential for neighborhood traffic intrusion associated with either light rail stations or trackway,
- Loss of left-turn access to and from driveways for at-grade and elevated light rail alternatives,
- Changes in property access, and other factors.

7.8 Freight

A qualitative assessment will be made of the light rail alignments' impact on freight movements. This assessment will focus on truck movement, truck routing impacts and impacts to the BNSF freight rail corridor. The freight assessment will focus on potential impacts to major truck routes (including I-90) and the BNSF rail corridor, truck service areas, access to truck depots or intermodal yards, and loss of on-street loading zones and modifications of truck access to local businesses.

7.9 Transit

To ensure transit is appropriately evaluated the level of service analysis documented in Transit Cooperative Research Program, Report 100, 2nd Edition *The Transit Capacity and Quality of Service Manual* (TCQSM) will be used as a guideline for measuring and comparing transit in the Existing, No-Build, and Build conditions. The transit LOS measures will generally be evaluated at the each screenline and between station-to-station locations. The measures to be considered include:

- Service Frequency – Transit schedules and headways will be reviewed at the regional transit centers and park-and-ride locations to determine the number of times an hour a user has access to the transit mode. Special attention will be focused on transit routes that would serve comparable destinations as light rail.
- Hours of Service – Also known as "service span," is simply the number of hours during the day when transit service is provided along a route, a segment of a route, or between two locations.
- Passenger Loads – Reflect the passenger's comfort level of the on-board vehicle portion of a transit trip, both in terms of being able to find a seat and overall crowding levels within the vehicle. This will mostly be a qualitative comparison among alignments, although at the screenline locations model output will be available and reported.
- Reliability (On-Time Performance and Headway Adherence) – This measure would rely on actual field information from King County's Metro and Sound Transit's Automatic Vehicle Location (AVL) data for an assessment of existing conditions at transit centers and park-and-ride lots. Observations will be made at selected potential station locations to assess the reliability of existing bus routes. Future No-Build and light rail alternatives would be assessed in a qualitative fashion.
- Travel Time/Transfers – Will be compared for No-Build and Build conditions. Average door-to-door travel times determined based on Sound Transit's forecasting model will be compared for the alternatives being considered.

The effect this project has on the Downtown Seattle bus operations will be provided. This assessment will identify how the light rail alternatives will impact bus service and frequencies in the downtown Seattle area.

Bus and Vanshare layover and queuing needs will also be reviewed for each proposed station location. The primary source of information for the future Build alternative will be the light rail alternatives' ridership forecasting effort which is expected to provide the network design, service level inputs, and ridership and travel time outputs. Coordination with King County Metro, and possibly Community Transit will be required.

7.10 Construction

Two primary sources of construction impacts to local traffic will be considered from a generally qualitative standpoint:

1. Impacts to traffic operations related to potential road, sidewalk, bicycle, or other transportation facility closures during construction; and
2. Impacts of construction-related traffic.

The assessment of construction traffic impacts will focus primarily on principal and minor arterials or on streets that could be directly affected by project construction.

As the construction duration along I-90 will cause the closure of the reversible center roadway a quantitative traffic analysis will be prepared to document and assess any relatively short-term construction impacts incurred by the light rail construction. This process and technical analysis will be prepared similar to the information presented in Sections 6.0 and 7.2. As part of this analysis it is assumed that Stage 3 of the I-90 Alternative R8A will be already constructed and operating to alleviate congestion caused by the reversible center roadway closure. The construction of Alternative R8A will not be included in this analysis as its construction staging and assessments are documented in the approved *I-90 Two-Way Transit and HOV Operations EIS and IJR*.

Construction traffic analysis will consider the following:

- Identification of changes in roadway capacity including potential lane closure requirements, parking restrictions, pedestrian or bicycle facility/routes impacts, alignment shifts, areas of construction activity adjacent to travel lanes, or other reductions to capacity due to transit facility and associated utility construction activity;
- Impacts to transit and emergency services;
- Impacts of construction-related activity on on-street parking supply;
- Identification of potential construction staging areas; including access and impact to roadway operations;
- Identification of potential construction access and truck routes and the impact of construction-related traffic on these routes;
- Estimation of construction truck traffic;
- Identification of areas that would require construction coordination between Sound Transit and other governmental agencies; and
- Development of measures that could mitigate traffic impacts from project construction.

The analysis will be summarized in a tabular format to identify the following:

- Impact location(s).
- Street characteristics.
- Type of construction activity including likely duration of impact (short-term versus long-term).
- Level of construction traffic (This may be characterized as high, moderate, or low). High truck traffic is associated with major fill, excavation, and concrete work such as with tunneling. Moderate truck traffic generally refers to activities not associated with major fill or excavation work. Low truck traffic occurs when none of the construction activities associated with moderate or high truck traffic occurs).
- Full or partial road closures.
- Availability of detour routes.
- Potential for detoured traffic to impact a residential neighborhood. (This is characterized as high, medium or low and is related to both potential for road closure and options for traffic detour.)

- Loss of on-street parking. (This may be characterized as "yes" for parking loss and "no" for no parking loss. Additionally, there may be some temporary loss of off-street parking due to the location and operation of construction staging.)
- The parking demand and supply data discussed in Section 7.5 will be used to determine the level of potential impact that construction worker parking could have on parking supply during construction activities.
- General comments highlighting key issues for each location related to construction traffic activity that do not fall into one of the foregoing categories.
    a. Identify capacity issues, impact on parking/access
    b. Identify construction routes/staging areas

7.11 Mitigation

Potential mitigation measures will be described to address potential transportation impacts associated with the light rail alternatives.

Based on the 2020 and 2030 traffic analysis, opportunities for mitigation of long-term impacts will be identified for intersections that do not meet the established level of service standards. These measures might include operational changes such as signal phasing or timing or physical modification such as added lanes. For intersections that do not meet the established level of service standards in the No-Build condition, the light rail alternatives are only obligated to bring the operating conditions back to the No-Build condition. Determining if an intersection meets the agency LOS standards will be based on the conditions at each individual intersection and not by a subarea weighted average.

Areas for potential parking mitigation will be identified by considering the potential for hide-and-ride in the neighborhoods surrounding transit stations. Areas with a high potential for this type of parking activity will be identified with potential mitigation strategies to reduce the likelihood of this activity.

Mitigation measures aimed at addressing the construction traffic impacts identified above will be developed and reviewed. As appropriate, this will include a review of measures proposed and/or used for the Central Link light rail construction. Mitigation measures identified to address local construction traffic impacts will also be reviewed for their relevancy in addressing regional and/or corridor level construction traffic issues.

8.0 Documentation

A Transportation Technical Report will be prepared documenting the technical analysis discussed in this report. A summary of the Transportation Technical Report will be incorporated into the relevant sections of the EIS as the Transportation section.

Attachment 1
No-Build Project List

No-Build Transportation Projects

Facility	Project Detail	2020	2030	Source
King County Interstate and State Routes				
I-405	1 lane each direction from I-5 to SR 181	X	X	Nickel Package
	1 lane NB from SR 181 to SR 167	X	X	Nickel Package
	1 lane SB from SR 169 to SR 167	X	X	Nickel Package
	1 lane NB from SR 167 to SR 169	X	X	TPA
	SR 515 half-diamond interchange (Talbot Rd)	X	X	TPA
	1 GP lane NB from 112th Ave SE to SE 8th	X	X	Nickel Package
	1 GP lane and one outside HOV SB from I-90 to SE 8th	X	X	Nickel Package
	NE 10th overcrossing	X	X	TPA
	NB Braided crossing from NE 8th to SR 520	X	X	TPA
	1 lane NB from NE 70th to NE 124th	X	X	Nickel Package
	1 lane NB from NE 124th to NE 160th	X	X	TPA
	1 lane SB from SR 522 to SR 520	X	X	Nickel Package
	2 NB lanes Braided Crossing from NE 160th to SR 522	X	X	TPA
	NE 132nd St Interchange	X	X	TPA
	Totem Lake Freeway Station NE 128th	X	X	Sound Transit
	Totem Lake Transit Center	X	X	Sound Transit
	NB/SB SR 167 to I-405 HOV Direct Connect		X	Destination 2030
	1 lane each direction SR 169 to SR 900 (Sunset Blvd)		X	Destination 2030
	2 lanes both directions Sunset to Park Drive		X	Destination 2030
	HOV Direct Access N 8th		X	ST/Destination 2030
	3 lanes both directions from Park Dr to NE 30th		X	Destination 2030
	2 lane NB NE 30th to SE 52nd Ave SE		X	Destination 2030
	3 lanes SB from Coal Creek to NE 30th		X	Destination 2030
	3 lanes both directions from Coal Creek to I-90 (Braids for I-90 to I-405)		X	Destination 2030
I-90	Two-way Transit/HOV from Seattle to Mercer Island (Stage 1, 2, and 3)	X	X	TPA (Only Stages 1 and 2)
	Eastgate Access / 142nd Ave SE	X	X	Sound Transit
SR 519	New ramp at South Atlantic Street and grade separated crossing over Royal South Royal Brougham Way	X	X	Nickel Package
SR 520	Widen to 8 lane including auxiliary and HOV lanes from W Lake Sammamish to SR 202	X	X	Nickel Package
	6 lane (2 GP, 1 HOV) facility Between I-405 and Mountlake Blvd (This project will also include the tolling strategies documented in the EIS.)		X	Destination 2030

No-Build Transportation Projects

Facility	Project Detail	2020	2030	Source
SR 167	1 SB lane from I-405 to SW 41st	X	X	TPA
	1 HOV lane SB from 15th NW to 15th SW	X	X	Nickel Package
	Add HOV both directions from 15th St SW to Pierce Co. Line	X	X	TPA
	Extend HOV lane from 8th St SW to 15th Street NW – HOV	X	X	Nickel Package
I-5	1 NB lane NE 175th to NE 205th	X	X	Nickel Package
	Complete HOV from Pierce Co. Line to Tukwila	X	X	Nickel Package
SR 509	Phase 1: 180th to I-5		X	Destination 2030
SR 900	Add 1 lane both directions from SE 78th to I-90	X	X	Nickel Package
	Add HOV lanes both directions from park-and-ride lot to I-90	X	X	Nickel Package
SR 522	UWBCC campus access: new interchange	X	X	Nickel Package
SR 518	Add 1 EB GP lane from airport access to I-5	X	X	TPA
	EB GP lane from Airport Access to I-5	X	X	TPA
SR 161	Widen to 5 Lanes from Jovita Blvd to S 360th St	X	X	Nickel Package
SR 99	Aurora Ave N Corridor Transit/HOV Lanes (N 105th to N 200th)	X	X	Nickel Package
	Replace viaduct		X	Destination 2030
SR 18	1 lane both directions Maple Valley to Issaquah Hobart Rd	X	X	Nickel Package
	1 lane both directions Issaquah Hobart Rd to I-90		X	Destination 2030
Snohomish County Interstate and State Routes				
I-5	HOV lanes from SR 526 to US 2	X	X	Nickel Package/TPA
	New ramp SB I-5 to WB SR 525	X	X	TPA
SR 522	4-lane widening from Snohomish River to US 2	X	X	Nickel Package
SR 9	Stages 1 and 2 from SR 522 to 176th St SE	X	X	Nickel Package
I-405	1 lane NB NE 195th to SR 527	X	X	TPA
SR 527	Additional lanes from 164th SE to 112th SE	X	X	Nickel Package
Pierce County Interstate and State Routes				
I-5	HOV lanes from S 48th (Tacoma) to King/Pierce Co. Line	X	X	Nickel Package
SR 161	Corridor improvements from 176th to 234th	X	X	Nickel Package
	Additional lanes from 36th to Jovita	X	X	Nickel Package
SR 16	HOV Improvements from Olympic View Dr to I-5	X	X	Nickel Package
	Tacoma Narrows Bridge: new bridge and approaches. Toll on bridge (EB only)	X	X	Bond/Toll
SR 410	Additional lanes from 214th to 234th	X	X	Nickel Package/TPA
Bellevue Arterials				
150th Ave SE	Widen to 7 lanes from SE 36th to Newport Way; add turn lanes	X	X	TFP-011
Northup Way	1 EB lane from 120th to 124th Avenues NE	X	X	TFP-091, TFP-106

No-Build Transportation Projects

Facility	Project Detail	2020	2030	Source
110th Ave NE	Widen to 5 lanes between NE 4th and NE 8th	X	X	TFP-110
NE 10th St	Extend from 112th Ave NE across I-405 and through the OHMC campus to connect with 116th Ave NE	X	X	TFP-189
106th and 108th Avenues	Convert roadway to function as a one-way couplet from Main St to NE 12th St		X	TFP-172
NE 8th St	Add westbound lane from 106th to 108th Ave NE becoming right turn lane at 106th Ave NE	X	X	TFP-184
NE 10th St at I-405	Add half interchange to/from the north	X	X	TFP-193
NE 2nd St	Extend NE 2nd St across I-405 from 112th Ave NE to 116th Ave NE		X	TFP-197
NE 2nd St	Widen the existing roadway from 3 lanes with parking and turn pockets to 5 lanes from Bellevue Way to 112th Ave NE	X	X	TFP-190
130th Ave NE	Construct a two-way left-turn lane from Bel-Red Rd to NE 20th St	X	X	TFP-039, R-122
148th/150th Ave SE	Widen by extending the third SB lane from the ramp to WB I-90 to south of Eastgate Way at the I-90 WB off Ramp		X	TFP-154
129th Ave SE	Extend 129th Ave SE from SE 38th St to Newport Way		X	TFP-103
Bel-Red Corridor Preferred Alt.	Land use changes included in the preferred alternative from the Bel-Red Corridor Project will be included in the transit ridership sensitivity analysis.	NA	NA	City of Bellevue
Redmond Arterials				
Union Hill Road	Widen Union Hill Rd from Avondale Rd to 178th Pl NE. Improvements include 2 through lanes and 1 right turn lane in each direction, left turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power and utility pole relocation.	X	X	RED-TFP- 049a
Union Hill Road	Widen Union Hill Rd from 178th Pl NE to 188th Ave NE. Improvements include 2 through lanes in each direction, left urn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power and utility pole relocation, right-of-way and easement acquisition. Construct permanent signal at 178th Place NE/Union Hill.	X	X	RED-TFP-049b
162nd Avenue NE (Bear Creek Parkway Extension, west)	Construct new arterial from 159th Pl NE to Leary Way. Improvements include 1 through lane in each direction, left turn lanes, curb, gutter, sidewalks, street lights, storm drainage, and right-of-way.	X	X	RED-TFP-050a
Redmond Way	Widen Redmond Way from SR 520 to 187th Ave NE. Improvements include 6-7 lanes from SR 520 to East Lake Sammamish Pkwy (ELSP) and 4-5 lanes from ELSP to 187th Ave NE, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power.	X	X	RED-TFP-065
160th Avenue NE	Construct new 160th arterial from current terminus at approximately NE 99th St north to the intersection with Red-Wood Rd and modify existing 160th arterial from NE 90th St north to current terminus. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, right of way and easement acquisition.	X	X	RED-TFP-072a
NE 116th Street	Widen NE 116th St from Red-Wood Rd to Avondale Rd. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, curb, gutter, sidewalks, equestrian trail, street lights, storm drainage, underground power, right-of-way and easement acquisition.	X	X	RED-TFP-105

No-Build Transportation Projects

Facility	Project Detail	2020	2030	Source
188th Avenue NE	Construct new 188th Ave NE arterial from Redmond Way to Union Hill Rd. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, right-of-way and easement acquisition.	X	X	RED-TFP-117
185th Ave NE	Construct new 185th Ave NE arterial from NE 80th St to Union Hill Rd. Improvements include 1 through lane in each direction, left turn lanes, sidewalks, street lights, storm drainage, right-of-way, easements and traffic signal at Union Hill Rd.	X	X	RED-TFP-118
161st Ave NE	Construct new 161st Ave NE from Bear Creek Pkwy Extension to Redmond Way. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, parking, sidewalks, street lights, storm drainage, right-of-way, easements and traffic signals at Cleveland St and Bear Creek Pkwy.	X	X	RED-TMP-001
164th Ave NE	Construct new 164th Ave NE from NE 76th St to Cleveland St. Improvements include 1 through lane in each direction, bike lanes, parking, sidewalks, street lights, storm drainage, right-of-way and easements.	X	X	RED-TMP-002
NE 36th St/NE 31st St	Construct new NE 36th St and bridge over SR 520 in the vicinity of NE 36th St and NE 31st St. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, sidewalks, street lights, storm drainage, right-of-way and easements.	X	X	RED-TMP-004
172nd Ave NE	Construct new 172nd Ave NE from NE 122nd St to NE 124th St. Improvements include 1 through lane in each direction, sidewalks, street lights, traffic calming, storm drainage and easements.	X	X	RED-TMP-007
NE 85th St	Reconfigure NE 85th St from 154th Ave NE to 164th Ave NE to 1 through lane in each direction, center left turn lane, bike lanes, parallel parking and pedestrian amenities.	X	X	RED-TMP-009
164th Ave NE	Reconfigure 164th Ave NE from Redmond Way to NE 87th St to 1 through lane in each direction, center left turn lane, bike lanes and pedestrian amenities.	X	X	RED-TMP-010
Old Redmond Rd	Widen Old Redmond Road to three lanes from 132nd Ave NE to 136th Ave NE and rechannelize from 136th Ave NE to 140th Ave NE. Improvements include 1 through lane in each direction, left turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power, right-of-way and easement acquisition.	X	X	RED-TMP-016
Cleveland St	Convert Cleveland St to 1 through lane in each direction. Improvements include parking, curb bulbouts, widened sidewalks, pedestrian amenities and realignment of street at eastern connection to Redmond Way to improve traffic flow.	X	X	RED-TMP-017
Redmond Way	Convert Redmond Way from 159th Pl NE to 170th Ave NE to 1 through lane in each direction and center turn lane except at west end where there would be two westbound through lanes from 159th Ave NE to 160th Ave NE. Improvements include curb bulbouts, sidewalk improvements, pedestrian amenities and parking.	X	X	RED-TMP-018
166th Ave NE	Reconfigure 166th Ave NE from NE 85th St to NE 104th St to 1 through lane in each direction, center left turn lane and bike lanes.	X	X	RED-TMP-019
NE 83rd Street	Widen NE 83rd St from 160th Ave NE to 161st Ave NE. Improvements include widened sidewalks, increased parking, street lights, pedestrian amenities and intersection modifications.	X	X	RED-TMP-061
Overlake Neighborhood Preferred Alt.	Land use changes included in the preferred alternative from the Overlake Neighborhood Plan will be included in the transit ridership sensitivity analysis.	NA	NA	City of Redmond

No-Build Transportation Projects

Facility	Project Detail	2020	2030	Source
Kirkland Arterials				
NE 120 St	Construct new 3-lane roadway with ped/bike facilities from Slater Ave to 124 Ave NE	X	X	R-21
Seattle Arterials				
Lander St	Overcrossing of BNSF railroad	X	X	Seattle
Spokane St	Addition of freeway ramps to 4th Avenue	X	X	Seattle
Alaskan Way Viaduct	New ramp connections at S Atlantic, South Royal Brougham, and King St		X	Destination 2030/Seattle
King County Arterials				
Military Road	From S 272nd to S 304th, widen to 4/5 lanes	X	X	CP-5
Issaquah Bypass	New facility		X	CP-7
Issaquah Hobart Rd	From Issaquah to SR 18, widen to 4 lanes	X	X	CP-6
Carr Road	Widen from SR 167 to Benson Road	X	X	CP-8
SE 212th/SE 208th	From SR 167 to SR 515 widen to 6 lanes (transit HOV priority lanes)	X	X	CP-14
Woodinville-Duvall Rd	Widen between 171st Ave NE and Avondale Road	X	X	CP-12
Avondale Road NE	From NE 155th to NE 168th, widen to 3 lanes	X	X	CP-13
Transit Assumptions				
Central Link	Northgate to S 200th: 5-minute peak and 7.5-minute off peak UW to Rainier Beach Station; 10-minute peak and 15-minute off peak to airport	X	X	Sound Move
ST Express	2006 SIP	X	X	Sound Move
Sounder	Everett to Seattle (4 peak period trips add Mukilteo Station), Tacoma to Seattle (9 peak period trips add S. Tacoma and Lakewood Station)	X	X	Sound Move
Street Car	Waterfront Street Car	X	X	King County Metro
	S. Lake Union street car	X	X	Seattle
	First Hill Streetcar	X	X	Sound Transit
Transit Service	Regional and local bus services operated by Sound Transit, King County Metro, Community Transit, Everett Transit and Pierce Transit. Sound Transit and King County Metro will be provide transit service integration plans for both No-Build and Build alternatives for 2020 and 2030 horizon years. The PSRC model assumes service provide by Kitsap Transit and the Washington State Ferries as well.	X	X	Agency service plans

ST2 Projects by Corridor				
Project ID	**Mode**	**Project Detail**	**2020**	**2030**
North Corridor				
N06	Link	University of Washington Station - Northgate (Seattle) - S 200th Street	X	X
N07a	Streetcar	Downtown Seattle - Capitol Hill via First Hill	X	X
N22	Sounder	Joint development of a Parking Garage at Mukilteo Station	X	X
N23a	Sounder	New Permanent station at Edmonds Crossing	X	X
N28	Link	Northgate - Jackson Park		X
N29	Link	Jackson Park - Shoreline		X
N30	Link	Shoreline - Mountlake Terrace		X
N31T2	Link	Mountlake Terrace - Lynnwood Transit Center (Terminal)		X
East Corridor				
E20	Express Bus	Transit Center and parking garage in Bothell	X	X
E25b	Express Bus	N 8th Street parking garage in Renton	X	X
South Corridor				
S17	Sounder	Permanent station at Tukwila	X	X
S18b	Sounder	Parking garage at Auburn Station (Alternative)	X	X
S20	Sounder	Parking garage and pedestrian bridge at Sumner Station	X	X
S21	Sounder	Parking garage and pedestrian bridge at Puyallup Station	X	X
S25	Sounder	Track and structure upgrade, Tacoma Dome Station - Reservation Junction		X
S27	Link	Sea-Tac Airport - S 200th St	X	X
S28	Link	S 200th St - Kent-Des Moines Rd via SR 99		X
S29a	Link	Kent-Des Moines Rd - S 272nd St via SR 99		X
S30	Link	S 272nd St - Federal Way Transit Center via SR 99		X
S40	Link	Federal Way Transit Center - S 348th St via I-5		X
S41T5	Link	S 348th St - Port of Tacoma via I-5 (Terminal)		X

Abbreviations:

CP = Capital Improvement Plan
DT = Downtown Plan
GP = general purpose
NA = not applicable
NB = northbound
OHMC = Overlake Hospital Medical Center
R = Roadway
TMP = Transportation Master Plan
SB = southbound
SIP = Service Implementation Plan
TPA = Transportation Partnership Account
TFP = Transportation Facilities Plan
UWBCC = University of Washington Bellevue Community College

No-Build Intersection Projects[a]

Facility	Project Detail	2020	2030	Notes
Bellevue Intersections				
Bel-Red Road at NE 30th Street	Will add a new traffic signal at the intersection.	X	X	TFP-024, I-70
112th Avenue SE at SE 6th Street	Will install a new traffic signal at the intersection.	X	X	TFP-030, I-88
SE 16th Street/145th Place SE to 148th Avenue SE	Construct a new westbound right-turn lane at 145th Place NE and upgrade the traffic signal at the intersection.	X	X	TFP-043, R-118
124th Avenue NE at Bel-Red Road	Prepare a design report investigating the following potential improvements: widening the 124th Avenue NE/Bel-Red Road intersection to provide a second westbound left-turn lane and a southbound right-turn lane; widening 124th Avenue NE for a second southbound lane between Bel-Red Road and Old Bel-Red Road; upgrading the signal equipment; and providing new curb, gutter, and sidewalk where widening occurs.	X	X	TFP-089, I-91
116th Avenue NE at NE 12th Street	Construct a northbound right-turn lane, extend eastbound left-turn lane.	X	X	TFP-090
Northup Way/120th Avenue NE to 124th Avenue NE	Widen Northup Way/124th Avenue NE intersection to provide a northbound right-turn lane and a second eastbound left-turn lane to the SR 520 ramp.	X	X	TFP-091, TFP-106, R-133
156th Avenue NE at Northup Way	Construct second northbound and southbound left-turn lanes and a second eastbound through lane east of 156th Avenue NE to the Unigard access.	X	X	TFP-092
148th Avenue NE at Bel-Red Road	Construct an eastbound right-turn lane and second westbound left-turn lane.	X	X	TFP-094, I-76
156th Avenue NE at Bel-Red Road	Construct a southbound right-turn lane.	X	X	TFP-095
148th Avenue NE at NE 20th Street	Construct second eastbound and westbound left turn lanes.	X	X	TFP-101, I-78
Bel-Red Road at NE 24th Street	Construct southbound right-turn and northbound left-turn lanes.	X	X	TFP-102
129th Avenue SE/SE 38th Street to Newport Way	Consider signalization and channelization improvements if warranted.	X	X	TFP-103
Factoria Boulevard at Newport Way	Construct back-to-back double left-turn pockets northbound at the Newport High School entrance and southbound at Newport Way.	X	X	TFP-120
148th Avenue NE at NE 36th Street	Construct a second southbound left turn lane and second westbound left turn lane.	X	X	TFP-128
Lakemont Boulevard at Village Park Drive	Install new signal and crosswalks.	X	X	TFP-155, I-89
NE 24th Street at 148th Avenue NE	Lengthen the westbound right-turn lane on NE 24th Street and provide a second westbound left-turn lane.	X	X	TFP-157
145th Place SE	Construct center medians and left-turn pockets where needed from SE 8th to SE 24th.	X	X	TFP-160, NIS-1
156th Avenue SE at SE Eastgate Way (I-90 westbound off-ramp)	Widen the I-90 westbound off-ramp to provide two dedicated left-turn lanes and a shared through/right-lane with a channelized right turn.	X	X	TFP-162
NE 8th Street at 148th Avenue NE	Construct 2nd eastbound and westbound left-turn lanes on NE 8th Street.	X	X	TFP-168
148th Avenue NE at SR 520	Streamline/Rechannelize the southbound lanes on 148th Avenue to reduce friction and improve southbound flow.	X	X	TFP-176
148th Avenue SE at Lake Hills Boulevard	Lengthen the westbound left-turn lane from Lake Hills Blvd to 148th Avenue SE from 75 feet to approximately 250 feet and/or convert the existing through/right-turn lane to a left/through/right-turn lane.	X	X	TFP-188, I-90
150th Avenue SE/SE 37th Street/I-90 off-ramp	Widen I-90 off-ramp 300 feet west of 150th Avenue SE and add a right-turn lane. Widen SE 37th Street 500 feet to the east of 150th Avenue SE to allow for a bypass lane on the right side of the street.	X	X	TFP-195
NE 20th Street/Bel-Red Road to 156th Avenue NE	Construct an east-to-west U-turn on NE 20th Street at 156th Avenue NE;	X	X	TFP-196
Bel-Red Road at NE 20th Place	Install signal, eastbound left-turn pocket, and pedestrian crossing.	X	X	TFP-198

No-Build Intersection Projects[a]

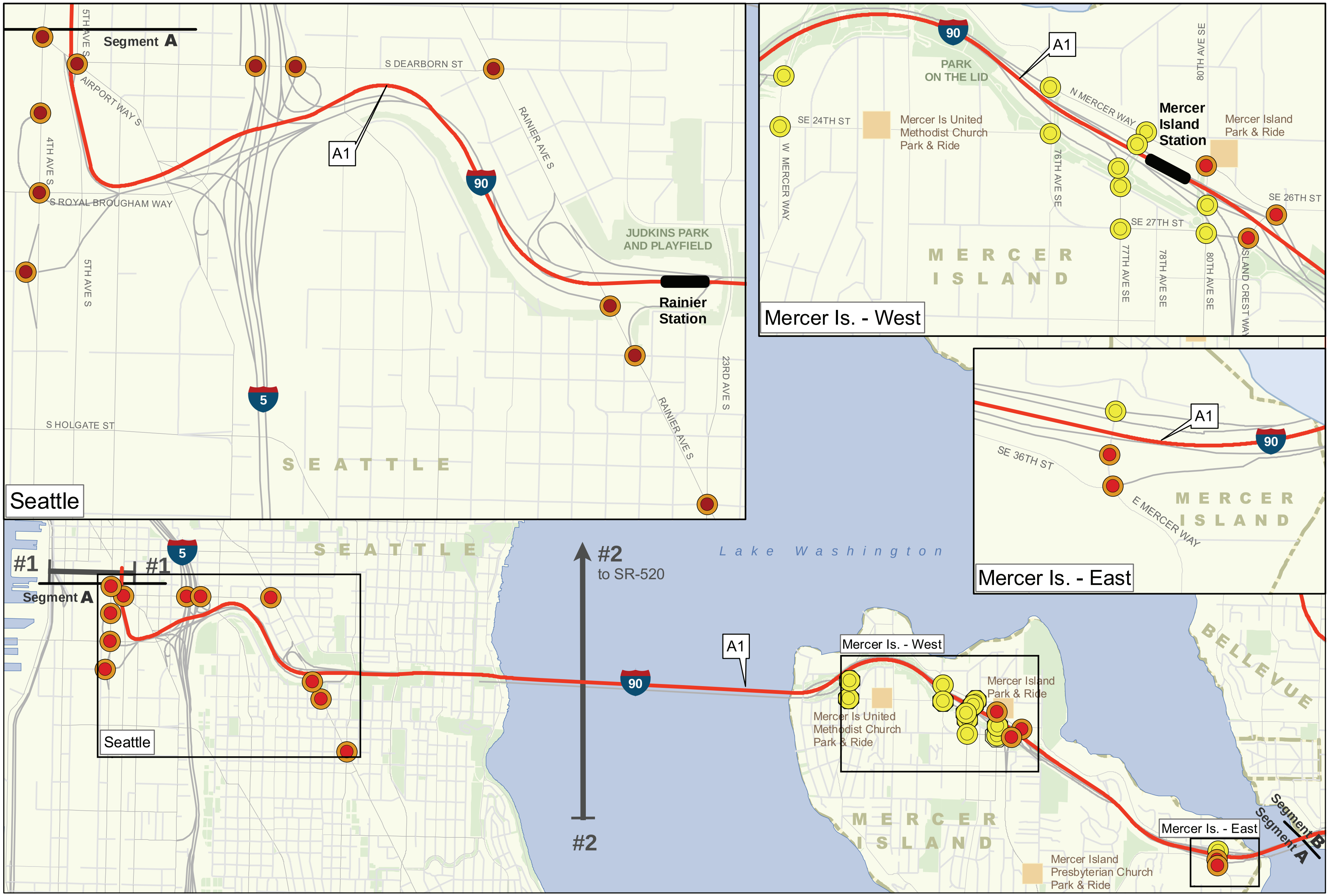
Facility	Project Detail	2020	2030	Notes
Lakemont Blvd (Phase 2)/Lewis Creek Park to 164th Ave SE	Install signal at 164th Ave SE/Lakemont Blvd; construct sidewalk and bike lane on east side; add planted medians where feasible.	X	X	TFP-205
NE 10th at I-405	Add half interchange (ramps) to/from the north.	X	X	TFP-189, TFP-193, R-149
NE 2nd Street at I-405	Add half interchange with I-405, to/from the south.		X	TFP-197, DT007, 009
Redmond Intersections				
156th Avenue NE/Bel-Red Road	Add southbound right-turn lane on 156th Ave NE.	X	X	JOINT-BROTS-22.3
148th Ave NE/NE 29th Place	Add southbound through and second westbound left-turn lanes; channelize yield for westbound right-turn lane; convert eastbound right-turn lane to shared right-turn/left-turn lane.	X	X	JOINT-BROTS-28
148th Ave NE/NE 20th St	Add second westbound left-turn and second westbound left-turn lanes.	X	X	JOINT-BROTS-50.1
Bel-Red Road/NE 20th Street	Add southbound right-turn lane; convert westbound lanes to provide left turn, left-turn/through and through/right-turn lanes.	X	X	JOINT-BROTS-52
Bel-Red Road/NE 24th Street	Add southbound right-turn and northbound left-turn lanes. Provide protected phasing for northbound left turns. Prohibit southbound left turns.	X	X	JOINT-BROTS-53.1
148th Avenue NE/NE 36th Street	Add second southbound left-turn lane and second westbound left-turn lane.	X	X	JOINT-BROTS-79
159th Ave NE/NE 40th St	Revise lanes to provide northbound left-turn and shared northbound left-turn/right-turn lanes.	X	X	RED-BROTS-004.1
148th Ave NE/Old Redmond Rd	Extend the northbound left-turn lane by increasing length and channelization.	X	X	RED-BROTS-005.4
150th Ave NE/NE 40th St	Add northbound right-turn lane.	X	X	RED-BROTS-008.1
W Lk Sam Pkwy NE/NE 51st St	Add southbound lane from NE 51st St to NE 50th St and then taper two southbound through lanes to one. Convert existing southbound right-turn only lane at NE 51st St to right/through lane.	X	X	RED-BROTS-011.1
W Lk Samm Pkwy NE/Bel-Red Rd	Add second southbound left-turn lane.	X	X	RED-BROTS-031
140th Ave NE/Redmond Way	Add second northbound left-turn lanes.	X	X	RED-BROTS-033
140th Ave NE/Redmond Way	Add eastbound right-turn lane.	X	X	RED-BROTS-033c
Willows Rd/Redmond Way	Convert southbound lanes to provide left-turn and left-turn/through/right-turn lanes; add westbound right turn lane.	X	X	RED-BROTS-034.1
152nd Ave NE/NE 24th St	Add northbound and southbound approach lanes. Make northbound lanes left/thru/through/right. Make southbound lanes left/through/right.	X	X	RED-BROTS-056.1
150th Ave NE/NE 51st St	Add north leg to intersection. Provide two southbound lef- turn lanes.	X	X	RED-BROTS-085
Union Hill Road	Widen Union Hill Rd from Avondale Rd to 178th Pl NE. Improvements include 2 through lanes and 1 right-turn lane in each direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power and utility pole relocation.	X	X	RED-TFP-049a
Union Hill Road	Widen Union Hill Rd from 178th Pl NE to 188th Ave NE. Improvements include 2 through lanes in each direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power and utility pole relocation, right-of-way and easement acquisition. Construct permanent signal at 178th Place NE/Union Hill.	X	X	RED-TFP-049b
162nd Avenue NE (Bear Creek Parkway Extension, west)	Construct new arterial from 159th Pl NE to Leary Way. Improvements include 1 through lane in each direction, left-turn lanes, curb, gutter, sidewalks, street lights, storm drainage, and right-of-way.	X	X	RED-TFP-050a
160th Avenue NE	Construct new 160th arterial from current terminus at approximately NE 99th St north to the intersection with Red-Wood Rd and modify existing 160th arterial from NE 90th St north to current terminus. Improvements include 1 through lane in each	X	X	RED-TFP-072a

No-Build Intersection Projects[a]

Facility	Project Detail	2020	2030	Notes
	direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, right of way and easement acquisition.			
NE 116th Street	Widen NE 116th St from Red-Wood Rd to Avondale Rd. Improvements include 1 through lane in each direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, equestrian trail, street lights, storm drainage, underground power, right-of-way and easement acquisition.	X	X	RED-TFP-105
188th Avenue NE	Construct new 188th Ave NE arterial from Redmond Way to Union Hill Rd. Improvements include 1 through lane in each direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, right-of-way and easement acquisition.	X	X	RED-TFP-117
185th Ave NE	Construct new 185th Ave NE arterial from NE 80th St to Union Hill Rd. Improvements include 1 through lane in each direction, left-turn lanes, sidewalks, street lights, storm drainage, right-of-way, easements and traffic signal at Union Hill Rd.	X	X	RED-TFP-118
NE 83rd Street at 161st Avenue NE	Install new traffic signal and make intersection improvements at NE 83rd St and 161st Ave NE.	X	X	RED-TFP-801-19
NE 51st Street at 150th Ave NE	Install new traffic signal at intersection of NE 51st St and 150th Ave NE.	X	X	RED-TFP-805-04
Redmond Way/East Lake Sammamish Parkway at 180th Avenue NE	Reconstruct intersection of Redmond Way at East Lake Sammamish Pkwy and 180th Ave NE.	X	X	RED-TFP-807-02
Redmond Way at 187th Avenue NE	Install new traffic signal at intersection of Redmond Way and 187th Ave NE.	X	X	RED-TFP-807-03
Union Hill Road at 188th Avenue NE	Reconstruct horizontal curve and install new traffic signal at intersection of Union Hill Rd and 188th Ave NE.	X	X	RED-TFP-807-05
Union Hill Road at Avondale Road	Intersection modification. Reconstruct intersection pavement and add one northbound free right-turn lane, one southbound left-turn lane, one southbound right-turn lane, one eastbound right-turn lane and one westbound left-turn lane.	X	X	RED-TFP-807-06
161st Ave NE	Construct new 161st Ave NE from Bear Creek Pkwy Extension to Redmond Way. Improvements include 1 through lane in each direction, left-turn lanes, bike lanes, parking, sidewalks, street lights, storm drainage, right-of-way, easements and traffic signals at Cleveland St and Bear Creek Pkwy.	X	X	RED-TMP-001
NE 36th St/NE 31st St	Construct new NE 36th St and bridge over SR 520 in the vicinity of NE 36th St and NE 31st St. Improvements include 1 through lane in each direction, left-turn lanes, bike lanes, sidewalks, street lights, storm drainage, right-of-way and easements.	X	X	RED-TMP-004
Old Redmond Rd	Widen Old Redmond Road from 132nd Ave NE to 136th Ave NE and rechannelize from 136th Ave NE to 140th Ave NE. Improvements include 1 through lane in each direction, left-turn lanes, bike lanes, curb, gutter, sidewalks, street lights, storm drainage, underground power, right-of-way and easement acquisition.	X	X	RED-TMP-016
East Lake Sammamish Pkwy at 187th Ave NE	Install new traffic signal. Improvements include southbound left-turn lane and reconstruct grade separated trail crossing.	X	X	RED-TMP-020
Old Redmond Rd at West Lake	Install new traffic signal. Improvements include modifications to better accommodate nonmotorized uses.	X	X	RED-TMP-042
Redmond Way at NE 76th Street	Modify intersection. Add a southbound right turn lane on NE 76th St and add dual lefts on eastbound Redmond Way.	X	X	RED-TMP-062

[a] Only the Cities of Bellevue and Redmond no-build intersection projects are presented in this table. Other jurisdictions do not have intersection improvements within the project study area.

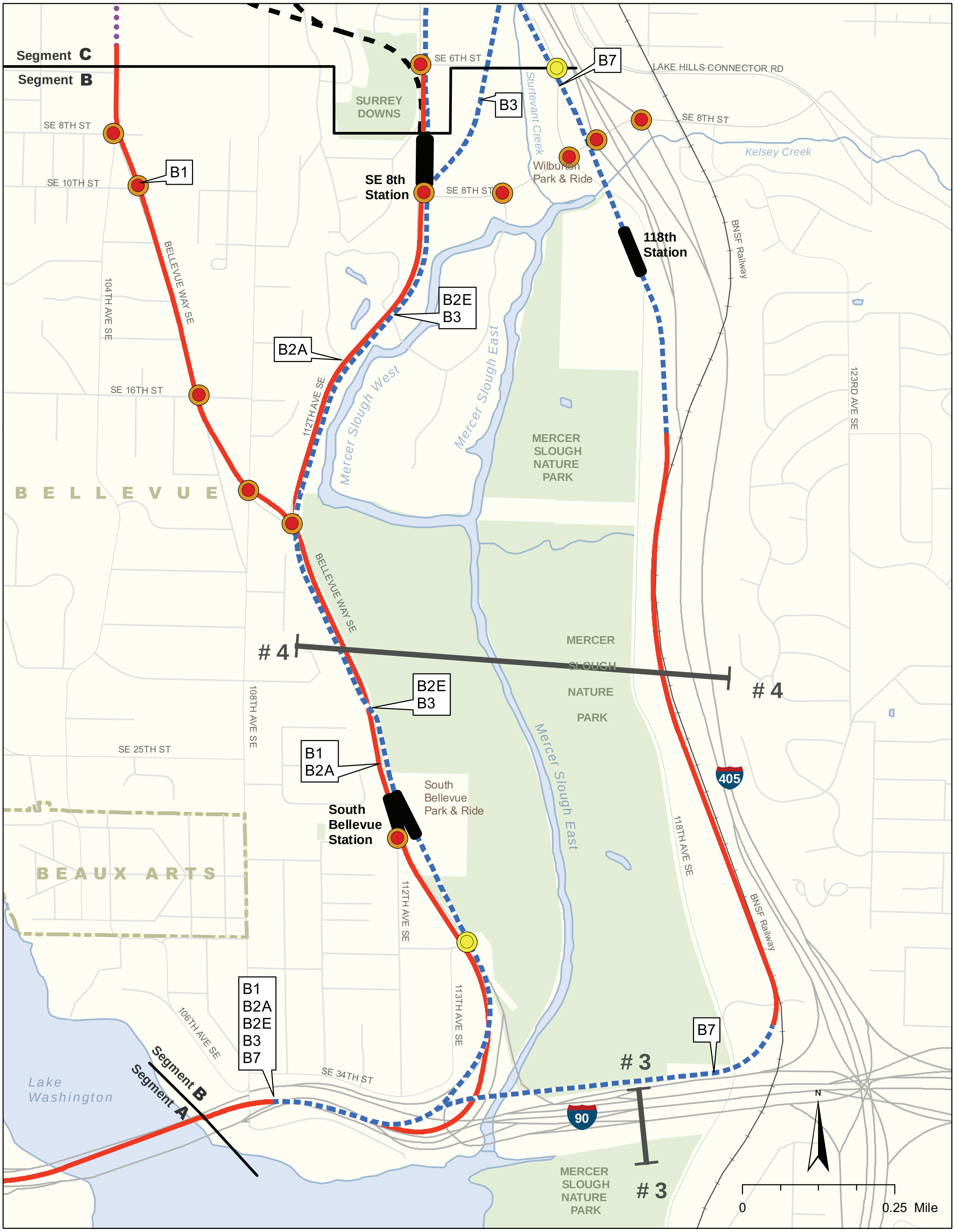
Attachment 2
Alternative and Study Intersection Maps



Source: King County (2006) modified by CH2M HILL.

Existing Intersection Control
Signalized
Non-signalized
Screenline
Proposed Station
City Limit
At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route
N
0 0.5 Miles

Segment A
STUDY INTERSECTIONS AND SCREENLINES
Sound Transit East Link Project



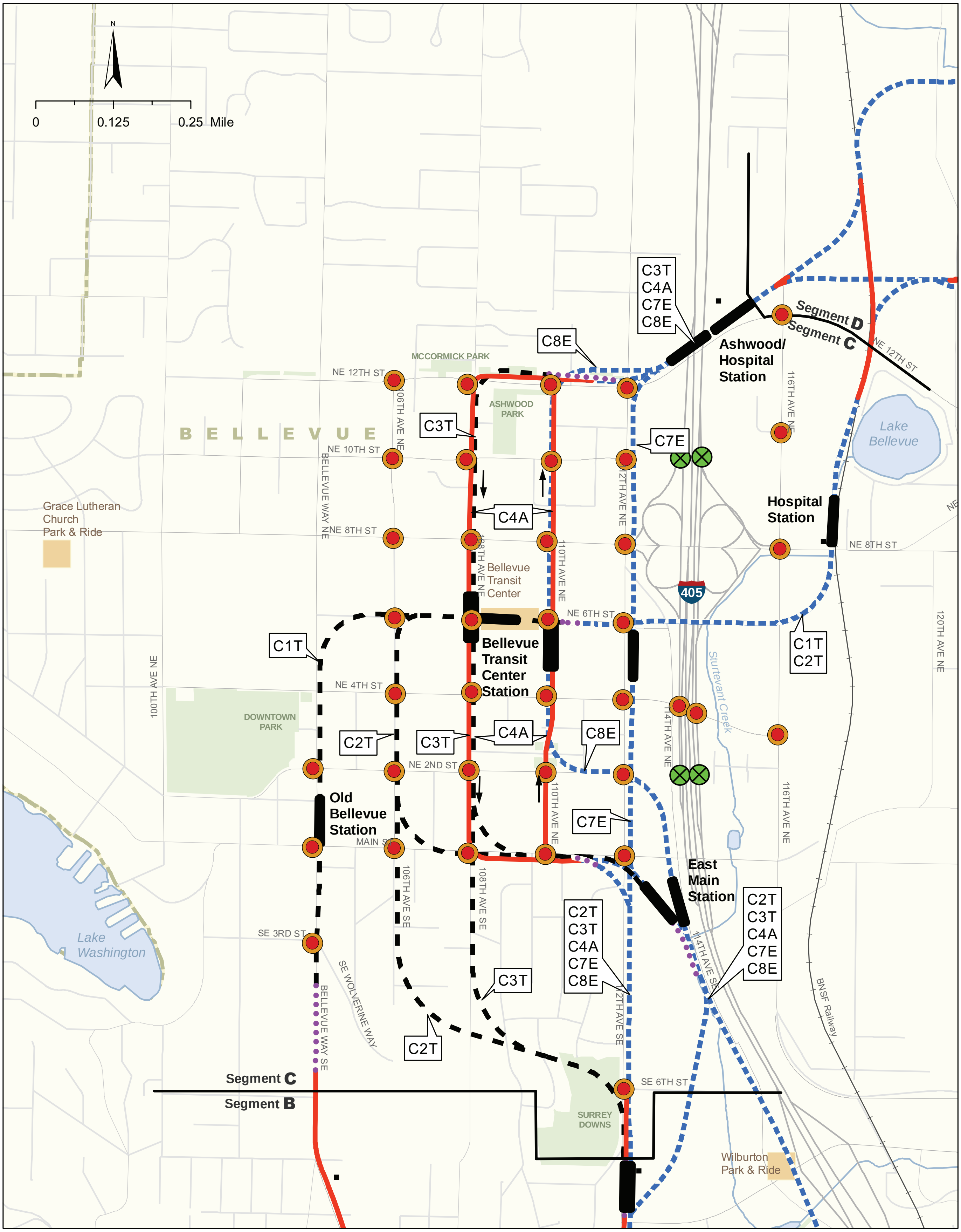
Source: Data from King County (2006) modified by CH2M HILL.

Existing Intersection Control
- Signalized
- Non-signalized

Screenline
Proposed Station
City Limits

At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route

Segment B
STUDY INTERSECTIONS AND SCREENLINES
Sound Transit East Link Project

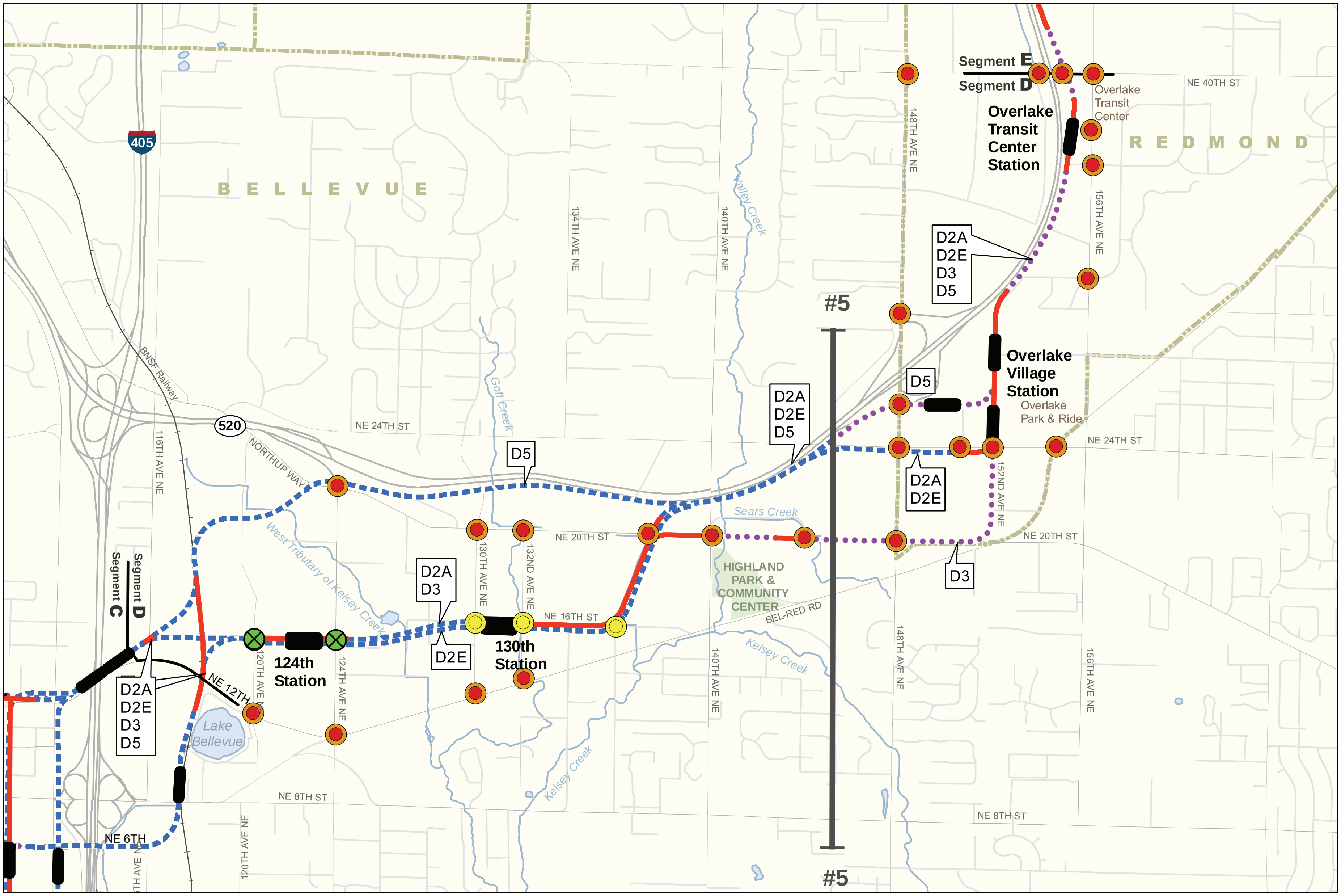


Existing Intersection Control

- Signalized
- Non-signalized
- Future Intersections
- Proposed Station
- City Limits
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route

Source: Data from King County (2006) modified by CH2M HILL.

Segment C
STUDY INTERSECTIONS AND SCREENLINES
Sound Transit East Link Project



Existing Intersection Control

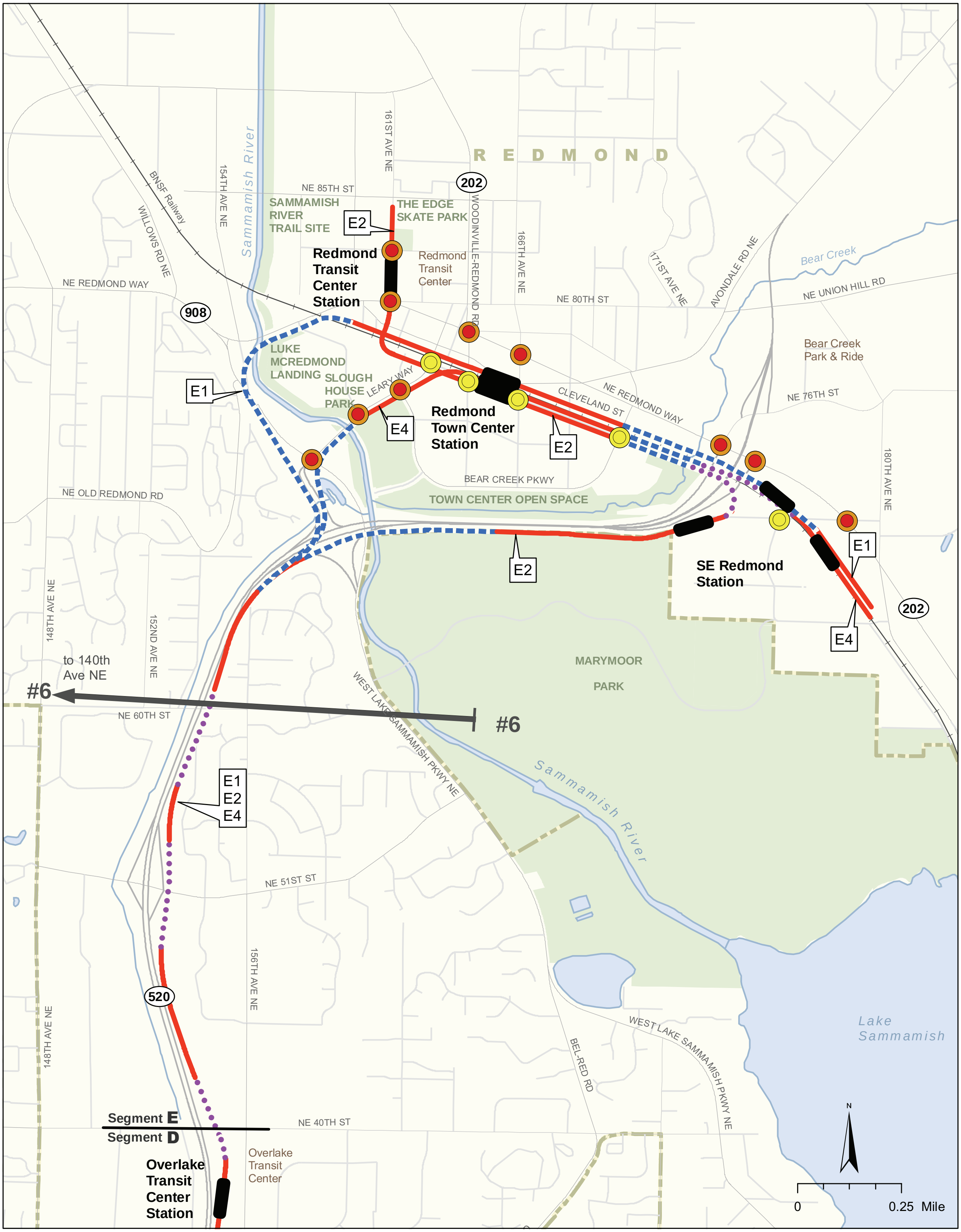
- Signalized
- Non-signalized
- Future Intersection
- Screenline
- Proposed Station
- City Limits
- At-Grade Route
- Elevated Route
- Retained-Cut Route
- Tunnel Route

Source: Data from King County (2006) modified by CH2M HILL.

N

0 0.25 Mile

Segment D
STUDY INTERSECTIONS AND SCREENLINES
Sound Transit East Link Project



Source: Data from King County (2006) modified by CH2M HILL.

Existing Intresection Control
Signalized
Non-signalized
Screenline
Proposed Station
City Limits
At-Grade Route
Elevated Route
Retained-Cut Route
Tunnel Route

Segment E
STUDY INTERSECTIONS AND SCREENLINES
Sound Transit East Link Project

Attachment 3
Summary of Sound Transit Ridership Forecasting Model

Attachment 3

Summary of Sound Transit Ridership Forecasting Model

To forecast transit ridership, Sound Transit uses an incremental model that was developed in the early 1990s. The model is structured so that transit ridership results are based on observed origins and destinations of transit users, observed transit line volumes, and a realistic simulation of observed transit service characteristics. External changes in demographics, highway travel time, and costs are distinctly incorporated into the process in phases, prior to estimating the impacts of incremental changes in transit service. The Sound Transit model relies on the Puget Sound Regional Council (PSRC) model for data on external changes. For East Link analysis, Sound Transit will be using the most recent data from PSRC.

In the first stage of ridership forecasting analysis, changes in demographics are taken into consideration. In the second stage, other external changes in highway travel time (congestion) and costs (including parking costs), transit fares, and household income are taken into consideration.

Using results from the first two stages of analysis, a forecast of zone-to-zone transit trips within and to/from the RTA district boundaries is developed. In the third and final stage, incremental changes in the transit level-of-service (i.e., access, wait, and ride travel times) are taken into consideration. Finally, transit trips are assigned to the future year transit network (2020 or 2030 for East Link).

The estimated transit volumes assigned to each transit route (i.e., bus or rail) depend on the service characteristics offered on each transit route or alignment, including potential markets served and accessibility of transit stops or stations to potential riders. For example, a light rail route through a more populated area within a corridor will probably attract more passengers than an alternative route that serves a less populated area within the same corridor. The model assigns more trips to a more frequent and faster transit route than to a less frequent and slower route between two locations.

Transit service changes are incorporated into the model through an East Link transit integration planning process. For the no-build alternative analysis, Sound Transit and its partner transit agencies provide a list of expected changes for the forecast years (2020 and 2030) for the transit network. These changes include span of service, frequency, new routes and deleted routes. These changes are incorporated into the model's transit network for the no-build alternative.

For the build alternatives, Sound Transit and its partner transit agencies use a representative light rail alignment to determine the changes in transit service. Some routes are modified to serve light rail stations along the representative alignment. These changes are incorporated into the transit network for the build alternatives.

The incremental model is more effective for transit planning analysis because it:

- Uses *observed* transit travel patterns, rather than estimated
- Concentrates efforts on transit network analysis
- Separates the evaluation of population and employment changes, highway congestion and cost, and transit services through the three stages of the forecasting process
- Focuses on direct comparisons rather than complete simulations of travel behavior

Like all travel forecasting models, the Sound Transit model has some limitations. It uses average daily traffic, so does not assess the effects of special events. Also, it is not well suited for analyzing structural changes in regional land use beyond those already included in PSRC demographic forecasts, or to forecasting in outlying areas of the three-county region where there is minimal existing transit service. Finally, the model does not explicitly take into account differences in safety, comfort, or reliability of bus or rail transit service.

Attachment 4
General Intersection and Freeway Level of Service Definitions

Attachment 4

General Intersection and Freeway Level of Service Definitions

The quality of traffic operations on roadway facilities is described in terms of level of service (LOS), a measure of operational conditions and their perception by motorists. As described in Table 1, intersection LOS ratings range from "A" to "F" based on the amount of control delay seconds per vehicle. LOS A represents the best operation and LOS F the poorest operation.

TABLE 1
Level of Service Definitions for Signalized and Unsignalized Intersections

	Average Control Delay (seconds per vehicle)		
LOS	**Signalized Intersection**	**Unsignalized Intersection**	**Traffic Flow Characteristics**
A	≤ 10	≤ 10	Virtually free flow; completely unimpeded.
B	> 10 and ≤ 20	> 10 and ≤ 15	Stable flow with slight delays; less freedom to maneuver.
C	> 20 and ≤ 35	> 15 and ≤ 25	Stable flow with delays; less freedom to maneuver.
D	> 35 and ≤ 55	> 25 and ≤ 35	High density but stable flow.
E	> 55 and ≤ 80	> 35 and ≤ 50	Operating conditions at or near capacity; unstable flow.
F	> 80	> 50	Forced flow; breakdown conditions.

Source: Transportation Research Board (TRB), *Highway Capacity Manual* (HCM), 2000.

Table 2 identifies the freeway LOS ratings. These ratings are defined by density, which is expressed in passenger cars per mile per lane (pcpmpl). Freeway densities are created for each segment of freeway analyzed. Three segment types are used in freeway analyses: mainline, merge/diverge, and weaving areas.

TABLE 2
Level of Service Definitions for Freeways

Level of Service	Basic Mainline Density	Merge/Diverge Density	Weave Density	Traffic Flow Characteristics
A	≤ 11	≤ 10	≤ 10	Free flows operation, vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. Unrestricted operation, smooth merging, diverging and weaving.
B	> 11 - ≤ 18	> 10 - ≤ 20	> 10 - ≤ 20	Reasonably free flow, vehicles maneuver within the traffic stream is only slightly restricted. Merging, diverging and weaving maneuvers become noticeable to through drivers.
C	> 18 - ≤ 26	> 20 - ≤ 28	> 20 - ≤ 28	Freedom to maneuver within the traffic stream is noticeably restricted. Both ramp and freeway vehicles begin to adjust their speeds to accomplish smooth transitions.
D	> 26 - ≤ 35	> 28 - ≤ 35	> 28 - ≤ 35	Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort level. Virtually all vehicles slow to accommodate merging, diverging and weaving.

TABLE 2
Level of Service Definitions for Freeways

Level of Service	Basic Mainline Density	Merge/Diverge Density	Weave Density	Traffic Flow Characteristics
E	> 35 - ≤ 45	> 35	> 35 - ≤ 43	Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speed that still exceeds 49 mph. Flow levels approach capacity, and small changes in demand or disruptions within the traffic stream can cause both ramp and freeway queues to form.
F	> 45	Demand exceeds capacity	> 43	Breakdowns in vehicular flow.

Source: TRB, 2000

Density: passenger car per mile per lane (pcpmpl)

Appendix B
Level of Service Definitions Used for East Link Analysis

TABLE B-1
LOS Definitions for Service Frequency (Urban Schedule Transit Service)

LOS	Headway (min.)	Comments
A	<10	Passengers don not need schedules
B	10-14	Frequent service, passengers consult schedules
C	15-20	Maximum desirable time to wait if bus/train missed
D	21-30	Service unattractive to choice riders
E	31-60	Transit service is available
F	>60	Service unattractive to all riders

Source: Transit Capacity and Quality Service Manual, Transportation Research Board (TRB), 2003.

TABLE B-2
LOS Definitions for Hours of Service

LOS	Hours of Service	Comments
A	19-24	Night or owl service provided
B	17-18	Late evening service provided
C	14-16	Early evening service provided
D	12-13	Daytime service provided
E	4-11	Peak hour service/limited midday service
F	0-3	Very limited or no service

Source: Transit Capacity and Quality Service Manual, TRB, 2003.

TABLE B-3
LOS Definition for Bus Passenger Load

LOS	passenger/seat	Comments
A	0.00-0.50	No passengers need sit next to another
B	0.51-0.75	Passengers can choose where to sit
C	0.76-1.00	All passengers can sit
D	1.01-1.25	Comfortable standee load for design
E	1.26-1.50	Maximum schedule load
F	>1.5	Crush load

Source: Transit Capacity and Quality Service Manual, TRB, 2003.

TABLE B-4
LOS Definition for Rail Passenger Load

LOS	ft2/passenger	Comments
A	>10.8[a]	At most some passengers must stand
B	8.2-10.8	No Passengers need to stand next to another
C	5.5-8.1	Passengers can choose where to stand
D	3.9-5.4	Comfortable standee load for design
E	2.2-3.8	Maximum schedule load
F	<2.2	Crush load

[a] This includes the potential for some cars to not have any standing passengers.

Source: Adapted from Transit Capacity and Quality Service Manual, TRB, 2003.

TABLE B-5
LOS Definitions for Reliability (On-Time Performance)

LOS	On-Time Percentage[a]	Description
A	95.0% - 100%	1 late transit vehicle every 2 weeks (no transfer)
B	90.0% - 94.9%	1 late transit vehicle every week (no transfer)
C	85.0% - 89.9%	3 late transit vehicles every 2 weeks (no transfer)
D	80.0% - 84.9%	2 late transit vehicles every week (no transfer)
E	75.0% - 79.9%	1 late transit vehicle every day (with a transfer)
F	<75.0%	1 late transit vehicle at least daily (with a transfer)

[a] "On time" is 0 to 5 minutes late; early departures are not considered on time.

Source: Transit Capacity and Quality Service Manual, TRB, 2003.

TABLE B-6
LOS Definitions for Reliability (Headway Adherence)

LOS	Coefficient of Variation	Description
A	0.00-0.21	Service provided like clockwork
B	0.22-0.30	Vehicles slightly off headway
C	0.31-0.39	Vehicles often off headway
D	0.40-0.52	Irregular headways, with some bunching
E	0.53-0.74	Frequent bunching
F	≥0.75	Most vehicles bunched

[a] Coefficient of variation is the deviation in actual departing headways over the scheduled headway. A high coefficient of variation signifies a large difference between the actual and scheduled departure time, resulting in a poor reliability LOS.

Note: Headway Adherence LOS applies only to transit routes with headways of 10 minutes or less.

Source: Transit Capacity and Quality Service Manual, TRB, 2003.

TABLE B-7
LOS Definitions for Intersections

Level of Service	Average Delay (seconds per vehicle)	Traffic Flow Characteristics
Signalized Intersections		
A	≤ 10	Most vehicles arrive during the green phase and do not stop at all.
B	> 10 - ≤ 20	More vehicles stop, causing higher delay.
C	> 20 - ≤ 35	Vehicles stopping is significant, but many still pass through the intersection without stopping.
D	> 35 - ≤ 55	Many vehicles stop, and the influence of congestion becomes more noticeable.
E	> 55 - ≤ 80	Very few vehicles pass through without stopping.
F	> 80	Considered unacceptable to most drivers. Intersection is not necessarily over capacity, even though arrivals exceed capacity of lane groups.
Unsignalized Intersections		
A	≤ 10	Little or no traffic delays
B	> 10 - ≤ 15	Short traffic delays
C	> 15 - ≤ 25	Average traffic delays
D	> 25 - ≤ 35	Long traffic delays
E	> 35 - ≤ 50	Very long traffic delays
F	> 50	Queuing on minor approaches and not enough gaps of suitable size to allow safe crossing of major streets. Signalization should be investigated at this point, but warrants must be satisfied before implementation.

Source: Highway Capacity Manual, TRB, 2000.

TABLE B-8
LOS Definitions for Freeways

Level of Service	Density (passenger car/mile/lane)	Traffic Flow Characteristics
Basic Freeway Segment		
A	≤ 11	Free flows operation, vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
B	> 11 - ≤ 18	Reasonably free flow, vehicles maneuver within the traffic stream is only slightly restricted.
C	> 18 - ≤ 26	Freedom to maneuver within the traffic stream is noticeably restricted.
D	> 26 - ≤ 35	Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort level.
E	> 35 - ≤ 45	Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speed that still exceed 49 mph.
F	> 45	Breakdowns in vehicular flow.
Merging and Diverging Area		
A	≤ 10	Unrestricted operation, smooth merging and diverging.
B	> 10 - ≤ 20	Merging and diverging maneuvers become noticeable to through drivers.
C	> 20 - ≤ 28	Both ramp and freeway vehicles begin to adjust their speeds to accomplish smooth transitions.
D	> 28 - ≤ 35	Virtually all vehicles slow to accommodate merging and diverging.
E	> 35	Flow levels approach capacity, and small changes in demand or disruptions within the traffic stream can cause both ramp and freeway queues to form.
F	Demand exceeds capacity	
Weaving Area		
A	≤ 10	Unrestricted operation, smooth weaving movements.
B	> 10 - ≤ 20	Weaving maneuvers become noticeable to through drivers.
C	> 20 - ≤ 28	Both ramp and freeway vehicles begin to adjust their speeds to accomplish smooth transitions.
D	> 28 - ≤ 35	Virtually all vehicles slow to accommodate weaving movements.
E	> 35 - ≤ 43	Flow levels approach capacity, and small changes in demand or disruptions within the traffic stream can cause both ramp and freeway queues to form.
F	> 43	

Source: Highway Capacity Manual, TRB, 2000.

TABLE B-9
LOS Definitions for Platoon-Adjusted Criteria for Walkways and Sidewalks

LOS	Flow Rate (p/min/ft)	Description
A	≤ 0.5	Walking speeds freely selected; conflicts with other pedestrians unlikely.
B	> 0.5-3	Walking speeds freely selected; pedestrians respond to presence of others.
C	> 3-6	Walking speeds freely selected; passing is possible in unidirectional streams; minor conflicts for reverse or cross movement.
D	> 6-11	Freedom to select walking speed and pass others is restricted; high probability of conflicts for reverse or cross movements.
E	> 11-18	Walking speeds and passing ability are restricted for all pedestrians; forward movement is possible only by shuffling; reverse or cross movements are possible only with extreme difficulty; volumes approach limit of walking capacity.
F	> 18	Walking speeds are severely restricted; frequent, unavoidable contact with others; reverse or cross movements are virtually impossible; flow is sporadic and unstable.

Note: Flow rates in the table represent average flow rates over a 5-6 minute period.

Source: Highway Capacity Manual, TRB, 2000.

Appendix C
Existing and Future
Transit Routes and Level of Service

TABLE C-1
Existing, No-Build, and Build Transit Routes in East Link Study Area

Route No.	Stop Locations in Project Area (Existing)	Service Area (Existing)	Stop Locations in Study Area (No Build)	Service Area (No Build)	Stop Location in Study Area (Build)	Service Area (Build)
KCM 111	I-90	Downtown Seattle, I-90 & Rainier, Newport Hills P&R, Kennydale, Renton Highlands P&R, Renton Highlands, Maplewood Heights, Lake Kathleen	Same as Existing	Same as Existing	I-90, South Bellevue, Bellevue	- Downtown Seattle, I-90 and Rainier + South Bellevue, Bellevue
KCM 114	I-90	Downtown Seattle, I-90 & Rainier, Newport Hills P&R, Kennydale, Renton Highlands P&R, Renton Highlands, Maplewood Heights, Lake Kathleen	Same as Existing	Same as Existing	I-90, South Bellevue, Bellevue	- Downtown Seattle, I-90 and Rainier + South Bellevue, Bellevue, Lake Kathleen
KCM 202	North Mercer Island	Downtown Seattle, North Mercer Island, South Mercer Island	Deleted	Deleted	Deleted	Deleted
KCM 205	North Mercer Island	University District, Montlake, First Hill Seattle, North Mercer Island, South Mercer Island	Deleted	Deleted	Deleted	Deleted
KCM 210	I-90 & Rainier Avenue	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate, Issaquah Transfer Point	Same as Existing	Same as Existing	South Bellevue	- Downtown Seattle, I-90 and Rainier + South Bellevue
KCM 212	I-90 & Rainier Avenue, South Bellevue	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate I-90 Freeway Station, Eastgate P&R	Same as Existing	Same as Existing	Same as No Build	Same as No Build
KCM 214	I-90 & Rainier Avenue	Downtown Seattle, I-90 & Rainier, Issaquah Transfer Point, Issaquah, Preston, Fall City, Snoqualmie Falls, Snoqualmie, North Bend, Factory Stores of North Bend	Same as Existing	- Snoqualmie Falls, Snoqualmie, North Bend, Factory Stores of North Bend	Same as No Build	Same as No Build
KCM 214.5	Route Does Not Exist	Route Does Not Exist	I-90 & Rainier Avenue	Downtown Seattle, I-90 & Rainier, North Bend	Same as No Build	Same as No Build
KCM 216	I-90 & Rainier Avenue, North Mercer Island, Redmond	Downtown Seattle, I-90 & Rainier, North Mercer Island, Pine Lake, South Sammamish P&R, Redmond, Bear Creek P&R	Same as Existing	Same as Existing	Same as No Build	Same as No Build
KCM 217	I-90 & Rainier Avenue, North Mercer Island	Downtown Seattle, I-90 & Rainier, Factoria, Eastgate P&R, Eastgate, North Issaquah	Deleted	Deleted	Deleted	Deleted
KCM 218	I-90 & Rainier Avenue	Issaquah Highlands P&R, Eastgate I-90 Freeway Station, I-90 & Rainier, Downtown Seattle	Same as Existing	Same as Existing	Same as No Build	Same as No Build
KCM 220	Bellevue, Redmond	Redmond P&R, Redmond Town Centre, Rose Hill, South Kirkland P&R, Bellevue	Deleted	Deleted	Deleted	Deleted

TABLE C-1
Existing, No-Build, and Build Transit Routes in East Link Study Area

Route No.	Stop Locations in Project Area (Existing)	Service Area (Existing)	Stop Locations in Study Area (No Build)	Service Area (No Build)	Stop Location in Study Area (Build)	Service Area (Build)
KCM 225	I-90 & Rainier Avenue, South Bellevue, Bellevue, Redmond	Downtown Seattle, I-90 & Rainier, Eastgate I-90 Freeway Station, Eastgate P&R, Phantom Lake, Overlake, Overlake Transit Center	Deleted	Deleted	Deleted	Deleted
KCM 229	I-90 & Rainier Avenue, South Bellevue, Bellevue, Redmond	Overlake Transit Center, Overlake, Crossroads, Phantom Lake, Eastgate P&R, Eastgate I-90 Freeway Station, I-90 & Rainier, Downtown Seattle	Deleted	Deleted	Deleted	Deleted
KCM 230	Bellevue, Overlake	Kingsgate P&R, Totem Lake Mall, Rose Hill, 124th Ave NE, NE 85th St, Kirkland Transit Center, Lake Washington Blvd., South Kirkland P&R, Bellevue Way NE, Bellevue Transit Center, NE 8th St, Crossroads, Overlake, Microsoft, 156th Ave NE, SR-520, Redmond	Deleted	Deleted	Deleted	Deleted
KCM 232	Bellevue, Overlake, Redmond	Duvall, Cottage Lake, English Hill, Redmond, SR-520, I-405, Bellevue, Bellevue Transit Center	Same as Existing	- English Hill	Overlake, Redmond	- Bellevue, Bellevue Transit Center
KCM 233	Bellevue, Overlake, Redmond	Avondale Rd NE & Avondale Pl NE, Bear Creek P&R, 148th Ave NE, 156th Ave NE, Microsoft, Overlake, Bell-Red Rd, Bellevue Transit Center	Bellevue, Overlake	- Avondale Rd NE & Avondale Pl NE, Bear Creek P&R, 148th Ave NE	Same as No Build	Same as No Build
KCM 234	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	South Bellevue, Bellevue, Overlake	Kenmore, Finn Hill, Juanita, Kirkland Transit Center, Northwest College, S. Kirkland P&R, 116th Ave NE, Bellevue Transit Center, South Bellevue P&R	Same as No Build	Same as No Build
KCM 239	Route Does Not Exist	Route Does Not Exist	Overlake, Redmond	Redmond Ridge, Redmond, Overlake Transit Center	Same as No Build	Same as No Build
KCM 249	Bellevue, Overlake	Redmond P&R, West Lake Sammamish Pkwy, Sammamish Viewpoint Park, Overlake, Overlake P&R, NE 20th St, 116th Ave. NE, Bellevue Transit Center	Same as Existing	Same as Existing	Bellevue, 122nd, Overlake	Same as No Build

TABLE C-1
Existing, No-Build, and Build Transit Routes in East Link Study Area

Route No.	Stop Locations in Project Area (Existing)	Service Area (Existing)	Stop Locations in Study Area (No Build)	Service Area (No Build)	Stop Location in Study Area (Build)	Service Area (Build)
KCM 253	Bellevue, Overlake	Bear Creek P&R, Redmond P&R, Redmond Civic Center, 148th Ave NE, Overlake, Overlake P&R, Crossroads, Bellevue Transit Center	Bellevue, Overlake, Redmond	- Bear Creek P&R, Redmond P&R, Redmond Civic Center, 148th Ave NE, Crossroads + Redmond Transit Center, 156th Ave NE, NE 8th Street	Same as No Build	Same as No Build
KCM 268	Overlake, Redmond	Downtown Seattle, Montlake, SR-520 Stops, Overlake Transit Center, Bear Creek P&R, 185th Ave NE & Redmond-Fall City Rd	Same as Existing	Same as Existing	Deleted	Deleted
KCM 269	Overlake, Redmond	Issaquah Transfer Point, Issaquah Highlands P&R, Issaquah-Pine Lake Rd, South Sammamish P&R, 228th Ave NE, Sahalee Way NE, Redmond-Fall City Rd, Bear Creek P&R, Overlake, Overlake P&R	Same as Existing	Same as Existing	Same as No Build	- Overlake P&R
KCM 271	Bellevue	Issaquah, Issaquah Transfer Point, Eastgate, Eastgate P&R, Bellevue Community College, Bellevue Transit Center, Medina, University District	Bellevue	- Issaquah, Issaquah Transfer Point, Eastgate, Eastgate P&R, Bellevue Community College	Same as No Build	Same as No Build
ST 532	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	South Bellevue, Bellevue	Everett, Everett Station, Eastmont P&R, Lynnwood, Canyon Park P&R, Brickyard Freeway Station, Totem Lake Freeway Station, Bellevue, South Bellevue
ST 535	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	Route Does Not Cross Any Screenlines	South Bellevue, Bellevue	Lynnwood Transit Center, Lynnwood, Canyon Park P&R, UW Bothell, Bothell P&R, Brickyard Freeway Station, Totem Lake Freeway Station, Bellevue, South Bellevue
ST 545	Bellevue, Overlake, Redmond	Bear Creek P&R, Redmond P&R, Redmond City Hall, Downtown Seattle	Same as Existing	Same as Existing	Deleted	Deleted

TABLE C-1
Existing, No-Build, and Build Transit Routes in East Link Study Area

Route No.	Stop Locations in Project Area (Existing)	Service Area (Existing)	Stop Locations in Study Area (No Build)	Service Area (No Build)	Stop Location in Study Area (Build)	Service Area (Build)
ST 550	Bellevue, South Bellevue, North Mercer Island, I-90 & Rainier Avenue	Bellevue Square, Bellevue Transit Center, South Bellevue P&R, North Mercer Island, I-90 & Rainier, Downtown Seattle	Same as Existing	Same as Existing	Deleted	Deleted
ST 554	North Mercer Island, I-90 & Rainier Avenue	South Sammamish P&R, Issaquah Highlands P&R, Downtown Issaquah, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Eastgate I-90 Freeway Station, North Mercer Island, I-90 & Rainier, Downtown Seattle	Same as Existing	Same as Existing	North Mercer Island	- I-90 & Rainier, Downtown Seattle
ST 555	South Bellevue, Bellevue	Issaquah Highlands P&R, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Factoria, Bellevue Transit Center, SR-520 Freeway Stations, Northgate Transit Center	Same as Existing	Same as Existing	Same as No Build	- SR-520 Freeway Stations, Northgate Transit Center
ST 556	South Bellevue, Bellevue	Issaquah Highlands P&R, Issaquah Transfer Point, Bellevue Community College, Eastgate P&R, Bellevue Transit Center, SR-520 Freeway Stations, University District, Northgate Transit Center	Same as Existing	Same as Existing	Deleted	Deleted
ST 564	Bellevue, Overlake	South Hill Mall Transit Center, South Hill P&R, Sumner Station, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Same as Existing	Same as Existing	Bellevue	- Overlake Transit Center
ST 565	Bellevue, Overlake	Federal Way Transit Center, Auburn Station, Kent Station, Renton Transit Center, Renton Boeing, Bellevue Transit Center, Overlake Transit Center	Same as Existing	Same as Existing	Bellevue	- Overlake Transit Center

Notes: Transit routes and park-and-ride stalls from fall 2007.

All transit routes listed have crossed the screenline in both directions.

TABLE C-2
Direct Transit Routes Evaluated For Existing, 2020 and 2030 No-Build and Build

		To								
From	**Condition**	**Northgate**	**U District**	**Downtown Seattle**	**Mercer Island**	**South Bellevue**	**Downtown Bellevue**	**Bel-Red**	**Overlake**	**Downtown Redmond**
Northgate	Existing: No Build: Build:				No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	2 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link
U District	Existing: No Build: Build:				1 Local No Direct Routes East Link	No Direct Routes Same As Existing East Link	1 Local, 1 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link
Downtown Seattle	Existing: No Build: Build:				2 Local, 2 EXP 1 Local, 2, EXP East Link	1 EXP Same As Existing East Link	1 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	1 Local, 1 EXP Same As Existing East Link	1 EXP Same As Existing East Link
Mercer Island	Existing: No Build: Build:	No Direct Routes Same As Existing East Link	1 Local No Direct Routes East Link	2 Local, 2 EXP 1 Local, 2 EXP East Link		1 EXP Same As Existing East Link	1 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link
South Bellevue	Existing: No Build: Build:	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	1 EXP Same As Existing East Link	1 EXP Same As Existing East Link		1 EXP 1 Local, 1 EXP East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link
Downtown Bellevue	Existing: No Build: Build:	2 EXP Same As Existing East Link	1 Local, 1 EXP Same As Existing East Link	1 EXP Same As Existing East Link	1 EXP Same As Existing East Link	1 EXP 1 Local, 1 EXP East Link		3 Local 2 Local East Link	5 Local, 2 EXP 3 Local, 1 RR, 2 EXP East Link	5 Local 1 Local, 1 RR East Link
Bel-Red	Existing: No Build: Build:	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	3 Local 2 Local East Link		2 Local Same As Existing East Link	2 Local No Direct Routes East Link
Overlake	Existing: No Build: Build:	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	1 Local, 1 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	5 Local, 2 EXP 3 Local, 1 RR, 2 EXP East Link	2 Local Same As Existing East Link		4 Local, 1 EXP 1 Local, 1 RR, 1 EXP East Link
Downtown Redmond	Existing: No Build: Build:	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	1 EXP Same As Existing East Link	No Direct Routes Same As Existing East Link	No Direct Routes Same As Existing East Link	5 Local 1 Local, 1 RR East Link	2 Local No Direct Routes East Link	4 Local, 1 EXP 1 Local, 1 RR, 1 EXP East Link	

Notes: ▨ Not Evaluated or Not Applicable

Existing and No Build include only bus. Build includes only light rail.

No Build applies to both 2020 and 2030 years.

Build applies to both 2020 and 2030 years.

RR is a Rapid Ride route.

EXP is an Express route.

TABLE C-3
PM Peak Period Transit Frequency LOS for Existing, 2020 and 2030 No Build and Build

		To								
From	**Condition**	**Northgate**	**U District**	**Downtown Seattle**	**Mercer Island**	**South Bellevue**	**Downtown Bellevue**	**Bel-Red**	**Overlake**	**Downtown Redmond**
Northgate	Existing: No Build: Build 2020: Build 2030:				No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	30/D Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A
U District	Existing: No Build: Build 2020: Build 2030:				100/F No Direct Service 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	12/B 10/B Same as No Build 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A
Downtown Seattle	Existing: No Build: Build 2020: Build 2030:				5/A Same as Existing 10/B 9/A	7/A 8/A 10/B 9/A	7/A 8/A 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	8/A 7/A 10/B 9/A	11/B 8/A 10/B 9/A
Mercer Island	Existing: No Build: Build 2020: Build 2030:	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	8/A 6/A 10/B 9/A		7/A 8/A 10/B 9/A	7/A 8/A 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A
South Bellevue	Existing: No Build: Build 2020: Build 2030:	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	10/B 8/A 10/B 9/A	10/B 8/A 10/B 9/A		7/A 6/A 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A
Downtown Bellevue	Existing: No Build: Build 2020: Build 2030:	30/D Same as Existing 10/B 9/A	25/D 15/C 10/B 9/A	10/B 8/A 10/B 9/A	10/B 8/A 10/B 9/A	10/B 6/A 10/B 9/A		10/B 15/C 10/B 9/A	5/A 3/A 10/B 9/A	6/A 10/B 10/B 9/A
Bel-Red	Existing: No Build: Build 2020: Build 2030:	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	10/B 15/C 10/B 9/A		15/C Same as Existing 10/B 9/A	15/C No Direct Service 10/B 9/A
Overlake	Existing: No Build: Build 2020: Build 2030:	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	15/C 8/A 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	4/A 3/A 10/B 9/A	15/C Same as Existing 10/B 9/A		4/A Same as Existing 10/B 9/A
Downtown Redmond	Existing: No Build: Build 2020: Build 2030:	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	15/C 8/A 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	No Direct Service Same as Existing 10/B 9/A	6/A Same as Existing 10/B 9/A	15/C No Direct Service 10/B 9/A	5/A 4/A 10/B 9/A	

Notes: ▨ Not Evaluated or Not Applicable

Existing and No Build include only bus. Build includes only light rail.

No Build applies to both 2020 and 2030 years.

9 / A = Frequency (in minutes) / Level of Service

TABLE C-4
Transit Hours of Service and LOS for Existing, 2020 and 2030 No Build and Build

		To								
From	**Condition**	**Northgate**	**U District**	**Downtown Seattle**	**Mercer Island**	**South Bellevue**	**Downtown Bellevue**	**Bel-Red**	**Overlake**	**Downtown Redmond**
Northgate	Existing: No Build: Build:				No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	6:49/E Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A
U District	Existing: No Build: Build:				3:07/F No Direct Service 20:00/A	No Direct Service Same as Existing 20:00/A	17:34/B Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A
Downtown Seattle	Existing: No Build: Build:				19:12/A Same as Existing 20:00/A	19:12/A Same as Existing 20:00/A	19:12/A Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	19:21/A Same as Existing 20:00/A	19:21/A Same as Existing 20:00/A
Mercer Island	Existing: No Build: Build:	No Direct Service Same as Existing 20:00/A	2:55/F No Direct Service 20:00/A	19:53/A Same as Existing 20:00/A		19:12/A Same as Existing 20:00/A	19:12/A Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A
South Bellevue	Existing: No Build: Build:	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	19:53/A Same as Existing 20:00/A	19:53/A Same as Existing 20:00/A		19:12/A Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A
Downtown Bellevue	Existing: No Build: Build:	7:13/E Same as Existing 20:00/A	17:05/B Same as Existing 20:00/A	19:53/A Same as Existing 20:00/A	19:53/A Same as Existing 20:00/A	19:53/A Same as Existing 20:00/A		14:25/C Same as Existing 20:00/A	19:14/A 20:30/A 20:00/A	19:14/A 20:30/A 20:00/A
Bel-Red	Existing: No Build: Build:	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	14:28/C Same as Existing 20:00/A		13:40/D Same as Existing 20:00/A	13:30/D No Direct Service 20:00/A
Overlake	Existing: No Build: Build:	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	18:31/B Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	20:05/A 20:30/A 20:00/A	14:28/C Same as Existing 20:00/A		19:21/A 20:30/A 20:00/A
Downtown Redmond	Existing: No Build: Build:	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	18:31/B Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	No Direct Service Same as Existing 20:00/A	20:05/A 20:30/A 20:00/A	12:29/D No Direct Service 20:00/A	20:05/A 20:30/A 20:00/A	

Notes: ▨ Not Evaluated or Not Applicable

Existing and No Build include only bus. Build includes only light rail.

No Build applies to both 2020 and 2030 years.

Build applies to both 2020 and 2030 years.

12:00 / A = Hours of Service / Level of Service

TABLE C-5
Existing, No Build, and Build PM Peak-Hour Passenger Load

					Existing		2020 No Build		2020 Build				2030 No Build		2030 Build			
					Bus		Bus		Bus		Light Rail		Bus		Bus		Light Rail	
Screenline	Existing Routes	No Build Routes	Build Routes	Direction	Average seated passenger/ seat	LOS	Average seated passenger/ seat	LOS	Average seated passenger/ seat	LOS	ft^2 / standing passenger	LOS	Average seated passenger /seat	LOS	Average seated passenger/ seat	LOS	ft^2 / standing passenger	LOS
1	11 local, 2 express	8 local, 2 express	5 local, light rail	SB	0.48	A	0.54	B	0.22	A	14.49	A	0.70	B	0.32	A	8.30	B
				NB	0.42	A	0.42	A	0.15	A	NSP	A	0.67	B	0.22	A	2273.68	A
2	14 local, 5 express	10 local, 5 express	6 local, light rail	EB	0.50	A	0.63	B	0.31	A	19.38	A	0.82	C	0.41	A	9.56	B
				WB	0.50	A	0.55	B	0.15	A	NSP	A	0.92	C	0.21	A	NSP	A
3	10 local, 1 express	8 local, 1 express	8 local, 1 express, light rail	EB	0.50	A	0.39	A	0.21	A	N/A	N/A	0.54	B	0.28	A	N/A	N/A
				WB	0.33	A	0.53	B	0.34	A	N/A	N/A	0.77	C	0.46	A	N/A	N/A
4	0 local, 3 express	1 local, 3 express	3 local, 4 express, light rail	NB	0.49	A	0.16	A	0.13	A	NSP	A	0.21	A	0.17	A	NSP	A
				SB	0.33	A	0.32	A	0.20	A	NSP	A	0.60	B	0.33	A	NSP	A
5	7 local, 3 express	4 local, 1, RapidRide, 3 express	2 local, 1 RapidRide, light rail	EB	0.30	A	0.43	A	0.23	A	NSP	A	0.59	B	0.26	A	NSP	A
				WB	0.31	A	0.27	A	0.14	A	NSP	A	0.35	A	0.16	A	NSP	A
6	8 local, 1 express	4 local, 1 RapidRide, 1 express	3 local, 1 RapidRide, light rail	NB	0.28	A	0.17	A	0.04	A	NSP	A	0.25	A	0.05	A	NSP	A
				SB	0.13	A	0.16	A	0.08	A	NSP	A	0.18	A	0.10	A	NSP	A

TABLE C-6
Existing, No Build, and Build PM Peak-Hour Reliability LOS

Station Location	Route Number	Direction	Headway (minutes)	Existing and Future Bus[a]			Future Light Rail[b]	
				% On-time Performance	Coefficient of Variation	LOS	Coefficient of Variation	LOS
International District/ Chinatown Station	KCM 210	Eastbound	25	41.7%	-	F		
	KCM 212	Eastbound	8.7	-	0.56	E		
	KCM 214	Eastbound	13	49.2%	-	F		
	KCM 216	Eastbound	26	40.7%	-	F		
	KCM 218	Eastbound	9.6	-	0.53	E		
	KCM 225	Eastbound	>60	59.4%	-	F		
	KCM 229	Eastbound	>60	44.8%	-	F		
	ST 550	Eastbound	6.6	-	0.68	E		
	ST 554	Eastbound	35	51.7%	-	F		
	KCM 111	Southbound	20	66.0%	-	F		
	KCM 114	Southbound	27	56.3%	-	F		
	KCM 202	Southbound	30	43.1%	-	F		
	KCM 212	Westbound	30	46.0%	-	F		
	ST 550	Westbound	10.1	30.3%	-	F		
	ST 554	Westbound	30	56.9%	-	F		
	Light Rail	N/A	9				0.16	A
Average				48.8%	0.59	F/E	0.16	A
Mercer Island	ST 550	Eastbound	6.5	-	1.02	F		
	ST 554	Eastbound	35	52.8%	-	F		
	KCM 202	Southbound	11	50.6%	-	F		
	KCM 216	Southbound	33	34.0%	-	F		
	KCM 202	Westbound	32	71.4%	-	F		
	KCM 203	Westbound	32	36.5%	-	F		
	ST 550	Westbound	10.2	50.0%	-	F		
	ST 554	Westbound	30	70.0%	-	F		
	Light Rail	N/A	9				0.16	A
Average				52.2%	1.02	F/F	0.16	A
Bellevue Transit Center	KCM 233	Eastbound	30	91.0%	-	B		
	KCM 249	Eastbound	30	84.8%	-	D		
	KCM 271	Eastbound	15	66.2%	-	F		
	ST 550	Eastbound	6	-	0.68	E		
	ST 556	Eastbound	37	55.9%	-	F		
	ST 564	Northbound	30	39.0%	-	F		
	ST 565	Northbound	60	3.3%	-	F		
	ST 564	Southbound	30	39.0%	-	F		
	ST 565	Southbound	30	23.8%	-	F		
	KCM 233	Westbound	30	48.3%	-	F		
	KCM 249	Westbound	30	41.3%	-	F		
	KCM 253	Westbound	30	38.2%	-	F		
	KCM 271	Westbound	22	71.0%	-	F		
	ST 550	Westbound	11.25	82.4%	-	D		
	ST 555	Westbound	39	71.0%	-	F		
	KCM 230	N/A	14.5	59.5%	-	F		

TABLE C-6
Existing, No Build, and Build PM Peak-Hour Reliability LOS

Station Location	Route Number	Direction	Headway (minutes)	Existing and Future Bus[a]			Future Light Rail[b]	
				% On-time Performance	Coefficient of Variation	LOS	Coefficient of Variation	LOS
	KCM 230	N/A	30	61.8%	-	F		
	KCM 232	N/A	23.5	29.3%	-	F		
	Light Rail	N/A	9				0.16	A
Average				53.3%	0.68	F/E	0.16	A
Overlake Transit Center	KCM 232	Eastbound	17	35.8%	-	F		
	KCM 268	Eastbound	36	34.0%	-	F		
	ST 545	Eastbound	10	-	0.39	C		
	KCM 230	Eastbound	29	74.6%	-	E		
	ST 564	Northbound	60	21.9%	-	F		
	ST 565	Northbound	60	13.3%	-	F		
	ST 564	Northbound	60	47.8%	-	F		
	ST 565	Northbound	60	17.4%	-	F		
	KCM 245	Northbound	29	87.5%	-	C		
	ST 564	Southbound	30	77.8%	-	E		
	ST 565	Southbound	30	89.5%	-	C		
	KCM 245	Southbound	30	84.8%	-	D		
	ST 545	Westbound	10	-	0.31	C		
	KCM 230	Westbound	32	75.0%	-	E		
	KCM 232	Westbound	30	50.0%	-	F		
	ST 545	Westbound	10	-	0.30	D		
	KCM 247	N/A	31	21.5%	-	F		
	KCM 225	N/A	31	46.7%	-	F		
	KCM 229	N/A	36	33.3%	-	F		
	KCM 256	N/A	28	95.2%	-	A		
	KCM 249	N/A	22	36.6%	-	F		
	Light Rail	N/A	9				0.16	A
Average				52.4%	0.33	F/C	0.16	A
Redmond Transit Center	KCM 230	N/A	31	32.3%	-	F		
	KCM 232	Eastbound	20.5	26.3%	-	F		
	KCM 253	Eastbound	30	40.0%	-	F		
	KCM 545	Eastbound	10.8	27.8%	-	F		
	KCM 220	Eastbound	29	18.0%	-	F		
	KCM 220	Westbound	25	100.0%	-	A		
	KCM 250	N/A	44	29.2%	-	F		
	KCM 253	Westbound	25	88.7%	-	C		
	ST 545	Westbound	10	-	0.48	D		
	Light Rail	N/A	9				0.16	A
Average				45.3%	0.48	F/D	0.16	A

[a] Future transit reliability remains similar to existing conditions because King Count Metro continually adjusts its transit service according to the demand levels.

[b] Future light rail reliability performance was projected using the St. Louis light rail data. See Table C-6.

N/A - transit route does not provide service in one particular direction

TABLE C-7
Saint Louis Light Rail Reliability

			Minutes Arrived Early or Late (-)						
Station	**Headway (Minutes)**	**Scheduled Arrival**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Standard Deviation**	**Cv**
Union Station									
	5							0.70	0.14
		16:27	-0.18	-0.55	0.98	-0.58	-0.07		
		17:35	1.10	-1.07	-0.25	-0.28	0.48		
Kiel Station									
	5							0.91	0.18
		16:26	0.10	-0.30	1.20	-0.25	0.25		
		17:36	0.98	-1.43	-1.22	-1.27	-0.45		
Busch Stadium									
	5							0.80	0.16
		16:24	0.12	-0.25	1.02	-0.10	0.25		
		17:38	0.22	-1.48	-1.22	-1.27	-0.45		
Grand									
	5							0.66	0.13
		16:31	-0.85	-0.70	0.22	-1.20	-1.27		
		17:31	0.60	-1.22	-0.08	-0.72	-0.03		
Average Downtown								0.79	0.16
Calculation: Cv=Stdev/headway									

Appendix D
Existing and Future
Intersection Level of Service Results

Existing Conditions

TABLE D-1
Existing 2007 AM and PM Peak-Hour Intersection LOS – Segment A

			Existing			
			AM		PM	
Intersection	Jurisdiction	Control Type	LOS	Delay	LOS	Delay
City of Seattle						
Rainier Avenue South & South Dearborn	Seattle	Signal	D	40.7	**F**	**93.5**
Rainier Avenue South & South Massachusetts St.	Seattle	Signal	C	25.5	B	16.8
Rainier Avenue South & 23rd Avenue South	Seattle	Signal	C	27.6	D	39.6
Rainier Avenue South & I-90 EB Off-Ramp	WSDOT	Signal	B	11.7	B	19.4
Dearborn Street & I-5 Southbound Ramp	WSDOT	Signal	A	6.5	A	7.1
Dearborn Street & I-5 Northbound Ramp	WSDOT	Signal	B	16.2	B	18.1
I-90 & 4th Avenue South	Seattle	Signal	C	28.1	**E**	**65.4**
South Royal Brougham Way & 4th Avenue South	Seattle	Signal	D	49.1	**F**	**118.1**
Airport Way South & 4th Avenue South	Seattle	Signal	C	26.9	D	36.8
Airport Way S & S Dearborn Street	WSDOT	Signal	D	38.9	D	39.7
4th Ave NB off Ramp & Edgar Martinez Dr S.	WSDOT	Signal	B	15.0	E	72.9
City of Mercer Island						
West Mercer Way & I-90 Ramps	WSDOT	TWSC	B	10.1	B	11.2
West Mercer Way & 24th Avenue SE	Mercer Island	AWSC	B	10.3	B	12.1
80th Avenue SE & SE 27th Street	Mercer Island	AWSC	B	13.4	C	22.8
80th Avenue SE & I-90 EB HOV On Ramp	WSDOT	TWSC	N/A	N/A	N/A	N/A
80th Avenue SE & I-90 WB HOV Off Ramp	WSDOT	TWSC	N/A	N/A	N/A	N/A
80th Avenue SE & I-90 Express Lanes Ramp	WSDOT	TWSC	B	11.4	A	1.9
80th Avenue SE & North Mercer Way	WSDOT	Signal	B	11.7	B	11.7
77th Avenue SE & Sunset Highway	Mercer Island	TWSC	C	15.8	C	15.6
77th Avenue SE & I-90 Express Lanes Ramp	WSDOT	TWSC	A	7.8	C	18.9
77th Avenue SE & I-90 EB HOV Off Ramp	WSDOT	TWSC	N/A	N/A	N/A	N/A
77th Avenue SE & I-90 EB Off-Ramp	WSDOT	TWSC	B	11.0	B	12.2
77th Avenue SE & North Mercer Way	Mercer Island	TWSC	**D**	**25.0**	C	20.4
77th Avenue SE & 27th Street	Mercer Island	AWSC	C	18.8	**E**	**43.6**
76th Avenue SE/North Mercer Way & I-90 WB On-Ramp	WSDOT	AWSC	B	10.9	C	16.5
76th Avenue SE & 24th Avenue SE	Mercer Island	AWSC	B	10.0	B	12.3
Island Crest Way & I-90 EB On-Ramp	Mercer Island	Signal	B	15.6	B	18.2
Island Crest Way & I-90 WB Off-Ramp	WSDOT	Signal	B	16.9	B	12.8
East Mercer Way & I-90 EB Off-Ramp	WSDOT	Signal	A	6.9	A	5.8
East Mercer Way & I-90 EB On-Ramp	WSDOT	Signal	B	10.1	B	10.2
East Mercer Way & I-90 WB Ramps	WSDOT	AWSC	D	27.6	**F**	**65.3**

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

TABLE D-2
Existing 2007 PM Peak-Hour Intersection LOS - Segment B

Intersection	Jurisdiction	Control Type	Existing	
			LOS	**Delay**
112th Avenue SE & Bellevue Way SE	Bellevue	Signal	C	34.0
112th Avenue SE & SE 8th Street	Bellevue	Signal	B	13.9
118th Avenue SE & SE 8th Street	WSDOT	Signal	**F**	**>150**
1-405 NB Ramps & SE 8th Street	WSDOT	Signal	C	25.8
I-405 SB Ramps & SE 8th Street	WSDOT	Signal	C	23.0
Bellevue Way SE & SE 30th Street[a]	Bellevue	TWSC	**F / F**	**119.0 / >150**
Bellevue Way SE & South Bellevue P&R[a]	Bellevue	Signal	C / **F**	25.7 / **109.5**
114th Avenue SE & SE 6th Street	Bellevue	TWSC	D	32.6
SE 8th Street & 114th Avenue SE (Bellefield Business Park)	Bellevue	Signal	B	12.0
Bellevue Way SE & 108th Avenue SE	Bellevue	Signal	C	23.7
Bellevue Way SE & SE 16th Street	Bellevue	Signal	A	7.3
Bellevue Way SE & 104th Avenue SE	Bellevue	Signal	A	4.8
Bellevue Way SE & SE 10th Street	Bellevue	Signal	A	5.6

Notes:

[a] Bellevue Way SE & SE 30th Street and Bellevue Way SE & South Bellevue P&R intersection results are report for both AM and PM peak hours (AM / PM LOS and AM / PM Delay).

Bold type text indicates where intersections fail to meet agency LOS standards.

Delay is measured by average seconds of delay per vehicle.

N/A – intersection is not evaluated in this condition.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

TABLE D-3
Existing 2007 PM Peak-Hour Intersection LOS – Segment C

Intersection	Jurisdiction	Control Type	Existing	
			LOS	Delay
112th Venue SE & SE 6th Street	Bellevue	Signal	A	7.8
Bellevue Way SE & SE Wolverine Way	Bellevue	Signal	B	16.1
Bellevue Way & Main Street	Bellevue	Signal	E	62.1
Bellevue Way NE & NE 2nd Street	Bellevue	Signal	C	25.0
112th Avenue NE & NE 12th Street	Bellevue	Signal	D	53.0
112th Avenue NE & NE 10th Street	Bellevue	Signal	B	11.1
112th Avenue NE & NE 8th Street/I-405 SB Ramp	WSDOT	Signal	**F**	**105.9**
112th Avenue NE & NE 6th Street	WSDOT	Signal	B	10.0
112th Avenue NE & NE 4th Street	WSDOT	Signal	D	35.5
112th Avenue NE & NE 2nd Street	Bellevue	Signal	B	16.3
112th Avenue & Main Street	Bellevue	Signal	E	73.8
110th Avenue NE & NE 12th Street	Bellevue	Signal	A	8.4
110th Avenue NE & NE 10th Street	Bellevue	Signal	B	10.6
110th Avenue NE & NE 8th Street	Bellevue	Signal	C	27.2
110th Avenue NE & NE 6th Street	Bellevue	Signal	C	23.8
110th Avenue NE & NE 4th Street	Bellevue	Signal	C	32.8
110th Avenue NE & NE 2nd Street	Bellevue	Signal	B	18.0
110th Avenue & Main Street	Bellevue	Signal	B	10.9
108th Avenue NE & NE 12th Street	Bellevue	Signal	B	18.3
108th Avenue NE & NE 10th Street	Bellevue	Signal	B	12.0
108th Avenue NE & NE 8th Street	Bellevue	Signal	D	45.2
108th Avenue NE & NE 6th Street	Bellevue	Signal	D	35.6
108th Avenue NE & NE 4th Street	Bellevue	Signal	D	53.4
108th Avenue NE & NE 2nd Street	Bellevue	Signal	B	17.2
108th Avenue & Main Street	Bellevue	Signal	A	7.6
106th Avenue NE & NE 12th Street	Bellevue	Signal	A	9.4
106th Avenue NE & NE 10th Street	Bellevue	Signal	A	9.8
106th Avenue NE & NE 8th Street	Bellevue	Signal	D	43.9
106th Avenue NE & NE 6th Street	Bellevue	Signal	A	4.5
106th Avenue NE & NE 4th Street	Bellevue	Signal	D	36.4
106th Avenue NE & NE 2nd Street	Bellevue	Signal	B	15.7
106th Avenue NE & Main Street	Bellevue	Signal	A	9.1
NE 4th Street & I-405 SB Ramp	WSDOT	Signal	C	24.2
NE 4th Street & I-405 NB Ramp	WSDOT	Signal	C	28.4
116th Avenue NE & NE 12th Street	Bellevue	Signal	D	41.7
116th Avenue NE & NE 10th Street	Bellevue	Signal	B	12.2
116th Avenue NE & NE 8th Street	WSDOT	Signal	E	61.7
116th Avenue NE & NE 4th Street	WSDOT	Signal	C	27.1

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

TABLE D-4
Existing 2007 PM Peak-Hour Intersection LOS – Segment D

Intersection	Jurisdiction	Control Type	Existing	
			LOS	Delay
City of Bellevue				
120th Avenue NE & NE 12th Street	Bellevue	Signal	C	25.3
124th Avenue NE & Northup Way	WSDOT	Signal	C	32.8
124th Avenue NE & Bel-Red Road	Bellevue	Signal	D	42.0
130th Avenue NE & Bel-Red Road	Bellevue	Signal	C	23.5
130th Avenue NE & NE 20th Street	Bellevue	Signal	C	26.0
132nd Avenue NE & Bel-Red Road	Bellevue	Signal	B	16.0
132nd Avenue NE & NE 16th Street	Bellevue	TWSC	B	13.8
132nd Avenue NE & NE 20th Street	Bellevue	Signal	B	15.7
136th Avenue NE & NE 16th Street	Bellevue	TWSC	B	11.3
136th Avenue NE & NE 20th Street	Bellevue	Signal	B	10.0
140th Avenue NE & 20th Avenue	Bellevue	Signal	D	47.6
NE 20th Street & Mall Entrance	Bellevue	Signal	B	11.8
City of Redmond				
148th Avenue NE & SR 520 WB Ramps	WSDOT	Signal	E	58.8
148th Avenue NE & SR 520 EB Ramps	WSDOT	Signal	C	27.7
NE 24th Street & 148th Avenue NE	Redmond	Signal	E	75.4
NE 24th Street & 151st Avenue NE	Redmond	Signal	B	17.8
NE 20th Street & 152nd Avenue NE	Redmond	TWSC	C	20.4
NE 24th Street & 152nd Avenue NE	Redmond	Signal	C	21.4
NE 26th Street & 152nd Avenue NE	Redmond	Signal	A	4.3
NE 24th Street & Bel-Red Road	Redmond	Signal	C	31.3
NE 40th Street & 148th Avenue NE	Redmond	Signal	C	30.2
NE 40th Street & SR 520 WB Ramps	WSDOT	Signal	C	28.8
NE 40th Street & SR 520 EB Ramps	WSDOT	Signal	B	19.3
NE 40th Street & 156th Avenue NE	Redmond	Signal	D	49.3
Overlake P&R Entrance & 156th Avenue NE	Redmond	Signal	A	8.4
NE 36th Street & 156th Avenue NE	Redmond	Signal	D	42.9
NE 31st Street & 156th Avenue NE	Redmond	Signal	C	33.4
148th Avenue NE & 20th Avenue	Redmond	Signal	E	79.1

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

TABLE D-5
Existing 2007 PM Peak-Hour Intersection LOS – Segment E

Intersection	Jurisdiction	Control Type	Existing	
			LOS	Delay
NE Leary Way & West Lake Sammamish Pkwy.	WSDOT	Signal	**F**	**80.2**
NE Leary Way & 159th Place NE	Redmond	Signal	B	13.7
NE Leary Way & Bear Creek Parkway	Redmond	Signal	B	12.0
NE Leary Way & NE 76th Street	Redmond	TWSC	A	9.5
Redmond Way & 161st Avenue NE	Redmond	Signal	C	25.8
NE 83rd Street & 161st Avenue NE	Redmond	Signal	B	11.8
NE 85th Street & 161st Avenue NE	Redmond	Signal	C	26.8
164th Avenue NE & SR 202	Redmond	Signal	B	13.5
164th Avenue NE& NE 76th Street	Redmond	TWSC	B	10.0
164th Avenue NE& Cleveland Street	Redmond	Signal	B	16.2
164th Avenue NE& NE 80th Street	Redmond	Signal	C	25.2
164th Avenue NE& NE 85th Street	Redmond	Signal	D	36.7
166th Avenue NE & SR 202	Redmond	Signal	B	17.5
166th Avenue NE & NE 76th Street	Redmond	TWSC	C	16.9
166th Avenue NE & NE Cleveland Street	Redmond	Signal	B	14.3
166th Avenue NE & NE 80th Street	Redmond	Signal	B	13.9
NE 76th Street & Bear Creek Parkway	Redmond	TWSC	D	34.1
SR 202 & SR 520 WB Ramps	WSDOT	Signal	E	69.9
SR 202 & SR 520 EB Ramps	WSDOT	Signal	C	29.7
SR 202 & NE 70th Street	Redmond	Signal	C	21.8
NE 70th Street & 176th Avenue NE	Redmond	TWSC	B	11.3
178th Place NE & Union Hill Road	Redmond	Signal	B	16.3
Avondale Road NE & Union Hill Road	Redmond	Signal	**F**	**146.6**
E Lake Sammamish Parkway & NE 65th Street	Redmond	Signal	C	29.1
SR 202 & E Lake Sammamish Parkway (180th Avenue NE)	Redmond	Signal	**F**	**84.7**

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

Future 2020 and 2030 Intersection LOS Results

TABLE D-6
Existing 2007, 2020, and 2030 No-Build and Build AM Peak-Hour Intersection LOS – Segment A

	Existing		2020 AM				2030 AM			
	AM		No-Build		Build		No-Build		Build	
Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Seattle										
Rainier Avenue South & South Dearborn	D	40.7	**E**	**61.7**	**E**	**61.9**	**F**	**109.1**	**F**	**105.9**
Rainier Avenue South & South Massachusetts St.	C	25.5	C	28.9	C	29.2	D	47.5	D	41.5
Rainier Avenue South & 23rd Avenue South	C	27.6	C	30.1	C	30.8	D	37.1	D	39.1
Rainier Avenue South & I-90 EB Off-Ramp	B	11.7	B	11.2	B	12.6	B	15.7	B	12.6
Dearborn Street & I-5 Southbound Ramp	A	6.5	A	6.7	A	6.8	A	6.9	A	6.8
Dearborn Street & I-5 Northbound Ramp	B	16.2	B	12.2	B	13.3	B	13.7	B	15.1
I-90 & 4th Avenue South	C	28.1	B	20.0	B	18.9	B	17.9	C	26.3
South Royal Brougham Way & 4th Avenue South	D	49.1	**E**	**79.6**	**E**	**73.5**	**F**	**118.2**	**F**	**124.3**
Airport Way South & 4th Avenue South	C	26.9	C	29.3	C	31.2	D	40.7	D	42.8
Airport Way S & S Dearborn Street	D	38.9	D	44.9	C	31.17	**E**	**59.4**	C	33.8
4th Ave NB off Ramp & Edgar Martinez Dr S.	B	15.0	B	10.1	B	13.4	B	11.9	B	18.3
Mercer Island										
West Mercer Way & I-90 Ramps	B	10.1	B	11.6	B	12.5	B	12.5	C	15.7
West Mercer Way & 24th Avenue SE	B	10.3	C	15.6	**D**	**27.1**	C	20.9	C	22.9
80th Avenue SE & SE 27th Street	B	13.4	**D**	**28.5**	C	16.2	**F**	**62.9**	**F**	**57.0**
80th Avenue SE & I-90 EB HOV On Ramp	--	--	A	0.9	A	0.6	A	1.3	A	0.6
80th Avenue SE & I-90 WB HOV Off Ramp	--	--	B	12.5	B	11.9	B	13.7	B	12.7
80th Avenue SE & I-90 Express Lanes Ramp	B	11.4	--	--	--	--	--	--	--	--
80th Avenue SE & North Mercer Way	B	11.7	B	16.8	B	14.4	B	18.4	B	17.2
77th Avenue SE & Sunset Highway	C	15.8	C	22.3	**D**	**30.5**	**E**	**40.6**	**F**	**56.8**
77th Avenue SE & I-90 Express Lanes Ramp	A	7.8	A	8.2	--	--	A	9.4	--	--
77th Avenue SE & I-90 EB HOV Off Ramp	--	--	B	11.0	B	12.6	B	12.2	D	29.4
77th Avenue SE & I-90 EB Off-Ramp	B	11.0	B	13.0	C	18.6	C	16.7	C	24.1
77th Avenue SE & North Mercer Way	**D**	**25.0**	**D**	**33.1**	**F**	**>150**	**F**	**69.3**	**F**	**>150**
77th Avenue SE & 27th Street	C	18.8	B	14.0	**D**	**36.2**	B	12.9	**E**	**68.7**
76th Avenue SE/North Mercer Way & I-90 WB On-Ramp	B	10.9	B	14.1	E	38.9	B	14.6	**F**	**75.4**
76th Avenue SE & 24th Avenue SE	B	10.0	B	12.2	C	18.7	B	13.3	C	17.1
Island Crest Way & I-90 EB On-Ramp	B	15.6	C	30.0	C	24.5	C	33.5	C	30.2
Island Crest Way & I-90 WB Off-Ramp	B	16.9	D	44.8	D	43.3	**F**	**97.6**	E	73.8
East Mercer Way & I-90 EB Off-Ramp	A	6.9	A	7.1	A	7.5	A	7.6	A	6.2
East Mercer Way & I-90 EB On-Ramp	B	10.1	B	13.3	B	13.6	B	16.8	B	17

TABLE D-6
Existing 2007, 2020, and 2030 No-Build and Build AM Peak-Hour Intersection LOS – Segment A

	Existing		2020 AM				2030 AM			
	AM		No-Build		Build		No-Build		Build	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
East Mercer Way & I-90 WB Ramps	D	27.6	**F**	**54.0**	**F**	**59.4**	**F**	**137.7**	**F**	**100.8**

Notes:

Bold type text indicates where intersections fail to met agency LOS standards. Seattle and WSDOT are LOS E and Mercer Island is LOS C

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

-- : intersection is not provided in this condition

TABLE D-7
Existing 2007, 2020 and 2030 No-Build and Build PM Peak Hour Intersection LOS – Segment A

	Existing		2020 PM				2030 PM			
	PM		No-Build		Build		No-Build		Build	
Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Seattle										
Rainier Avenue South & South Dearborn	**F**	**93.5**	**F**	**116.7**	**F**	**114.9**	**F**	**>150**	**F**	**>150**
Rainier Avenue South & South Massachusetts St.	B	16.8	D	41.4	D	40.5	**E**	**74.8**	**E**	**62.7**
Rainier Avenue South & 23rd Avenue South	D	39.6	**F**	**102.9**	**F**	**101.1**	**F**	**>150**	**F**	**134.0**
Rainier Avenue South & I-90 EB Off-Ramp	B	19.4	E	70.2	E	76.3	**F**	**123.5**	**F**	**116.5**
Dearborn Street & I-5 Southbound Ramp	A	7.1	A	7.2	A	7.8	A	9.2	A	9.2
Dearborn Street & I-5 Northbound Ramp	B	18.1	B	18.7	B	20	C	21.3	C	21.3
I-90 & 4th Avenue South	**E**	**65.4**	**E**	**73.8**	D	40.3	**F**	**107.5**	E	75.6
South Royal Brougham Way & 4th Avenue South	**F**	**118.1**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
Airport Way South & 4th Avenue South	D	36.8	D	40.2	D	53.9	**F**	**95.1**	**E**	**60.3**
Airport Way S & S Dearborn Street	D	39.7	**E**	**60.3**	D	51.7	**F**	**>150**	D	48.0
4th Ave NB off Ramp & Edgar Martinez Dr S.	E	72.9	C	20.1	C	29.0	D	51.3	E	62.6
Mercer Island										
West Mercer Way & I-90 Ramps	B	11.2	B	14.6	E	38.9	C	21.9	E	44
West Mercer Way & 24th Avenue SE	B	12.1	C	23.2	**F**	**121.2**	**F**	**97.4**	**F**	**>150**
80th Avenue SE & SE 27th Street	C	22.8	**E**	**39.2**	**E**	**38.7**	**F**	**59.8**	**F**	**73.3**
80th Avenue SE & I-90 EB HOV On Ramp	--	--	A	1.4	A	1.3	A	1.3	A	1.5
80th Avenue SE & I-90 WB HOV Off Ramp	--	--	C	17.2	C	15.9	C	20.4	C	21.8
80th Avenue SE & I-90 Express Lanes Ramp	A	1.9	--	--	--	--	--	--	--	--
80th Avenue SE & North Mercer Way	B	11.7	B	17.7	B	16.4	B	20.0	C	21.0
77th Avenue SE & Sunset Highway	C	15.6	C	23.4	**D**	**26.4**	**D**	**27.3**	**D**	**25.6**
77th Avenue SE & I-90 Express Lanes Ramp	C	18.9	E	44.2	--	--	**F**	**69.3**	--	--
77th Avenue SE & I-90 EB HOV Off Ramp	--	--	B	13.6	**F**	**66.1**	B	14.5	E	39.1
77th Avenue SE & I-90 EB Off-Ramp	B	12.2	B	14.5	C	16.1	C	15.4	B	14.4
77th Avenue SE & North Mercer Way	C	20.4	**F**	**120.6**	**F**	**>150**	**F**	**>150**	**F**	**147.3**
77th Avenue SE & 27th Street	**E**	**43.6**	B	14.2	B	18.7	C	21.8	C	21.6
76th Avenue SE/North Mercer Way & I-90 WB On-Ramp	C	16.5	**F**	**75.2**	**F**	**79.8**	**F**	**99.9**	**F**	**82.2**
76th Avenue SE & 24th Avenue SE	B	12.3	C	17.8	C	19.0	C	22.1	C	21.4
Island Crest Way & I-90 EB On-Ramp	B	18.2	C	20.9	B	18.7	C	30.2	C	30.4
Island Crest Way & I-90 WB Off-Ramp	B	12.8	D	38.8	C	29.8	**F**	**81.7**	**F**	**109.9**
East Mercer Way & I-90 EB Off-Ramp	A	5.8	A	8.0	A	8	A	7.8	A	7.1

TABLE D-7
Existing 2007, 2020 and 2030 No-Build and Build PM Peak Hour Intersection LOS – Segment A

	Existing		2020 PM				2030 PM			
	PM		No-Build		Build		No-Build		Build	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
East Mercer Way & I-90 EB On-Ramp	B	10.2	B	16.0	B	16.7	C	20.9	B	19.9
East Mercer Way & I-90 WB Ramps	**F**	**65.3**	**F**	**123.8**	**F**	**115.6**	**F**	**>150**	**F**	**>150**

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards: Seattle and WSDOT are LOS E, and Mercer Island is LOS C.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

-- Intersection is not provided in this condition.

TABLE D-8
Future 2020 and 2030 PM Peak-Hour Intersection LOS – Segment B

	2020												2030											
	No-Build		B2E		B2A		B3		B7		B1		No-Build		B2E		B2A		B3		B7		B1	
Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
112th Avenue SE & Bellevue Way SE	C	26.5	C	33.1	**F**	**110.5**	**F**	**98.6**	C	31.7	**F**	**88.2**	C	28.9	C	33.9	**F**	**103.9**	**F**	**109.4**	C	31.2	**F**	**102.3**
112th Avenue SE & SE 8th Street	C	24.7	C	21.2	C	34.1	C	26.4	C	25.1	C	25.9	C	29.9	C	30.0	D	51.1	C	30.3	C	30.2	C	29.8
118th Avenue SE & SE 8th Street	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
1-405 NB Ramps & SE 8th Street	C	25.5	-	-	-	-	-	-	C	23.3	-	-	C	27.2	-	-	-	-	-	-	C	27.5	-	-
I-405 SB Ramps & SE 8th Street	C	25.3	-	-	-	-	-	-	C	25.6	-	-	C	26.6	-	-	-	-	-	-	C	26.8	-	-
Bellevue Way SE & SE 30th Street*	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**E**	**77.7**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**83.9**
Bellevue Way SE & South Bellevue P&R (S)	**F**	**83.6**	**F**	**124.5**	**F**	**125.4**	**F**	**131.7**	**F**	**86.5**	**F**	**144.6**	**F**	**90.9**	**F**	**141.5**	**F**	**>150**	**F**	**141.5**	**F**	**93.6**	**F**	**>150**
Bellevue Way SE & South Bellevue P&R (N)	N/A	N/A	A	9.1	C	21.9	B	11.2	N/A	N/A	B	10.9	N/A	N/A	B	15.5	B	17.0	B	15.8	N/A	N/A	B	15.5
114th Avenue SE & SE 6th Street	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**150.0**	B	12.8	B	12.1	B	12.1	B	12.8	B	12.8	B	12.8
SE 8th Street & 114th Avenue SE (Bellefield Business Park)	B	19.1	-	-	C	25.1	C	25.4	C	22.9	-	-	B	17.0	-	-	C	24.5	C	25.0	B	18.5	-	-
Bellevue Way SE & 108th Avenue SE	B	17.1	B	19.5	C	20.4	B	18.2	B	18.3	C	21.7	B	17.9	B	13.6	B	18.6	B	18.3	B	17.0	C	22.7
Bellevue Way SE & SE 16th Street	A	7.4	A	6.8	A	4.9	A	3.7	-	-	B	10.3	A	7.9	A	4.9	A	7.0	A	4.9	-	-	A	10.0
Bellevue Way SE & 104th Avenue SE	A	4.9	A	3.5	A	3.7	A	4.1	-	-	B	19.4	A	5.3	A	4.3	A	4.6	A	4.1	-	-	B	16.2
Bellevue Way SE & SE 10th Street	A	9.2	A	5.9	A	8.3	A	7.5	-	-	B	14.9	A	9.0	A	7.4	A	6.9	A	7.7	-	-	C	15.4

Notes:

Bold type text indicates where intersections fail to meet agency LOS standards: WSDOT is LOS E, and Bellevue is LOS D.

Delay is measured by average seconds of delay per vehicle.

AWSC – All-way stop controlled intersection, TWSC – Two-way stop controlled intersection.

-- Intersection is not provided in this condition.

TABLE D-9
Future 2020 PM Peak-Hour Intersection LOS – Segment C

	2020													
	No-Build		C1T		C2T		C3T		C4A		C7E		C8E	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
112th Avenue SE & SE 6th Street	B	10.9	-	-	-	-	-	-	-	-	-	-	-	-
Bellevue Way SE & SE Wolverine Way	B	14.1	B	11.1	C	21.7	C	23.5	C	24.3	C	23.0	B	17.6
Bellevue Way & Main Street	**F**	**132.5**	**F**	**136.4**	**F**	**131.0**	**F**	**131.2**	**F**	**137.7**	**F**	**130.4**	**F**	**133.5**
Bellevue Way NE & NE 2nd Street	C	29.1	C	29.3	C	30.7	C	30.7	D	38.2	C	30.8	C	27.9
112th Avenue NE & NE 12th Street	E	76.0	E	72.6	E	72.8	E	74.3	E	75.1	E	75.9	E	79.2
112th Avenue NE & NE 10th Street	C	21.3	B	27.6	C	24.2	C	24.0	C	28.4	C	24.2	B	19.1
112th Avenue NE & NE 8th Street/I-405 SB Ramp	**F**	**131.5**	**F**	**139.5**	**F**	**137.5**	**F**	**137.8**	**F**	**163.4**	**F**	**139.1**	**F**	**149.5**
112th Avenue NE & NE 6th Street	B	16.3	C	21.8	C	25.8	B	16.9	C	24.6	C	23.8	B	19.6
112th Avenue NE & NE 4th Street	C	25.1	C	31.3	C	24.5	C	25.5	C	31.2	C	26.0	C	27.2
112th Avenue NE & NE 2nd Street	D	48.0	D	41.5	D	48.4	D	47.0	E	60.0	D	47.9	D	45.4
112th Avenue & Main Street	**F**	**117.3**	**F**	**123.8**	**F**	**119.3**	**F**	**119.8**	**F**	**130.0**	**F**	**119.2**	**F**	**124.4**
110th Avenue NE & NE 12th Street	B	19.4	C	21.3	B	18.8	B	18.8	A	4.7	B	18.9	B	15.3
110th Avenue NE & NE 10th Street	B	12.6	B	19.0	C	22.9	C	22.9	A	9.3	C	24.2	B	17.7
110th Avenue NE & NE 8th Street	E	68.0	E	65.9	E	66.7	E	67.7	C	31.4	E	76.8	**F**	**>150**
110th Avenue NE & NE 6th Street	C	28.5	C	26.6	D	40.5	C	27.7	C	34.8	C	23.9	**F**	**87.0**
110th Avenue NE & NE 4th Street	D	41.2	D	46.5	D	43.5	D	43.5	D	51.9	D	42.8	D	44.4
110th Avenue NE & NE 2nd Street	D	44.0	D	43.7	D	40.9	D	41.4	D	54.4	D	41.8	D	46.4
110th Avenue & Main Street	C	24.6	D	30.8	C	30.0	C	28.7	C	30.2	C	30.0	D	38.4
108th Avenue NE & NE 12th Street	B	18.9	B	16.1	B	17.2	B	17.2	D	48.8	B	17.2	B	17.1
108th Avenue NE & NE 10th Street	A	6.4	B	13.5	B	17.4	B	17.4	C	24.8	B	17.4	B	13.9
108th Avenue NE & NE 8th Street	D	44.6	D	49.2	D	39.8	D	39.7	E	55.3	C	35.0	D	35.9
108th Avenue NE & NE 6th Street	A	6.6	A	7.6	A	6.6	A	5.9	B	11.3	A	6.1	A	7.3
108th Avenue NE & NE 4th Street	C	22.3	C	26.1	C	25.2	B	12.6	C	28.2	C	25.3	C	25.5
108th Avenue NE & NE 2nd Street	B	15.2	B	17.7	B	15.5	B	15.4	C	24.3	B	15.6	C	24.1
108th Avenue & Main Street	B	17.0	B	19.3	C	25.2	B	15.5	C	32.4	B	17.2	B	16.6

TABLE D-9
Future 2020 PM Peak-Hour Intersection LOS – Segment C

	2020													
	No-Build		C1T		C2T		C3T		C4A		C7E		C8E	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
106th Avenue NE & NE 12th Street	B	12.7	A	7.5	B	13.0	B	13.0	B	15.0	B	13.0	A	7.8
106th Avenue NE & NE 10th Street	A	9.5	B	16.1	A	9.3	A	9.3	B	13.5	A	9.2	A	7.5
106th Avenue NE & NE 8th Street	B	17.8	B	18.4	B	14.4	B	14.0	E	72.4	B	13.8	C	25.2
106th Avenue NE & NE 6th Street	B	17.6	C	25.9	C	22.4	C	22.5	C	23.4	C	22.4	C	29.8
106th Avenue NE & NE 4th Street	C	29.8	C	25.1	C	24.6	C	24.4	D	52.0	C	24.4	C	24.4
106th Avenue NE & NE 2nd Street	B	18.7	C	20.2	B	18.9	B	19.0	C	25.3	B	19.0	C	20.7
106th Avenue NE & Main Street	B	11.6	B	18.0	B	17.3	B	12.0	B	19.4	B	10.9	B	13.6
NE 4th Street & I-405 SB Ramp	B	16.4	B	15.8	B	16.5	B	16.3	B	16.9	B	17.0	B	15.0
NE 4th Street & I-405 NB Ramp	C	27.0	C	23.8	C	28.4	C	28.5	C	27.4	C	28.1	B	19.7
116th Avenue NE & NE 12th Street	D	47.7	D	43.4	D	42.5	D	42.2	D	38.0	D	42.3	D	42.4
116th Avenue NE & NE 10th Street	C	21.5	-	-	-	-	-	-	-	-	-	-	-	-
116th Avenue NE & NE 8th Street	D	47.4	-	-	-	-	-	-	-	-	-	-	-	-
116th Avenue NE & NE 4th Street	C	21.3	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

- The intersection is outside the influence of this alternative, and no change in operations is expected at this location.

Bold type text indicates where intersections fail to meet agency LOS standards: WSDOT and Bellevue are LOS E

Delay is measured by average seconds of delay per vehicle.

TABLE D-10
Future 2030 PM Peak-Hour Intersection LOS – Segment C

	2030													
	No-Build		C1T		C2T		C3T		C4A		C7E		C8E	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
112th Avenue SE & SE 6th Street	E	58.4	-	-	-	-	-	-			-	-	-	-
Bellevue Way SE & SE Wolverine Way	B	15.7	B	10.7	B	18.6	C	21.3	B	19.8	C	20.4	B	18.4
Bellevue Way & Main Street	**F**	**141.4**	**F**	**145.4**	**F**	**137.3**	**F**	**140.8**	**F**	**140.3**	**F**	**137.7**	**F**	**134.0**
Bellevue Way NE & NE 2nd Street	D	46.7	E	56.1	D	53.0	D	48.2	E	73.8	D	52.7	E	65.7
112th Avenue NE & NE 12th Street	**F**	**102.5**	**F**	**105.9**	**F**	**104.1**	**F**	**107.3**	**F**	**110.6**	**F**	**113.4**	**F**	**102.0**
112th Avenue NE & NE 10th Street	C	23.3	B	21.4	C	20.5	C	21.6	C	24.9	C	20.6	B	17.1
112th Avenue NE & NE 8th Street/I-405 SB Ramp	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
112th Avenue NE & NE 6th Street	C	32.4	D	48.2	D	49.3	C	33.1	D	43.5	D	46.3	C	33.1
112th Avenue NE & NE 4th Street	C	33.8	D	37.1	D	35.1	C	29.7	D	43.6	D	39.0	D	35.5
112th Avenue NE & NE 2nd Street	E	76.0	E	69.9	E	69.6	E	71.6	E	78.9	E	68.9	E	74.0
112th Avenue & Main Street	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
110th Avenue NE & NE 12th Street	C	24.7	C	20.9	B	13.4	C	20.3	A	6.1	C	26.0	C	21.4
110th Avenue NE & NE 10th Street	B	13.7	C	24.0	C	23.3	B	12.9	A	9.8	B	19.0	C	33.2
110th Avenue NE & NE 8th Street	**F**	**108.0**	**F**	**110.8**	**F**	**119.0**	**F**	**119.9**	E	63.7	**F**	**123.8**	**F**	**>150**
110th Avenue NE & NE 6th Street	D	43.8	E	77.9	E	78.9	D	40.5	C	33.9	D	37.6	**F**	**>150**
110th Avenue NE & NE 4th Street	E	65.2	E	64.8	E	64.5	E	66.3	E	63.5	E	64.2	E	79.6
110th Avenue NE & NE 2nd Street	D	52.0	D	52.1	D	46.5	D	48.7	C	33.0	D	49.8	D	43.0
110th Avenue & Main Street	D	42.7	D	54.6	D	51.1	D	50.7	D	42.9	D	52.9	D	52.7
108th Avenue NE & NE 12th Street	C	20.3	B	19.9	B	18.9	B	18.6	E	72.8	C	20.1	B	19.8
108th Avenue NE & NE 10th Street	B	12.2	B	14.6	B	16.5	A	6.9	C	28.0	B	17.0	B	16.5
108th Avenue NE & NE 8th Street	E	62.4	E	57.0	E	57.2	E	57.6	E	80.0	D	47.9	D	53.1
108th Avenue NE & NE 6th Street	A	6.5	A	5.3	A	3.8	A	5.1	B	19.3	A	5.3	B	12.0
108th Avenue NE & NE 4th Street	C	24.6	C	23.4	C	24.7	C	24.3	C	30.6	C	23.2	C	22.1
108th Avenue NE & NE 2nd Street	B	18.1	B	19.0	B	19.7	B	18.8	B	19.8	B	18.2	C	23.6
108th Avenue & Main Street	C	26.6	C	27.8	C	22.0	C	22.9	D	38.5	C	22.2	C	29.1

TABLE D-10
Future 2030 PM Peak-Hour Intersection LOS – Segment C

	2030													
	No-Build		C1T		C2T		C3T		C4A		C7E		C8E	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
106th Avenue NE & NE 12th Street	B	13.7	B	17.6	B	18.4	B	14.8	C	27.3	B	17.5	B	16.9
106th Avenue NE & NE 10th Street	B	10.4	B	13.0	B	10.9	B	10.4	B	12.0	A	9.2	B	11.1
106th Avenue NE & NE 8th Street	C	32.6	C	26.0	C	26.2	C	29.7	E	76.4	C	23.0	C	32.5
106th Avenue NE & NE 6th Street	B	17.0	C	25.8	C	23.6	B	16.7	C	21.1	C	26.8	C	20.4
106th Avenue NE & NE 4th Street	B	19.7	C	25.7	C	24.9	C	27.0	B	18.1	C	24.4	C	23.7
106th Avenue NE & NE 2nd Street	B	16.2	B	14.9	B	15.7	B	14.8	D	49.6	B	15.6	B	15.1
106th Avenue NE & Main Street	B	13.3	B	18.2	B	13.3	B	12.9	C	26.3	B	12.9	B	13.8
NE 4th Street & I-405 SB Ramp	C	28.0	C	23.1	C	25.0	C	25.6	C	28.0	B	15.9	C	26.6
NE 4th Street & I-405 NB Ramp	C	23.0	C	23.2	C	26.0	C	27.7	C	22.7	C	26.9	C	23.7
116th Avenue NE & NE 12th Street	D	54.5	D	54.6	D	50.9	D	52.0	D	46.8	D	51.8	D	51.2
116th Avenue NE & NE 10th Street	C	34.4	C	34.0	-	-	D	38.7	D	44.9	D	38.7	D	38.7
116th Avenue NE & NE 8th Street	E	58.7	-	-	E	56.0	-	-	-	-	-	-	-	-
116th Avenue NE & NE 4th Street	C	29.6	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

- The intersection is outside the influence of this alternative, and no change in operations is expected at this location.

Bold type text indicates where intersections fail to met agency LOS standards. WSDOT and Bellevue are LOS E.

Delay is measured by average seconds of delay per vehicle.

TABLE D-11
Future 2020 and 2030 PM Peak-Hour Intersection LOS – Segment D

	2020										2030									
	No-Build		D2A		D2E		D3		D5		No-Build		D2A		D2E		D3		D5	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
120th Avenue NE & NE 12th Street	C	32.5	-	-	-	-	-	-	-	-	D	36.0	-	-	-	-	-	-	-	-
124th Avenue NE & Northup Way	C	33.8	-	-	C	34.0	D	35.8	C	33.8	D	39.9	D	40.0	D	40.5	D	40.1	D	40.1
124th Avenue NE & Bel-Red Road	C	28.0	-	-	C	30.9	C	31.1	C	28.6	C	34.9	-	-	-	-	-	-	-	-
130th Avenue NE & Bel-Red Road	B	17.2	B	16.8	B	16.9	B	16.7	B	16.0	B	18.1	C	20.4	C	20.3	C	20.3	B	18.2
130th Avenue NE & NE 20th Street	C	25.0	C	27.9	C	27.7	C	28.1	C	28.2	C	29.9	C	33.1	C	32.1	C	34.4	C	29.6
132nd Avenue NE & Bel-Red Road	B	15.5	B	16.3	B	14.2	B	17.4	B	16.2	B	14.8	B	17.7	B	15.4	B	16.2	B	15.3
132nd Avenue NE & NE 16th Street	B	14.7	B	11.9	C	15.1	A	9.9	-	-	B	14.9	B	13.8	C	15.4	B	13.4	-	-
132nd Avenue NE & NE 20th Street	A	9.1	B	10.4	-	-	B	11.3	-	-	A	9.6	B	11.6	-	-	B	12.7	-	-
136th Avenue NE & NE 16th Street	B	13.5	C	25.3	C	15.3	D	25.6	C	15.4	B	13.8	C	24.3	C	15.9	D	27.9	C	15.9
136th Avenue NE & NE 20th Street	B	14.5	B	13.5	B	10.2	B	16.1	-	-	B	17.3	B	17.2	B	12.5	B	15.1	-	-
140th Avenue NE & 20th Avenue	E	78.6	-	-	-	-	E	79.6	E	78.6	**F**	**101.3**	**F**	**101.3**	**F**	**101.3**	**F**	**108.5**	**F**	**102.4**
NE 20th Street & Mall Entrance	A	10.0	A	9.4	-	-	B	17.6	-	-	B	10.3	B	11.9	-	-	B	17.6	-	-
148th Avenue NE & SR 520 WB Ramps	D	39.2	-	-	-	-	-	-	-	-	D	43.4	-	-	-	-	-	-	-	-
148th Avenue NE & SR 520 EB Ramps	C	24.5	-	-	-	-	-	-	-	-	E	58.5	-	-	-	-	-	-	-	-
NE 24th Street & 148th Avenue NE	**F**	**125.6**	**F**	**124.7**	**F**	**124.7**	**F**	**126.4**	**F**	**125.7**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
NE 24th Street & 151st Avenue NE	C	23.0	**F**	**>150**	**F**	**>150**	C	24.6	C	22.9	C	27.2	**F**	**>150**	**F**	**>150**	C	32.2	C	29.5
NE 20th Street & 152nd Avenue NE	D	26.2	D	27.8	D	27.8	B	12.9	D	27.8	D	28.9	D	31.3	D	31.3	B	12.7	D	31.3
NE 24th Street & 152nd Avenue NE	C	26.6	E	63.7	E	63.7	E	59.3	C	32.1	C	30.0	E	70.0	E	70.0	E	79.2	D	43.4
NE 26th Street & 152nd Avenue NE	A	5.3	A	5.9	A	5.9	A	8.8	A	5.9	A	5.3	A	6.1	A	6.1	A	7.4	A	6.1
NE 24th Street & Bel-Red Road	C	32.4	C	32.6	C	32.6	C	32.6	-	-	C	33.6	-	-	-	-	-	-	-	-
NE 40th Street & 148th Avenue NE	D	45.1	-	-	-	-	-	-	-	-	**F**	**82.9**	**F**	**83.9**	**F**	**83.9**	**F**	**83.9**	**F**	**83.9**
NE 40th Street & SR 520 WB Ramps	C	22.9	-	-	-	-	-	-	-	-	C	27.0	-	-	-	-	-	-	-	-
NE 40th Street & SR 520 EB Ramps	B	18.6	-	-	-	-	-	-	-	-	D	40.2	-	-	-	-	-	-	-	-
NE 40th Street & 156th Avenue NE	**F**	**92.7**	**F**	**95.7**	**F**	**95.7**	**F**	**95.7**	**F**	**95.3**	**F**	**130.9**	**F**	**134.5**	**F**	**134.5**	**F**	**134.5**	**F**	**134.5**

TABLE D-11
Future 2020 and 2030 PM Peak-Hour Intersection LOS – Segment D

	2020										2030									
	No-Build		D2A		D2E		D3		D5		No-Build		D2A		D2E		D3		D5	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
Overlake P&R Entrance & 156th Avenue NE	B	17.0	C	22.7	C	22.7	C	22.7	C	22.7	B	20.0	D	43.4	D	43.4	D	43.4	D	43.4
NE 36th Street & 156th Avenue NE	E	61.8	E	67.0	E	67.0	E	67.0	E	67.0	E	71.7	E	79.1	E	79.1	E	79.1	E	79.3
NE 31st Street & 156th Avenue NE	D	44.3	-	-	-	-	-	-	-	-	E	66.3	-	-	-	-	-	-	-	-
148th Avenue NE & 20th Avenue	E	64.1	-	-	-	-	E	74.2	-	-	E	76.1	-	-	-	-	**F**	**90.2**	-	-

Notes:

- The intersection is outside the influence of this alternative, and no change in operations is expected at this location.

Bold type text indicates where intersections fail to meet agency LOS standards. WSDOT, Bellevue, and Redmond are LOS E.

Delay is measured by average seconds of delay per vehicle.

TABLE D-12
Future 2020 and 2030 PM Peak-Hour Intersection LOS – Segment E

	2020								2030							
	No-Build		E1		E2		E4		No-Build		E1		E2		E4	
Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
NE Leary Way & West Lake Sammamish Pkwy.	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
NE Leary Way & 159th Place NE	D	43.6	D	43.3	D	43.3	D	43.3	D	49.4	D	49.4	D	49.4	D	49.4
NE Leary Way & Bear Creek Parkway	C	33.3	C	33.6	C	33.6	D	43.3	D	35.8	D	36.1	D	36.1	D	49.4
NE Leary Way & NE 76th Street	B	10.8	B	10.8	B	10.8	B	10.8	B	10.7	B	10.7	B	10.7	B	10.7
Redmond Way & 161st Avenue NE	D	43.5	E	70.5	**F**	**92.1**	E	70.5	E	75.2	**F**	**97.9**	**F**	**96.0**	**F**	**97.9**
Cleveland Street & 161st Avenue NE	C	24.7	C	24.4	C	28.4	C	24.4	C	25.9	C	25.5	D	43.7	C	25.5
NE 83rd Street & 161st Avenue NE	B	19.0	B	18.9	D	38.3	B	18.9	C	22.1	C	22.3	E	67.9	C	22.3
NE 85th Street & 161st Avenue NE	C	24.0	C	24.0	C	24.7	C	24.0	C	30.6	C	31.5	C	34.4	C	31.5
164th Avenue NE & SR 202	C	22.6	C	22.4	C	22.0	C	22.0	C	25.9	C	24.9	C	24.9	C	24.9
164th Avenue NE& NE 76th Street	E	41.3	E	47.6	E	47.6	E	47.6	E	38.5	E	47.2	E	47.2	E	47.2
164th Avenue NE & NE Cleveland Street	C	25.8	C	29.5	C	29.5	C	29.5	C	24.9	C	32.4	C	34.2	C	32.4
164th Avenue NE & NE 80th Street	D	33.5	D	35.3	D	35.3	D	35.3	D	38.5	D	43.2	D	42.9	D	43.2
164th Avenue NE & NE 85th Street	E	64.2	E	66.8	E	66.8	E	66.8	**F**	**96.1**	**F**	**98.4**	**F**	**98.4**	**F**	**98.4**
166th Avenue NE & SR 202	C	25.8	C	32.4	C	32.6	C	32.6	C	34.7	D	44.0	D	44.0	D	44.0
166th Avenue NE & NE 76th Street	C	20.2	C	22.7	C	22.7	C	22.7	C	20.0	C	24.0	C	24.0	C	24.0
166th Avenue NE & Cleveland Street	B	18.5	C	33.0	C	33.0	C	33.0	B	15.6	C	36.5	C	35.9	C	36.5
166th Avenue NE & 80th Street	B	14.9	B	15.0	B	15.0	B	15.0	B	16.5	B	16.8	B	16.8	B	16.8
NE 76th Street & Bear Creek Parkway	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
SR 202 & SR 520 WB Ramps	C	26.6	D	38.7	D	38.7	D	38.7	D	48.0	E	70.9	E	70.9	E	70.9
SR 202 & SR 520 EB Ramps	D	48.9	E	62.8	E	63.0	E	63.0	**F**	**87.1**	**F**	**98.1**	**F**	**98.1**	**F**	**98.1**

TABLE D-12
Future 2020 and 2030 PM Peak-Hour Intersection LOS – Segment E

	2020								2030							
	No-Build		E1		E2		E4		No-Build		E1		E2		E4	
Intersection	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
SR 202 & NE 70th Street	B	18.7	D	54.1	D	53.9	D	53.9	E	57.4	**F**	**108.5**	**F**	**108.5**	**F**	**108.5**
NE 70th Street & 176th Avenue NE	B	10.3	E	40.1	E	40.5	**F**	**>150**	B	10.9	**F**	**50.3**	E	49.7	**F**	**>150**
178th Place NE & Union Hill Road	B	20.0	B	19.2	B	19.2	B	19.2	C	31.4	C	28.5	C	28.5	C	28.5
Avondale Road NE & Union Hill Road	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**
E Lake Sammamish Parkway & NE 65th Street	C	34.2	C	31.0	C	31.0	C	31.0	D	49.0	D	44.6	D	44.6	D	44.6
SR 202 & E Lake Sammamish Parkway (180th Avenue NE)	**F**	**121.1**	**F**	**117.2**	**F**	**117.2**	**F**	**117.2**	**F**	**137.1**	**F**	**147.4**	**F**	**147.4**	**F**	**147.4**

Notes:

- The intersection is outside the influence of this alternative, and no change in operations is expected at this location.

Bold type text indicates where intersections fail to meet agency LOS standards. WSDOT and Redmond are LOS E.

Delay is measured by average seconds of delay per vehicle.

TABLE D-13
Future 2020 and 2030 AM Mitigated Intersection LOS

	2020 AM						2030 AM					
	No-Build		Build[a]		Build Mitigated[b]		No-Build		Build[a]		Build Mitigated[b]	
Intersection (Segment A)	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**
W. Mercer Way & 24th Ave SE	C	15.6	**D**	**27.1**	C	15.5	C	20.9	C	22.9	C	20.7
80th Ave SE & SE 27th St.	**D**	**28.5**	C	16.2	B	14.3	**F**	**62.9**	**F**	**57.0**	**D**	**32.0**
77th Ave SE & Sunset Highway	C	22.3	**D**	**30.5**	**D**	**27.1**	**E**	**40.6**	**F**	**56.8**	**E**	**42.4**
77th Ave SE & I-90 EB HOV Off Ramp	B	11.0	B	12.6	B	10.8	B	12.2	D	29.4	C	17.5
77th Ave SE & N Mercer Way	**D**	**33.1**	**F**	**>150**	A	9.6	**F**	**69.3**	**F**	**>150**	B	11.1
77th Ave SE & 27th St	B	14.0	**D**	**36.2**	C	22.3	B	12.9	**E**	**68.7**	C	31.8
76th Ave SE/N Mercer Way & I-90 WB On-Ramp	B	14.1	E	38.9	C	16.6	B	14.6	**F**	**75.4**	C	23.0

Notes:

[a] The build intersection results represent the alternative with worst LOS and delay. Refer to Table D-6 for the alternative intersection LOS results without improvements.

[b] Build mitigated results are for the alternative that has the worst mitigated LOS and delay.

Bold type text indicates where intersections fail to meet agency LOS standards.

TABLE D-14
Future 2020 and 2030 PM Mitigated Intersection LOS

	2020 PM						2030 PM					
	No-Build		Build[a]		Build Mitigated*		No-Build		Build[a]		Build Mitigated*	
Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Segment A												
W. Mercer Way & 24th Ave SE	C	23.2	**F**	**121.2**	**D**	**30.0**	**F**	**97.4**	**F**	**>150**	**D**	**34.5**
80th Ave SE & SE 27th St.	**E**	**39.2**	**E**	**38.7**	**D**	**29.9**	**F**	**59.8**	**F**	**73.3**	**F**	**55.7**
77th Ave SE & Sunset Highway	C	23.4	**D**	**26.4**	C	23.5	**D**	**27.3**	**D**	**25.6**	C	22.7
77th Ave SE & I-90 EB HOV Off Ramp	B	13.6	**F**	**66.1**	C	15.4	B	14.5	E	39.1	B	14.5
77th Ave SE & N Mercer Way	**F**	**120.6**	**F**	**>150**	B	11.1	**F**	**>150**	**F**	**147.3**	B	11.1
77th Ave SE & 27th St	B	14.2	B	18.7	B	12.6	C	21.8	C	21.6	B	15.0
76th Ave SE/N Mercer Way & I-90 WB On-Ramp	**F**	**75.2**	**F**	**79.8**	D	30.7	**F**	**91.8**	**F**	**82.2**	E	43.8
Segment B												
112th Ave SE & Bellevue Way SE (B1, B2A, B3)	C	27.1	**F**	**110.5**	C	35.5	C	29.6	**F**	**109.4**	C	39.7
118th Ave SE & SE 8th Street (B7)	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**>150**	**F**	**146.4**
Segment C												
110th Ave NE & NE 8th (C8E)	E	68	**F**	**>150**	E	79.5	**F**	**108**	**F**	**>150**	**F**	**105.4**
110th Ave NE & NE 6th (C8E)	C	28.5	**F**	**>150**	E	73.4	D	43.8	**F**	**>150**	**F**	**106.7**
Segment D												
151st Ave NE & NE 24th St. (D2A, D2E)	C	23.0	**F**	**>150**	-	-	C	27.2	**F**	**>150**	-	-
152nd Ave NE & NE 24th St. (D2A, D2E)	C	26.6	E	63.7	-	-	C	30.0	E	70.0	-	-
148th Ave NE & NE 20th St. (D3)	E	64.1	E	74.2	E	67.3	E	76.1	**F**	**90.2**	E	77.2
Segment E												
NE Leary Way & Bear Creek Parkway (E4)	C	33.3	D	43.3	C	32.6	D	35.8	D	49.4	C	34.3
Redmond Way & 161st Ave NE (E2)	C	24.4	**F**	**93.7**	D	40.8	C	30.6	**F**	**99.8**	D	36
83rd St & 161st Ave NE (E2)	B	19	D	37.0	C	22.6	C	22.1	E	69.0	C	26.3
SR 202 & NE 70th St. (E1, E2, E4)	B	18.7	D	53.9	D	39.6	E	57.4	**F**	**108.5**	E	76.1
NE 70th St & 176th Ave NE (E1, E2, E4)	B	10.3	E	40.5	B	12.2	B	10.9	E	49.7	D	38.3

Notes:

[a] The build intersection results represent the alternative with worst LOS and delay. Refer to Tables D-7 through D-12 for alternative-by-alternative intersection LOS results without improvements.

* Build mitigated results are for the alternative that has the worst mitigated LOS and delay.

– Coordination required between agencies to determine acceptable improvements.

Appendix E
National Research Safety Statistics on Light Rail

Appendix E

National Research Safety Statistics on Light Rail

As part of the qualitative safety analysis performed for the East Link light rail alternatives, the guidance in following Federal Transit Administration (FTA) publications was used to generate many of the conclusions regarding the safety of the alternatives:

- Transit Cooperative Research Program (TCRP) Report 17, Integration of Light Rail Transit into City Streets, 1996
- TCRP Report 69, Light Rail Service Pedestrian and Vehicular Safety, 2001.

This appendix summarizes findings from these reports that apply to the track designs proposed for the East Link Project.

E.1 At-Grade Side-Running within Right-of-Way but Outside Vehicle Travel Way, and At-Grade Median-Running with Curb and Fencing

This design has distinct advantages in fewer accidents between trains and pedestrians or vehicles because of the separation between train traffic from vehicular and pedestrian traffic. This can be seen in the findings from TCRP Report 17, which showed that only 8 percent of accidents occurred along these types of facilities despite the fact that these designs accounted for 62 percent of mainline track miles. Furthermore, TCRP Report 17 reported an overall average of 1.11 accidents per year per mainline track mile for the light rail systems surveyed. For designs with less train separation, the average was 3.7 accidents per year per mainline.

The findings are also backed by TCRP Report 69, in which the survey of current systems found that 77 percent of light rail track miles fit into this design category, but only 13 percent of annual accidents occurred on these track miles. Furthermore, the average number of accidents per crossing was 0.17 accidents per crossing-year, compared to 0.54 accidents per crossing-year for the category with less train separation.

However, this design does exhibit safety problems in terms of crash severity. Because the more exclusive right-of-way allows for higher travel speeds, collisions tend to be more severe. TRCP Report 69 reported that, for this design, 19 percent of vehicle-train accidents resulted in a fatality, and 29 percent of pedestrian-train accidents resulted in a fatality. In comparison to the less exclusive designs, fatal accidents accounted for 1 percent and 18 percent, respectively.

E.2 At-Grade Median-Running with Curb or Striping, and Nonexclusive Designs

These designs are use lower speeds for the trains, and the trains mix with vehicle and pedestrian traffic in the same right-of-way with little or no physical separation. The general experience is that these designs have more accidents because of the increased interaction between the trains and pedestrians or vehicles. This is supported by TCRP Report 17, which found that 92 percent of accidents were along these types of routes despite the fact that only 38 percent of mainline track miles were of this design. TRCP Report 69 revealed similar patterns, because the average crossing had 0.54 accidents per crossing-year, compared to 0.17 accidents per crossing-year for the more exclusive design type.

From a traffic safety perspective, this design performed better in accident severity. Fatal accidents represented a far smaller percentage for both vehicle-train and pedestrian-train accidents. The lower light rail travel speeds with this design appear to provide some protection to pedestrians and motorists.

E.3 Elevated Median-Running, and Retained-Cut Median-Running

Both designs separate transit and vehicle operations, one with an elevated track and the other with a retained cut. Because the trains and motorists operate in separate travelways, there is no ability for a vehicle-train accident to happen or for a train to collide with a pedestrian or bicyclist. Furthermore, the designs provide additional safety by separating opposite directions of travel, limiting mid-block turning movements, and even converting some intersections into right-in/right-out (RI/RO) design. These will effectively eliminate mid-block accidents that involve left-turning traffic. However, it is possible that some of the mid-block accidents could redistribute to nearby intersections because motorists would have to choose different routes in order to complete their trips, such as a U-turn at a signal followed by a right turn instead of a direct left turn.

City of Des Moines, WA

Likely the largest traffic safety issue is vehicle accidents with the center pier of an elevated track or the concrete wall protecting a trench track. However, the expectation is that these accidents would happen at low vehicle speeds (≤35 miles per hour [mph]) and would likely result in property damage only. Furthermore, increased median widths to provide greater offset distances could be used for either design. In addition, for the elevated track design, alternative curb designs that provide more protection could be used instead of the traditional 6-inch curb. Such alternative designs may include taller 9-inch curbs or a low-profile median barrier used in the City of Des Moines, Washington, as shown in the photo above (FTA, *Public Roads,* "Preventing Roadway Departures," July/August 2005. http://www.tfhrc.gov/pubrds/05jul/03.htm).

E.4 One-Way Couplets with At-Grade Tracks within Street Travelway

Numerous cities in the United States, such as Denver, Colorado, have designed and built light rail systems that operate on one-way streets in the opposite direction. In general, the conversion of two-way streets to one-way couplets with light rail can have both positive and negative impacts for motor vehicle, pedestrian, and bicycle traffic. For example, one-way streets have fewer conflict points at intersections, which can reduce vehicle collisions. However, higher travel speeds that can accompany one-way streets can create additional safety problems for pedestrians and bicyclists.

Specifically regarding the East Link Couplet Alternative (C4A), the light rail train would travel southbound on 108th Avenue NE along the west side of the street in an exclusive lane. Auto traffic would travel one-way northbound in up to three lanes to the east. This would obey United States driving conditions with oncoming traffic (light rail) to the left. The advantage of light rail traveling in the opposite direction from automobiles is that drivers can see the light rail train coming towards them, particularly as they turn left. If the train traveled the same direction as the cars, drivers would be turning right across the track with a train potentially coming from behind, out of their vision. In the downtown environment, the proposed configuration (light rail train opposite cars) also represents a typical street for pedestrians and cross-traffic with the curbside lane/track coming from the left. Finally, buses require a contra-flow lane on the one-way streets adjacent to the Bellevue Transit Center to maintain their routing and provide full access, so with the proposed roadway configuration, they would be able to share the track with the train between NE 8th and NE 4th streets in a joint-use operation.

Along 110th Avenue NE, light rail and vehicle operations would operate in the opposite directions as 108th Avenue NE but the same conclusions for 108th Avenue NE apply.

Appendix F
Existing and Future
Pedestrian Sidewalk Level of Service

TABLE F-1
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment A

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
Rainier Ave/I-90 EB off ramp															
NB/SB (east leg)	21	0.28	A	26	0.34	A	30	0.39	A	46	0.61	B	54	0.72	B
EB/WB (south leg)	14	0.19	A	17	0.23	A	20	0.26	A	103	1.38	B	125	1.66	B
Rainier Ave/South Massachusetts Street															
NB (east leg)	7	0.09	A	9	0.11	A	10	0.13	A	14	0.18	A	16	0.21	A
SB (west leg)	8	0.11	A	10	0.13	A	11	0.15	A	32	0.42	A	38	0.51	B
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	44	0.59	B	54	0.72	B
WB (south leg)	4	0.05	A	5	0.07	A	6	0.08	A	8	0.11	A	9	0.12	A
23rd Ave South/Rainier Station Crossing															
EB/WB (crosswalk)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	86	1.15	B	105	1.40	B
80th Ave SE/North Mercer Way															
SB/NB (west leg)	114	0.63	B	147	0.82	B	161	0.89	B	167	0.93	B	187	1.04	B
EB/WB (north leg)	80	0.44	A	103	0.57	B	113	0.63	B	177	0.99	B	212	1.18	B
77th Ave SE/Sunset Highway															
NB (east leg)	7	0.04	A	9	0.05	A	10	0.05	A	10	0.06	A	11	0.06	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
EB (north leg)	4	0.02	A	5	0.03	A	6	0.03	A	6	0.03	A	7	0.04	A
WB (south leg)	5	0.03	A	6	0.04	A	7	0.04	A	9	0.05	A	11	0.06	A
80th Ave SE/SE 27th St															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	5	0.03	A	7	0.04	A
SB (west leg)	4	0.02	A	5	0.03	A	6	0.03	A	15	0.08	A	19	0.11	A
EB (north leg)	2	0.01	A	3	0.01	A	3	0.02	A	8	0.04	A	9	0.05	A
WB (south leg)	1	0.01	A	1	0.01	A	1	0.01	A	6	0.03	A	8	0.04	A
77th Ave SE/North Mercer Way															
NB/SB (east leg)	4	0.02	A	5	0.03	A	6	0.03	A	10	0.06	A	12	0.07	A

Note: City of Mercer Island standard sidewalk width: 12 feet. City of Seattle standard sidewalk width: 5 feet.

TABLE F-2
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment B

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
Bellevue Way/S Bellevue P&R															
NB (east leg)	1	0.01	A	1	0.01	A	1	0.01	A	5	0.13	A	7	0.16	A
SB (west leg)	2	0.02	A	2	0.02	A	3	0.02	A	2	0.06	A	3	0.07	A
EB (north leg)	7	0.06	A	9	0.07	A	9	0.08	A	39	0.97	B	48	1.21	B
WB (south leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
112th Ave SE/SE 8th St															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	13	0.33	A	18	0.45	A
SB (west leg)	4	0.03	A	5	0.04	A	5	0.04	A	5	0.12	A	5	0.13	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	2	0.05	A	3	0.07	A
WB (south leg)	1	0.01	A	1	0.01	A	1	0.01	A	2	0.06	A	3	0.07	A
114th Ave SE/SE 8th St															
NB (east leg)	2	0.02	A	2	0.02	A	3	0.02	A	8	0.21	A	11	0.28	A
SB (west leg)	1	0.01	A	1	0.01	A	1	0.01	A	5	0.13	A	7	0.17	A
EB (north leg)	1	0.01	A	1	0.01	A	1	0.01	A	16	0.41	A	22	0.55	B
WB (south leg)	2	0.02	A	2	0.02	A	3	0.02	A	2	0.06	A	3	0.07	A
118th Ave SE/SE 8th St[a]															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	2	0.05	A	3	0.07	A
SB (west leg)	3	0.03	A	4	0.03	A	4	0.03	A	38	0.94	B	50	1.24	B
EB (north leg)	3	0.03	A	4	0.03	A	4	0.03	A	38	0.94	B	50	1.24	B
WB (south leg)	0	0.00	A	0	0.00	A	0	0.00	A	40	1.00	B	54	1.34	B
SE 8th St/I-405 SB On/Off Ramps[a]															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
EB (north leg)	2	0.02	A	2	0.02	A	3	0.02	A	2	0.06	A	3	0.07	A

[a] Nearest intersection(s) location greater than 300 feet from station entrance

Note: City of Bellevue standard sidewalk width: 8 feet

TABLE F-3
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment C

		Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
Alternative	Intersection Approach (Crosswalk)	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds	Flow Rate (ped/min/ft)	LOS
	112th Ave NE/Main Street															
	NB (east leg)	10	0.08	A	14	0.12	A	15	0.12	A	14	0.12	A	15	0.12	A
	SB (west leg)	4	0.03	A	6	0.05	A	6	0.05	A	11	0.09	A	14	0.12	A
	EB (north leg)	4	0.03	A	6	0.05	A	6	0.05	A	11	0.09	A	14	0.12	A
B3, B7	WB (south leg)	2	0.02	A	3	0.02	A	3	0.02	A	13	0.11	A	20	0.17	A
	112th Ave NE/NE 4th Street															
	NB (east leg)	50	0.42	A	70	0.58	B	74	0.61	B	70	0.58	B	74	0.61	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	75	0.62	B	79	0.66	B
	EB (north leg)	50	0.42	A	70	0.58	B	74	0.61	B	80	0.67	B	84	0.70	B
	WB (south leg)	50	0.42	A	70	0.58	B	74	0.61	B	70	0.58	B	74	0.61	B
	112th Ave NE/NE 6th Street															
	NB (east leg)	2	0.02	A	8	0.06	A	3	0.02	A	13	0.11	A	8	0.07	A
	SB (west leg)	3	0.03	A	9	0.08	A	4	0.04	A	19	0.16	A	15	0.12	A
	EB (north leg)	3	0.03	A	9	0.08	A	4	0.04	A	9	0.08	A	4	0.04	A
C7E	WB (south leg)	9	0.08	A	13	0.10	A	13	0.11	A	18	0.15	A	19	0.15	A
C4A, C3T	**110th Ave NE/NE 4th Street**															
	NB (east leg)	15	0.13	A	21	0.17	A	22	0.18	A	21	0.17	A	22	0.18	A
	SB (west leg)	16	0.13	A	22	0.19	A	24	0.20	A	29	0.24	A	31	0.26	A
	EB (north leg)	11	0.09	A	15	0.13	A	16	0.14	A	25	0.21	A	27	0.22	A
	WB (south leg)	15	0.13	A	21	0.17	A	22	0.18	A	24	0.20	A	25	0.21	A
	110th Ave NE/NE 6th Street															
	NB (east leg)	50	0.42	A	70	0.58	B	74	0.61	B	75	0.62	B	79	0.66	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	80	0.67	B	84	0.70	B

TABLE F-3
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment C

		Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
Alternative	**Intersection Approach (Crosswalk)**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds**	**Flow Rate (ped/min/ft)**	**LOS**
	EB (north leg)	50	0.42	A	70	0.58	B	74	0.61	B	75	0.62	B	79	0.66	B
	WB (south leg)	50	0.42	A	70	0.58	B	74	0.61	B	70	0.58	B	74	0.61	B
	108th Ave NE/NE 4th Street															
	NB (east leg)	50	0.42	A	76	0.63	B	74	0.61	B	83	0.69	B	81	0.68	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	73	0.61	B	77	0.64	B
	EB (north leg)	50	0.42	A	90	0.75	B	74	0.61	B	90	0.75	B	74	0.61	B
	WB (south leg)	50	0.42	A	91	0.76	B	74	0.61	B	91	0.76	B	74	0.61	B
	108th Ave NE/NE 6th Street															
	NB (east leg)	107	0.89	B	169	1.41	B	158	1.31	B	179	1.49	B	168	1.40	B
	SB (west leg)	0	0.00	A		0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
	EB (north leg)	249	2.08	B	368	3.06	C	367	3.06	C	383	3.19	C	383	3.19	C
	WB (south leg)	289	2.41	B	423	3.53	C	426	3.55	C	458	3.82	C	463	3.86	C
	110th Ave NE/NE 6th Street															
	NB (east leg)	50	0.42	A	70	0.58	B	74	0.61	B	70	0.58	B	74	0.61	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	80	0.67	B	84	0.70	B
	EB (north leg)	50	0.42	A	70	0.58	B	74	0.61	B	70	0.58	B	74	0.61	B
	WB (south leg)	50	0.42	A	70	0.58	B	74	0.61	B	75	0.62	B	79	0.66	B
	108th Ave NE/NE 6th Street															
	NB (east leg)	107	0.89	B	149	1.24	B	158	1.31	B	169	1.41	B	179	1.49	B
	SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
	EB (north leg)	249	2.08	B	348	2.90	B	367	3.06	C	363	3.02	C	383	3.19	C
C1T, C2T	WB (south leg)	289	2.41	B	403	3.36	C	426	3.55	C	433	3.61	C	457	3.81	C

TABLE F-3
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment C

		Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
Alternative	Intersection Approach (Crosswalk)	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds.	Flow Rate (ped/min/ft)	LOS	No. of Peds	Flow Rate (ped/min/ft)	LOS
	110th Ave NE/NE 4th Street															
	NB (east leg)	15	0.13	A	26	0.22	A	22	0.18	A	41	0.34	A	38	0.32	A
	SB (west leg)	16	0.13	A	22	0.19	A	24	0.20	A	37	0.31	A	39	0.33	A
	EB (north leg)	11	0.09	A	20	0.17	A	16	0.14	A	35	0.29	A	32	0.27	A
	WB (south leg)	15	0.13	A	26	0.22	A	22	0.18	A	31	0.26	A	27	0.23	A
	110th Ave NE/NE 6th Street															
	NB (east leg)	50	0.42	A	75	0.62	B	74	0.61	B	85	0.71	B	84	0.70	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	80	0.67	B	84	0.70	B
	EB (north leg)	50	0.42	A	75	0.62	B	74	0.61	B	85	0.71	B	84	0.70	B
C8E	WB (south leg)	50	0.42	A	70	0.58	B	74	0.61	B	85	0.71	B	89	0.75	B
	112th Ave NE/NE 12th Street															
	NB (east leg)	1	0.01	A	1	0.01	A	1	0.01	A	31	0.26	A	87	0.72	B
	SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	4	0.03	A	11	0.09	A
	EB (north leg)	3	0.03	A	4	0.03	A	4	0.04	A	8	0.07	A	16	0.13	A
	WB (south leg)	2	0.02	A	3	0.02	A	3	0.02	A	17	0.14	A	43	0.36	A
	116th Ave NE/Bel-Red Road															
	NB (east leg)	9	0.08	A	13	0.10	A	13	0.11	A	13	0.10	A	13	0.11	A
	SB (west leg)	9	0.08	A	13	0.10	A	13	0.11	A	18	0.15	A	27	0.23	A
	EB (north leg)	3	0.03	A	4	0.03	A	4	0.04	A	9	0.08	A	19	0.16	A
C3T, C4A, C7E	WB (south leg)	9	0.08	A	13	0.10	A	13	0.11	A	13	0.10	A	13	0.11	A
C1T	**Bellevue Way/NE 2nd St**															
	NB (east leg)	50	0.42	A	70	0.58	B	74	0.61	B	73	0.61	B	79	0.66	B
	SB (west leg)	50	0.42	A	70	0.58	B	74	0.61	B	72	0.60	B	77	0.64	B

TABLE F-3
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment C

		Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
Alternative	**Intersection Approach (Crosswalk)**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds.**	**Flow Rate (ped/min/ft)**	**LOS**	**No. of Peds**	**Flow Rate (ped/min/ft)**	**LOS**
	EB (north leg)	50	0.42	A	70	0.58	B	74	0.61	B	71	0.59	B	75	0.63	B
	WB (south leg)	50	0.42	A	70	0.58	B	74	0.61	B	74	0.62	B	80	0.67	B
	Bellevue Way/NE Main St															
	NB (east leg)	4	0.03	A	6	0.05	A	6	0.05	A	9	0.07	A	11	0.09	A
	SB (west leg)	98	0.82	B	137	1.14	B	144	1.20	B	139	1.16	B	148	1.23	B
	EB (north leg)	15	0.13	A	21	0.17	A	22	0.18	A	21	0.17	A	22	0.18	A
	WB (south leg)	16	0.13	A	22	0.19	A	24	0.20	A	24	0.20	A	27	0.22	A

[a] Nearest intersection(s) located greater than 300 feet from station entrance.

Notes:

City of Bellevue standard sidewalk width: 8 feet.

Pedestrians distributed for the Bellevue Transit Center were obtained from changes in walk trips between the no-build and build conditions.

TABLE F-4
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment D

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
124th Ave NE/Bel-Red Rd															
NB (east leg)	2	0.02	A	2	0.02	A	2	0.02	A	8	0.05	A	10	0.09	A
SB (west leg)	2	0.02	A	2	0.02	A	2	0.02	A	6	0.03	A	7	0.06	A
EB (north leg)	9	0.08	A	11	0.09	A	9	0.08	A	21	0.08	A	17	0.14	A
WB (south leg)	2	0.02	A	2	0.02	A	2	0.02	A	4	0.02	A	3	0.03	A
130th Ave NE/Bel-Red Rd															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	20	0.17	A	20	0.17	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	7	0.06	A	7	0.06	A
EB (north leg)	2	0.02	A	2	0.02	A	2	0.02	A	7	0.04	A	5	0.04	A
WB (south leg)	2	0.02	A	2	0.02	A	2	0.02	A	34	0.27	A	32	0.27	A
132nd Ave NE/Bel-Red Rd															
NB (east leg)	1	0.01	A	1	0.01	A	1	0.01	A	16	0.13	A	15	0.13	A
SB (west leg)	2	0.02	A	2	0.02	A	2	0.02	A	42	0.33	A	40	0.33	A
EB (north leg)	2	0.02	A	2	0.02	A	2	0.02	A	12	0.08	A	10	0.08	A
WB (south leg)	1	0.01	A	1	0.01	A	1	0.01	A	31	0.25	A	30	0.25	A
NE 26th St/152nd Ave NE															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	60	0.50	B	170	1.42	B
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	70	0.58	B	199	1.66	B
WB (south leg)	0	0.00	A	0	0.00	A	0	0.00	A	20	0.17	A	57	0.47	A
NE 24th St/151st Ave NE															
NB (east leg)	7	0.06	A	8	0.07	A	9	0.08	A	10	0.02	A	5	0.04	A
SB (west leg)	9	0.08	A	11	0.09	A	12	0.10	A	12	0.01	A	3	0.03	A
EB (north leg)	14	0.12	A	17	0.14	A	19	0.16	A	26	0.08	A	20	0.17	A
WB (south leg)	7	0.06	A	8	0.07	A	9	0.08	A	9	0.01	A	2	0.02	A

TABLE F-4
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment D

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
NE 24th St/152nd Ave NE							0								
NB (east leg)	10	0.08	A	12	0.10	A	13	0.11	A	34	0.18	A	48	0.40	A
SB (west leg)	11	0.09	A	13	0.11	A	15	0.12	A	19	0.05	A	13	0.11	A
EB (north leg)	4	0.03	A	5	0.04	A	5	0.04	A	27	0.18	A	49	0.41	A
WB (south leg)	2	0.02	A	2	0.02	A	3	0.02	A	5	0.03	A	7	0.06	A
156th Ave NE/NE 40th St															
NB (east leg)	7	0.06	A	8	0.07	A	9	0.08	A	28	0.17	A	24	0.12	A
SB (west leg)	4	0.03	A	5	0.04	A	5	0.04	A	15	0.08	A	15	0.08	A
EB (north leg)	1	0.01	A	1	0.01	A	1	0.01	A	1	0.00	A	1	0.00	A
WB (south leg)	7	0.06	A	8	0.07	A	9	0.08	A	28	0.17	A	24	0.12	A
156th Ave NE/Overlake TC															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
SB (west leg)	11	0.09	A	13	0.11	A	15	0.12	A	13	0.00	A	15	0.00	A
EB (north leg)	72	0.60	B	87	0.73	B	97	0.81	B	108	0.18	A	112	0.13	A
WB (south leg)	1	0.01	A	1	0.01	A	1	0.01	A	1	0.00	A	1	0.00	A
156th Ave NE/NE 36th St															
NB (east leg)	9	0.08	A	11	0.09	A	12	0.10	A	11	0.00	A	12	0.00	A
SB (west leg)	4	0.03	A	5	0.04	A	5	0.04	A	5	0.00	A	5	0.00	A
EB (north leg)	14	0.12	A	17	0.14	A	19	0.16	A	27	0.08	A	24	0.04	A
WB (south leg)	13	0.11	A	16	0.13	A	17	0.15	A	16	0.00	A	17	0.00	A
NE 40th St/SR520 EB On															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
EB (north leg)	9	0.08	A	11	0.09	A	12	0.10	A	11	0.00	A	12	0.00	A

TABLE F-4
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment D

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
WB (south leg)	19	0.16	A	23	0.19	A	26	0.21	A	43	0.17	A	40	0.12	A

[a] Nearest intersection(s) located greater than 300 feet from station entrance.

Notes:

City of Bellevue and City of Redmond standard sidewalk width: 8 feet.

Pedestrians distributed for the Overlake Transit Center were obtained from changes in walk trips between the no-build and build conditions.

TABLE F-5
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment E

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
166th Ave NE/NE 76th St															
NB (east leg)	9	0.08	A	13	0.11	A	14	0.12	A	14	0.01	A	15	0.13	A
SB (west leg)	15	0.13	A	21	0.18	A	24	0.20	A	50	0.24	A	53	0.44	A
EB (north leg)	1	0.01	A	1	0.01	A	2	0.01	A	13	0.10	A	14	0.11	A
WB (south leg)	18	0.15	A	25	0.21	A	28	0.24	A	27	0.02	A	30	0.25	A
164th Ave NE/NE 76th St															
NB (east leg)	4	0.03	A	6	0.05	A	6	0.05	A	37	0.26	A	38	0.32	A
SB (west leg)	7	0.06	A	10	0.08	A	11	0.09	A	12	0.02	A	13	0.11	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	10	0.08	A	10	0.08	A
WB (south leg)	20	0.17	A	28	0.24	A	32	0.26	A	31	0.03	A	35	0.29	A
161st Ave NE/NE 83rd St															
NB (east leg)	10	0.08	A	14	0.12	A	16	0.13	A	15	0.01	A	17	0.14	A
SB (west leg)	10	0.08	A	14	0.12	A	16	0.13	A	20	0.05	A	22	0.18	A
EB (north leg)	10	0.08	A	14	0.12	A	16	0.13	A	20	0.05	A	22	0.18	A
WB (south leg)	10	0.08	A	14	0.12	A	16	0.13	A	15	0.01	A	17	0.14	A
161st Ave NE/NE 85th St															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	2	0.02	A	2	0.02	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	15	0.13	A	15	0.13	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	1	0.01	A	1	0.01	A
WB (south leg)	0	0.00	A	0	0.00	A	0	0.00	A	15	0.13	A	15	0.13	A
164th Ave NE/Redmond Way															
NB (east leg)	9	0.08	A	13	0.11	A	14	0.12	A	33	0.17	A	35	0.29	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	5	0.04	A	5	0.04	A
EB (north leg)	4	0.03	A	6	0.05	A	6	0.05	A	11	0.04	A	11	0.10	A
WB (south leg)	2	0.02	A	3	0.02	A	3	0.03	A	23	0.17	A	24	0.20	A

TABLE F-5
2020 and 2030 PM Peak-Hour Pedestrian LOS – Segment E

Intersection Approach (Crosswalk)	Existing			2020 No-Build			2030 No-Build			2020 Build			2030 Build		
	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS	No. of Pedestrians	Flow Rate (ped/min/ft)	LOS
166th Ave NE/Redmond Way															
NB (east leg)	2	0.02	A	3	0.02	A	3	0.03	A	6	0.03	A	6	0.05	A
SB (west leg)	3	0.03	A	4	0.04	A	5	0.04	A	19	0.13	A	20	0.16	A
EB (north leg)	6	0.05	A	8	0.07	A	9	0.08	A	11	0.03	A	12	0.10	A
WB (south leg)	9	0.08	A	13	0.11	A	14	0.12	A	28	0.13	A	28	0.24	A
176th Ave NE/NE 70th St															
NB (east leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
SB (west leg)	1	0.01	A	1	0.01	A	2	0.01	A	4	0.03	A	5	0.04	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A	0	0.00	A
WB (south leg)	0	0.00	A	0	0.00	A	0	0.00	A	11	0.09	A	11	0.09	A
Redmond Way/NE 70th St															
NB (east leg)	3	0.03	A	4	0.04	A	5	0.04	A	4	0.00	A	5	0.04	A
SB (west leg)	0	0.00	A	0	0.00	A	0	0.00	A	3	0.03	A	3	0.03	A
EB (north leg)	0	0.00	A	0	0.00	A	0	0.00	A	1	0.01	A	1	0.01	A
WB (south leg)	4	0.03	A	6	0.05	A	6	0.05	A	14	0.07	A	14	0.12	A

[a] Nearest intersection(s) location greater than 300 feet from station entrance.

Note: City of Redmond standard sidewalk width: 8 feet.

Appendix G
History of I-90 Agreements and Studies

Interstate 90 Transportation Studies

This appendix summarizes and compares the East Link Environmental Impact Statement (EIS) transportation analysis of the I-90 corridor across Lake Washington with two previous operational studies of HCT in this corridor. Using Interstate 90 (I-90) as the primary corridor for cross-Lake Washington high-capacity transit (HCT) in the Puget Sound region has been identified and evaluated for the last 40 years. The history of this analysis is summarized in Chapter 2 of this Draft EIS and fully documented in the *East Corridor High Capacity Transit Mode History* report (August 2006). Coupled with this was an understanding, dating back to the 1960s, that rail would be the preferred transit service mode between Seattle and Bellevue. The 1976 I-90 Memorandum Agreement (amended in 2004) was one of the first documents that specified that the I-90 reversible center roadway be designed for and permanently committed to future transit use, including the potential to convert all or part of the transit roadway to fixed guideway. In the 1980s, the current Metropolitan Planning Organization (Puget Sound Council of Governments [PSCOG]) conducted various studies that recommended rail service on I-90. In 1996, with voter approval of Sound Move and with the formation of Sound Transit, the Long Range Vision (1996) identified the development of HCT across I-90 with future rail. Concurrently, the Trans-Lake Washington Study (Washington State Department of Transportation [WSDOT] and Sound Transit) analyzed HCT and found rail to be a viable option. Most recently, in July 2005, the Sound Transit Board identified light rail as the preferred mode across I-90 serving the East Corridor, and in July 2008, included the East Link Light Rail Project in the ST2 Program. All of these studies have endorsed an objective of placing fixed guideway transit within I-90's center roadway. Implementation of this objective has included three operational analysis studies:

- I-90 Two-Way Transit and HOV Operations EIS (WSDOT, Sound Transit, Federal Highway Administration [FHWA]) – This study considered five alternatives and confirmed the need for two-way transit/high-occupancy vehicle (HOV) operations across I-90.
- I-90 Center Roadway Study (WSDOT) – This study considered three alternatives and confirmed the utility of the center roadway as an HCT facility with no center roadway access for vehicles.
- East Link Project EIS (Sound Transit) - This study considers three I-90 alternatives and potentially confirms the need for light rail transit in the center roadway linking the Eastside and Seattle.

The I-90 Two Way Transit and HOV Operations Project was conducted in the early 2000s with an adopted EIS in 2002. This study recommended an alternative (Alternative R-8A) to put HOV lanes on both the eastbound and westbound roadways between Mercer Island and Seattle. The next study, I-90 Center Roadway study, completed in 2006, evaluated various Alternative R-8A scenarios and a form of HCT on I-90. Lastly, the East Link EIS evaluates a similar set of scenarios as the I-90 Center Roadway study but with different assumed conditions.

With the quickly changing state of the transportation analysis practice, the evolution and use of analytical models, and shifting background assumptions, many elements in each of these three studies are different (see Table G-1 at the end of this appendix). Not only are the measures of effectiveness different but as a result of changing baseline parameters, results are different. Beginning with the first study, evaluation of the SR 520 bridge replacement was ongoing without any published environmental document and therefore no defined set of improvements were assumed. Since then, the two following studies both assumed some form of a new SR 520 facility. Further demonstrating the complexity in comparing the results from these studies, the I-90 Center Roadway Study did not any assume a form of congestion pricing, while the East Link project includes SR 520 tolling general-purpose vehicles and two-person HOV. This is based on the recent SR 520 Draft EIS, which assumes tolling on SR 520; this tolling has been incorporated into East Link's project assumptions.

Between the Center Roadway Study and the East Link Project, not only are the SR 520 tolling strategies different, but also the assumed use of the I-90 HOV lanes and travel demand modeling approaches are different. The East Link Project assumed that Mercer Island residents would be eligible to use the HOV lanes between Seattle and Mercer Island with light rail in the reversible center roadway due to recent policy decisions by the state. Also while the two studies use the Puget Sound Regional Council travel demand model, the Sound Transit East Link project incorporates the latest PSRC model update available when the analysis began in 2007, and the project's transit usage is derived from the Sound Transit transit ridership model. Review the table (Table G-1) below for a further list of key assumptions and methods between each of these three studies.

References

Sound Transit. 1996. *Regional Transit Long-Range Vision*. Seattle, WA.

Sound Transit. 2006. East Corridor High Capacity Transit Mode Analysis History Report.

Washington State Department of Transportation (WSDOT). 2004. *Amendment to the 1976 I-90 Memorandum Agreement*.

Washington State Department of Transportation (WSDOT) and Sound Transit. 2004. *I-90 Two Way Transit and HOV Operations: Volume I, Final Environmental Impact Statement*. May 21, 2004.

Washington State Department of Transportation (WSDOT). 2006. *I-90 Center Roadway Study.*

TABLE G-1
Comparison of I-90 studies

	I-90 Two Way Transit and HOV Operations Project	Center Roadway Study	East Link Project	Comments
Analysis Parameters				
Demand Model(s)	PSRC, 2001	PSRC, 2005	PSRC, 2006 and Sound Transit Ridership Model	Each study utilized the most recent model versions from the PSRC.
Software Tools	FREQ	VISSIM	VISSIM	
I-90 Study limits	Bellevue Way to I-5 (WB) I-5 to I-405 (EB)	Western terminus to east of I-405	Western terminus to east of I-405	
Analysis Years	2005/2025	2005/2015/2030	2007/2020/2030	
Analysis Periods	AM and PM Peak Hour	AM and PM Peak Periods	AM and PM Peak Periods	
Projects Assumptions				
SR 520	No capacity expansion	6 lane facility	6 lane facility with tolling	
I-405	No capacity expansion	TPA and Nickel Projects	TPA and Nickel Projects	
I-90 HOV Eligibility	2+ persons until 2025 when 3+ persons. Alternative R8A would remain 2+ persons.	2+ persons	2+ persons and Mercer Island residents in Build (light rail) alternative only	For East Link, Mercer Island's HOV lane eligibility is per agreement between WSDOT and Mercer Island.
Key I-90 Operations Measures of Effectiveness				
	- Density/Level of Service - Travel Times - Person Throughput - Duration of Congestion	- Travel Time (by modes) - Vehicle Throughput	- Travel Time (by modes) - Person and Vehicle Throughput and Capacity - Density/Level of Service	As these studies have different purposes, the measures of effectiveness changed. Comparable results are documented below.
Key Results				
2030 Cross Lake I-90 Peak Period (3-hour) Demand	N/A	AM Peak: 33,600 PM Peak: 43,000	AM Peak: 37,300 PM Peak: 44,700	I-90 demand is expected to be slightly higher with the East Link project as it assumes tolling on SR 520. Demand is for the peak morning and afternoon periods and includes SOV, HOV and Truck modes. Demand only compares the Non-Exclusive (Center Roadway) to No Build (East Link) alternatives. Westbound and eastbound demand is combined in these values.

TABLE G-1
Comparison of I-90 studies

	I-90 Two Way Transit and HOV Operations Project	Center Roadway Study	East Link Project	Comments
2030 AM and PM Hour I-90 Vehicle Throughput (across Lake Washington)	N/A	Non-Exclusive: AM Peak: 12,200 PM Peak: 12,900 Exclusive: AM Peak: 11,100 PM Peak: 11,900	No-Build: AM Peak: 14,000 PM Peak: 14,000 Build: AM Peak: 13,900 PM Peak: 12,900	There is about a 10 percent difference in throughput between the two studies. This is attributed to the different HOV lane eligibility and SR 520 tolling. For comparison purposes, the differences between the Non-Exclusive to Exclusive and No-Build to Build conditions in the two studies are similar. This measure only compares vehicles because person throughput was not analyzed for the Center Roadway Study. Based on the East Link analysis, person throughput is higher in both AM and PM peak periods with the Build alternative. Westbound and eastbound throughput is combined in these values.
2030 General-Purpose Travel Times between Seattle and Eastgate (in minutes)	R8A Alternative: AM Peak: 9 / 10 (WB/EB) PM Peak: 12 / 9 (WB/EB)	Non-Exclusive: AM Peak: 35 / 12 (WB/EB) PM Peak: 38 / 10 (WB/EB) Exclusive: AM Peak: 41 / 16 (WB/EB) PM Peak: 38 / 12 (WB/EB)	No-Build: AM Peak: 22 / 25 (WB/EB) PM Peak: 31 / 20 (WB/EB) Build: AM Peak: 23 / 19 (WB/EB) PM Peak: 27/ 15 (WB/EB)	Travel times between the Center Roadway study and East Link vary as assumptions and existing data and software calibration techniques vary. For instance the travel times in the Center Roadway are for only peak hour, while East Link reported travel times over a two-hour period. Another factor contributing to travel time differences are the ends points where the travel times are measured from. The largest difference between the two studies is in the eastbound direction where the study limits in East Link are slightly over 1.75 miles longer than in the Center Roadway Study. Assuming Mercer Island traffic is eligible to use the HOV lane in the East Link project provides some travel time improvements for the general-purpose, but reduces HOV reliability and speed. Travel times for the I-90 Two-Way transit and HOV project are for 2025.

MEMORANDUM AGREEMENT

City of Seattle
City of Mercer Island
City of Bellevue
King County
Metro
Washington State Highway Commission

December, 1976

MEMORANDUM AGREEMENT

WHEREAS, the cities of Seattle, Mercer Island and Bellevue; the Municipality of Metropolitan Seattle (hereinafter "Metro"); and King County by and through their respective councils and the Washington State Highway Commission (hereinafter "the Commission") desire to resolve the disputes which have surrounded the plans to construct an improved Interstate 90 (I-90) facility between Interstate 405 (I-405) and Interstate 5 (I-5); and

WHEREAS, there is a desire to create an environment of cooperation in which agreement is reached among all parties concerned relative to the design of the I-90 facility and related transportation projects; and

WHEREAS, the decisions of the Ninth Circuit Court of Appeals of the United States District Court for the Western District of Washington have required that all alternatives to the proposed highway be studied; and

WHEREAS, all parties hereto state that they have reviewed the proposed highway development and all currently available alternatives to it, including the option of withdrawal and substitution; and

WHEREAS, the I-90 facility from I-405 to I-5, when constructed, must contain all of the social and environmental amenities included in the Commission's previously adopted plans and modifications thereof contained in the Findings and Order of the Board of Review in order to be acceptable to all jurisdictions; and

WHEREAS, the parties believe that construction of the agreed upon I-90 facility will be of definite advantage to all four local jurisdictions because it will provide an excellent transit way between Seattle, Mercer Island and Bellevue; it will eliminate the dangerous three-one reversible lane operation presently employed in that corridor; it will provide improved truck access from the east to Seattle's south industrial/commercial area and port; it will provide improved capacity in the off-peak direction; it will probably provide an improved facility sooner than other approaches; it will provide access to and from I-90 and I-5 south of downtown Seattle eliminating traffic presently going through Beacon Hill residential areas; it will provide many jobs for our citizens during the period of construction; and it will repair the corridor and help knit together the communities now split by U.S. 10 west of the Mount Baker ridge and across Mercer Island; and

WHEREAS, the parties have concluded that withdrawal and substitution is not a desirable option because it would double the local matching monies required and because Mercer Island and Seattle find unacceptable a major highway/transit I-90 facility without extensive environmental amenities which amenities might not be funded under the withdrawal and substitution alternative; and

WHEREAS, it is in the best interest of the citizens of the Puget Sound area and the State of Washington that this segment of I-90 be completed in an expeditious manner; and

WHEREAS, all jurisdictions believe that sufficient public hearings have been held on the project and that no further hearings should be held unless legally required; and

WHEREAS, the parties desire to identify and establish a reasonable assurance of construction of certain priority public transportation facilities which are contained in the 1990 Transportation System Plan for the Central Puget Sound Region and which serve to ensure that I-90 functions as an integral part of the region's transportation system; and

WHEREAS, the parties desire to ensure that these future improvements are consistent with the goals and policies for regional development presently under consideration by the Puget Sound Council of Governments (hereinafter "PSCOG") and the subsequent subregional land use element of the Regional Development Plan for the Central Puget Sound Region;

NOW THEREFORE, in consideration of the mutual and reciprocal benefits accruing to each of the parties hereto, it is hereby agreed as follows:

1. The Cities of Seattle, Mercer Island and Bellevue; King County; Metro and the Commission support the construction of a facility which will accommodate no more than eight motor vehicle lanes which are arranged in the following general manner:

   (a) Three general-purpose motor-vehicle lanes in each direction shall be constructed between the South Bellevue Interchange and I-5. In addition, there will be provision for necessary weaving lanes and possible local access across the East Channel, to be determined in accordance with paragraph 1(e) below.

(b) The facility shall also contain provision for two lanes designed for and permanently committed to transit use. The eastern and western termini for these lanes shall be designed to facilitate uninterrupted transit and carpool access to downtown Seattle and to downtown Bellevue in accordance with paragraph 3 hereinbelow. The design shall be such as to accommodate the operation of the two transit lanes in either a reversible or in a two-way directional mode.

(c) The facility shall be designed in a manner which, as much as practicable, minimizes the width of the roadway and the taking of land.

(d) To the extent practical, the facility shall provide priority by-pass access for local transit to the general purpose motor-vehicle lanes.

(e) The parties agree that the transit lanes shall operate initially in a two-way directional mode, at no less than 45 mph average speed, with the first priority to transit, the second to carpools, and the third to Mercer Island traffic. In the direction of minor flow, the transit lane shall be restricted to busses. The parties further agree that the initial operation of the East Channel bridge shall consist of only three general purpose auto lanes in each direction in addition to the transit lanes. In addition, there will be an acceleration lane from the South Bellevue Interchange which will terminate prior to the exit ramp at the East Mercer Interchange. The subsequent mode of operation of the facility shall be based upon existing needs as determined by the Commission in consultation with the affected jurisdictions, pursuant to paragraph 14 of this agreement. That determination will consider efficient transit flow, equitable access for Mercer Island and Bellevue traffic, and traffic-related impacts on Seattle.

2. The I-90 facility shall be designed and constructed so that conversion of all or part of the transit roadway to fixed guideway is possible.

3. The parties recognize that the planning, design and construction of efficient access at the eastern terminus and western terminus of this facility will enhance the operation of I-90 as a regional transportation facility. Therefore, the Commission, jointly with Seattle, Mercer Island, Bellevue, King County, and Metro, as their respective interests and responsibilities may dictate, shall immediately upon execution of this agreement undertake the development of the necessary plans and designs for, and shall further proceed, with

the required public hearings and the preparation of the necessary environmental impact statements in order to obtain maximum eligibility for Federal Interstate funding for the construction of the following projects:

(a) Transit access from I-90 to downtown Seattle:

(b) Transit access from I-90 to I-405 and to the Bellevue central business district;

(c) Transit and general-purpose access from I-90 to the King County Stadium area; and

(d) Transit and general-purpose access from I-90 to arterials serving the north Duwamish industrial/commercial area and the Seattle waterfront;

(e) Transit access from I-90 transit lanes to I-5;

For any of the above projects or portions thereof which are not eligible for Federal Interstate funding, the Cities, the County and Metro with full support of the Commission, shall seek any available funding for such projects and shall make reasonable effort to complete the construction thereof prior to the completion of I-90.

4. The parties further agree, except as otherwise provided in this agreement, that the modified design of the facility will preserve and incorporate all of the provisions for community amenities and for reducing adverse environmental impacts as contained in limited access plans adopted by the State Highway Commission for

(a) the segment of I-90 from the West Shore of Mercer Island to the East Channel Bridge and for

(b) the segment from I-5 to the West Shore of Mercer Island (modified by the Findings and Order of the Board of Review dated March 26, 1973, and the Stipulation to Resolve Certain Issues incorporated therein, including but not limited to the provisions for a full lid tying affected Seattle neighborhoods together. The lid shall be constructed to permit park and/or two-story residential or business construction (not industrial uses) to take place on top of the highway between the Mt. Baker tunnel and 23rd Avenue South. Additional loads may be acceptable following specific agreement between the Commission and the City of Seattle. The Commission agrees to fund the landscaping of the lid and the maintenance thereof except as may be agreed to by other parties.

5. The parties agree that the design of the entire facility shall include the following additional features:

(a) a transit station permitting transfer of transit passengers at Empire Way South or 23rd Avenue South as more particularly set forth in the Findings and Order of the Board of Review.

(b) a direct Highway connection for Rainier Valley to and from the east.

(c) the Commission's plan for preserving access between Seattle communities over adjacent local city streets shall include improvements of South Norman Street between 20th Avenue South and 23rd Avenue South to provide access to the Judkins neighborhood, this being done in lieu of the development of South Judkins Street as provided in the Commission's adopted plan as modified by the Findings and Order of the Board of Review.

(d) a continuous park/pedestrian link between Judkins Park and the lid over I-90 west of the Mt. Baker Ridge Tunnel.

6. The Commission agrees to participate jointly with the City of Seattle in an I-90 corridor area planning study for the purpose of designing alternative means of redeveloping areas adjacent to the I-90 project in Seattle. The extent of such study shall be defined and agreed to by Seattle and the Commission, and to the extent that the study relates to the effects of the I-90 facility in the corridor, it shall be funded by the Commission.

7. At the option of the local jurisdictions to be exercised within a reasonable time, the Commission shall transfer to the appropriate jurisdiction fee title of all state-purchased lands acquired for the I-90 project but which are outside the finally determined right-of-way lines of I-90 to the fullest extent and at the lowest cost legally possible.

8. The parties hereto agree that they will proceed under established legal processes, including regional transportation planning procedures of PSCOG and consistent with the approved Regional Development Plan of PSCOG, to determine those projects which are of highest priority in the Transportation System Plan and the Transportation

Improvement Program as the Plan and Program apply to the King County subregion. The parties hereby agree that projects (a) through (g) listed below are of highest priority and shall so indicate in the process of establishing the King County Subregional Transportation Improvement Program, the Regional 1990 Transportation System Plan, and Metro's Comprehensive Public Transportation Plan. The Commission and Metro shall work with the local jurisdictions in undertaking location and design studies for these projects at the earliest possible date commensurate with state, regional, metropolitan and local planning and priority programming practices. Projects to be considered through these processes shall include, but not be limited to, the following regional components of PSCOG 1990 Transportation Plan:

(a) Transit/carpool lanes and/or Surveilance Control and Driver Information Systems (SC&DI) on I-5 from I-405 at Tukwila to the King County Snohomish County line:

(b) The park-and-ride lots and flyer stops contained in the approved 1980 Plan as may be modified by Metro:

(c) Provision for a busway or exclusive transit/carpool lane(s) as a part of the SR 99 and SR 509 corridor including a crossing of the First Avenue South Bridge, consistent with Metro's transition planning for this corridor;

(d) Provision for a busway or exclusive transit/carpool lane(s) and/or SC&DI as a part of SR 520 from I-5 to I-405;

(e) Redesign, in a manner acceptable to the City of Seattle, of the lanes where SR 520 meets I-5 and at the Mercer Street egress from I-5 in order to improve transit flow and reduce the congestion on I-5 between Mercer Street and Roanoke Street;

(f) Provision for a busway or exclusive transit/carpool lane(s) and/or SC&DI as a part of I-405 from Bothell to Renton

(g) Provision for exclusive transit lane(s) on I-405 through Bellevue which shall also include provision for a freeway flyer stop and a park-and-ride facility on I-405 between Main Street and N.E. 8th in Bellevue and provision for I-405 access improvements to the Bellevue central business district as determined by the Joint State Legislative/Highway Commission and City of Bellevue I-405 Access Study.

9. The parties agree that the I-90 facility should be operated in such a manner as to encourage growth and development in the presently urbanized areas of King County rather than in undeveloped areas. Therefore, the Commission shall conduct a study in coordination with the parties to this agreement to determine the feasibility and means of metering and controlling local access to I-90 east of Bellevue during peak hours.

10. Seattle, Bellevue, Mercer Island, King County and Metro agree that dedicated public transit rights-of-way through downtown Seattle and through downtown Bellevue are compatible with the public transportation plans of this area and are desirable to be implemented in conjunction with the completion of the I-90 facility.

11. Immediately upon the issuance of the environmental impact statement, another review team comprised of representatives chosen by each of the parties to this agreement shall be established to further monitor and advise the Commission on the development of the design and the implementation of the entire I-90 facility and the I-90 transit access provisions listed in paragraph 3 above. In addition, review teams including elected officials and citizens from Seattle, Bellevue, Mercer Island and King County may be established to further monitor and advise the Commission upon the implementation and design of the I-90 facility.

12. Upon execution of this agreement, the Commission becomes responsible for the design and construction of the facilities described in this agreement that can be funded with federal interstate funds as well as any other facilities referred to in this agreement for which the Commission, by law, has the sole responsibility; and the several parties to this agreement become responsible for the design and construction of the remaining facilities referred to in this agreement; provided that all such undertakings are subject to available funding and legal and procedural requirements. Seattle,

Bellevue, Mercer Island, King County and the Commission agree to process any permits required for construction of the agreed upon facilities in a timely and expeditious manner, as provided by law.

13. It is expressly understood that agreement to the above by the Commission is tentative pending review of (1) the final environmental impact statement to be filed in connection with the project and (2) the hearing record being prepared in connection with the corridor-design hearing held in January and February 1976. It is also understood that the parties have reached this agreement under the assumption and on the condition that the funding for the project, in accordance with the modified design of said project as referred to in paragraphs 1, 2 and 4 and those eligible portions under paragraph 3 which will qualify for Federal Aid Interstate monies, is approved prior to the initiation of construction and shall be funded from federal and state funds, except as agreed to by the affected jurisdiction(s).

14. This agreement represents substantial accommodations by the parties of positions held heretofore. Such accommodations were made in order to achieve a unanimous agreement upon which to proceed with the design and construction of I-90 and related projects. This agreement, therefore, sets forth the express intent of the existing governing bodies that the parties to this agreement understand that their respective governing bodies are limited in the degree to which they can bind their successors with respect to the exercise of govern-

mental powers vested in those governing bodies by law. Accordingly, the Commission will take no action which would result in a major change in either the operation or the capacity of the I-90 facility without prior consultation with and involvement of the other parties to this agreement, with the intent that concurrence of the parties be a prerequisite to Commission action to the greatest extent possible under law.

Dated this 21st day of December, 1976

COUNTY OF KING

By: [signature]

CITY OF SEATTLE

By: [signature]

MUNICIPALITY OF METROPOLITAN SEATTLE

By: [signature]

CITY OF MERCER ISLAND

By: [signature]

WASHINGTON STATE HIGHWAY COMMISSION

By: [signature]

CITY OF BELLEVUE

By: M. F. [signature]

AMENDMENT To The I-90
MEMORANDUM AGREEMENT

AUGUST, 2004

Central Puget Sound Regional Transit Authority
City of Bellevue
City of Mercer Island
City of Seattle
King County
Washington State Transportation Commission

August 2004
Amendment to 1976 Memorandum Agreement

WHEREAS, the Cities of Seattle, Mercer Island, and Bellevue; King County; by and through their respective governing bodies and the Washington State Transportation Commission (hereinafter "the Commission") desire to amend the existing Memorandum Agreement (the Agreement) signed by all parties in 1976 to reflect current and future conditions and demands along the Interstate 90 (I-90) corridor between Bellevue and Seattle crossing Lake Washington via Mercer Island (the "I-90 Corridor"), including increased travel growth, changes in travel patterns, and a reduction in transit reliability; and

WHEREAS, there is a desire among the parties and Sound Transit to add Sound Transit as the Regional Transit Authority with responsibility for High Capacity Transit as a signatory to this 2004 Amendment, but not to the underlying 1976 Agreement, given its role in the region generally and the I-90 Corridor specifically; and

WHEREAS, all parties recognize the I-90 facility as a key interstate corridor connecting the East and West Coasts, Eastern and Western Washington, and recognize its importance as a critical link between major urban centers in King County, and the only means of mobility to and from Mercer Island; and

WHEREAS, all parties acknowledge I-90 as a critical transportation link vital to the economy of the region and the state by providing for the movement of people and goods within the region; and

WHEREAS, all parties agree that the current configuration and operation of I-90 between Bellevue, Mercer Island, and Seattle does not address today's demands and expected growth in the region; and a new configuration that helps move more people and goods is imperative to manage congestion on what is the busiest east-west corridor in the region; and

WHEREAS, all parties recognize the importance of the environment and thereby seek to preserve and enhance its quality; and

WHEREAS, all parties agree that the ultimate configuration for I-90 between Bellevue, Mercer Island, and Seattle should be defined as High Capacity Transit in the center roadway and HOV lanes in the outer roadways; and further agree that High Capacity Transit for this purpose is defined as a transit system operating in dedicated right-of-way such as light rail, monorail, or a substantially equivalent system; and

WHEREAS, all parties agree to work cooperatively to secure funding at local, regional, state, and federal levels to fully fund both parts of the ultimate configuration of the "I-90 Corridor" (HOV lanes on the outer roadway and High Capacity Transit in the center roadway); and

WHEREAS, all parties have studied many alternatives as participants on the Steering Committee for Sound Transit and the Washington State Department of Transportation's (WSDOT) I-90 Two-Way Transit and HOV Operations Project (Project), and all parties agree that building HOV lanes on the outer roadways as identified as Alternative R-8A as set forth in the April 25, 2003 Draft Environmental Impact Statement (DEIS) prepared for the project, is an essential first step toward achieving the ultimate configuration; and

WHEREAS, all parties acknowledge that the ultimate configuration is consistent with the region's transportation action plan, Destination 2030, which focuses on integrated multi-modal transportation systems; describing facilities that weave parts of the region together by crossing county or city boundaries or access major regional activity centers as critical to the region's transportation system; and specifically calls for safety, maintenance, and capacity investments on I-90 between I-5 and I-405; and high capacity transit in the "I-90 Corridor" between Seattle and Bellevue; and

WHEREAS, all parties agree that I-90 is an integral piece of the regional bike network, providing the only bicycle-pedestrian path across Lake Washington; that the preferred alternative maintains a ten foot bicycle lane as part of providing optimal multi-modal travel in the I-90 corridor for cyclists and pedestrians; and

WHEREAS, the Cities of Bellevue, Mercer Island, and Seattle; King County; Sound Transit, and the Washington State Transportation Commission, as participants of the I-90 Steering Committee, having conducted a thorough evaluation of the performance and benefits of the alternatives, agree that Alternative R-8A has been shown to improve regional mobility by providing reliable and safe two-way transit and high occupancy vehicle operations on I-90 between Bellevue, Mercer Island, and Seattle, and mobility for Mercer Island, while minimizing impacts to the environment, to other users, and to other transportation modes; and is an essential first step toward implementing High Capacity Transit in the I-90 corridor;

NOW THEREFORE BE IT RESOLVED, the parties to this 2004 Amendment agree to the following principles regarding future development of the I-90 Corridor between Seattle and Bellevue:

1. Alternative R-8A with High Capacity Transit deployed in the center lanes is the ultimate configuration for I-90 in this segment;
2. Construction of R-8A should occur as soon as possible as a first step to the ultimate configuration;
3. Upon completion of R-8A, move as quickly as possible to construct High Capacity Transit in the center lanes;
4. Commit to the earliest possible conversion of center roadway to two-way High Capacity Transit operation based on outcome of studies and funding approvals.
5. Minimize construction impacts to the existing bicycle/pedestrian path, and maintain safe access to the path during construction;

6. Maintain the existing width of the bicycle/pedestrian path and to install screen treatments to create a safe barrier between the path users and vehicular traffic; and
7. To the extent of any loss of mobility to and from Mercer Island based on the outcome of studies, additional transit facilities and services such as additional bus service, parking available for Mercer Island residents, and other measures shall be identified and satisfactorily addressed by the Commission, in consultation with the affected jurisdictions pursuant to paragraph 14 of the Agreement, prior to the time the center roadway converts to High Capacity Transit.

King County

By: Ron Sims

Its: King County Executive

City of Bellevue

By: Connie Marshall

Its: Mayor

City of Mercer Island

By: [signature]

Its: Mayor

Washington State Transportation Commission

By: [signature]

Its: Chairman

City of Seattle

By: [signature]

Its: Mayor

Central Puget Sound Regional Transit Authority

By: Joan M Earl

Its: Chief Executive Officer

STATE OF WASHINGTON

December 22, 2006

The Honorable Bryan Cairns, Mayor
City of Mercer Island
9611 SE 36th Street
Mercer Island, WA 98040

Dear Mayor Cairns:

Thank you for your letter of November 13 concerning access for single occupancy vehicles from Mercer Island to the HOV lane on I-90 after conversion of the center roadway to high capacity transit.

The Governor's Office and the Washington State Department of Transportation intend to honor our understanding of the agreement reached by the signatories regarding Mercer Island access to HOV lanes. We have concluded that when the center roadway is converted to high capacity transit, Mercer Island residents should be permitted HOV lane access until the HOV lanes are converted to high occupancy toll (HOT) lanes or another tolling regimen. It is important to emphasize that we do not know how long the lanes would operate as HOV lanes, and it is possible that those lanes may be operated as tolled lanes from the time of or even before the conversion of the center roadway occurs.

We would also note that other issues apart from Mercer Island considerations are involved in HOV lane access for Mercer Island. An equitable outcome must take into account the reasonable expectations of all the users of the corridor, including users of transit and other high occupancy vehicles who must be assured that the lane meets performance standards. In addition, the access and mobility opportunities provided for Mercer Island residents include new high capacity transit uses of the corridor as well as the private passenger vehicle uses.

Thank you again for your letter. Please let us know if you have additional questions or concerns.

Sincerely,

Tom Fitzsimmons, Chief of Staff
Office of the Governor

Doug MacDonald, Secretary
Washington State Department of Transportation